Behaviour Research and Therapy 83 (2016) 11–18

Contents lists available at ScienceDirect

Behaviour Research and Therapy

journal homepage: www.elsevier.com/locate/brat

Shorter communication

Positive extreme responding after cognitive therapy for depression: Correlates and potential mechanisms

Nicholas R. Forand [a, *], Daniel R. Strunk [b], Robert J. DeRubeis [c]

[a] The Ohio State University Wexner Medical Center, Department of Psychiatry and Behavioral Health, 1670 Upham Drive, Columbus, OH 43210, United States
[b] The Ohio State University, Department of Psychology, 1835 Neil Avenue, Columbus, OH 43210, United States
[c] University of Pennsylvania, Department of Psychology, 3720 Walnut Street, Solomon Lab Bldg, Philadelphia, PA 19104-624, United States

ARTICLE INFO

Article history:
Received 18 November 2015
Received in revised form
6 April 2016
Accepted 17 May 2016
Available online 19 May 2016

Keywords:
Depression
Extreme responding
Cognitive therapy
Relapse

ABSTRACT

"Extreme responding" is the tendency to endorse extreme responses on self-report measures (e.g., 1s and 7s on a 7-point scale). It has been linked to depressive relapse after cognitive therapy (CT), but the mechanisms are unknown. Moreover, findings of positive extreme responding (PER) predicting depressive relapse do not support the original hypothesis of "extreme" negative thinking leading to extreme negative emotional reactions. We assessed the relationships between post-treatment PER on the Dysfunctional Attitudes Scale (DAS) and Attributional Style Questionnaire (ASQ) and these constructs: coping skills, in-session performance of cognitive therapy skills, age, and estimated IQ. Significant correlates were entered into a model predicting rate of relapse to determine whether these constructs explained the relationship between PER and relapse. The sample consisted of 60 individuals who participated in CT for moderate to severe depression. Results indicated the following relationships: a negative correlation between ASQ PER and IQ, negative correlations between DAS PER and performance of CT skills and planning coping, and a positive correlation between DAS PER and behavioral disengagement coping. IQ scores fully accounted for the relationship between ASQ PER and relapse. These results suggest two potential mechanisms linking PER to relapse: cognitive limitations and coping deficits/cognitive avoidance.

Research on relapse after depression treatment has focused on a style of responding to self-report questionnaires known as "extreme responding" (Beevers, Keitner, Ryan, & Miller, 2003; Teasdale et al., 2001). Individuals with this response style are identified by their tendency to endorse "extreme" end of scale responses (1s and 7s) to cognitive questionnaires such as the Attributional Style Questionnaire (ASQ; Peterson et al., 1982) or Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). This extreme response style has been linked to depressive relapse in at least three studies (Beevers et al., 2003; Forand & DeRubeis, 2014; Teasdale et al., 2001). However, other studies have failed to find evidence for such a relationship, possibly for reasons detailed below (Ching & Dobson, 2010; Jacobs et al., 2010; Peterson et al., 2007).

Extreme responding has been hypothesized to reflect a rigid depressogenic thinking style likened to cognitive biases such as "all or nothing" thinking (Teasdale et al., 2001). However, a close examination of the evidence suggests this account is not wholly satisfactory. In the cognitive model of depression, factors that confer vulnerability to depression are theorized to positively covary with depressive symptoms (Haaga, Dyck, & Ernst, 1991; Kovacs & Beck, 1978). Research on extreme responding has produced findings inconsistent with this prediction. For example, Teasdale et al. (2001) found that individuals with residual depressive symptoms endorsed *fewer* extreme responses than never-depressed individuals. With respect to symptom change, extreme responding on measures such as the ASQ has been found to remain stable from pre to post treatment (Ching & Dobson, 2010; Peterson et al., 2007; Teasdale et al., 2001). In contrast, studies using the DAS tend to find that extreme responding *increases* as symptoms improve (Beevers et al., 2003; Forand & DeRubeis, 2014; Jacobs et al., 2010). This increase in extreme responses is observed even while total scores

* Corresponding author. Northwell Health, Zucker Hillside Hospital, 75-59 263rd St., Glen Oaks, NY 11004, United States.
E-mail addresses: nforand@gmail.com (N.R. Forand), strunk.20@osu.edu (D.R. Strunk), derubeis@psych.upenn.edu (R.J. DeRubeis).

http://dx.doi.org/10.1016/j.brat.2016.05.005
0005-7967/

on the DAS are decreasing (Haaga et al., 1991). These results lead us to wonder if the association of extreme responding and relapse might be due to a process other than an extreme depressogenic style of thinking.

Overall, the research on extreme responding in depression has suffered from several problems, including non-standard operationalization of the construct, a failure to differentiate between an "extreme response style" and legitimate end of scale responses, and an unsubstantiated link between the behavior and its underlying theoretical cause. In our previous paper, we sought to address the first two methodological issues (Forand & DeRubeis, 2014). In the current paper, we seek to investigate correlates of extreme responding to improve our understanding of this construct and its potential causes. Given the uncertain construct validity of extreme responding in the studies we have reviewed, it is important to evaluate the nomological network of extreme responding on the DAS and ASQ. In this paper, we examine the relationships between extreme responding (specifically positive extreme responding [PER]) and several plausibly related constructs, and assess whether any of these related constructs might account for the relationship between extreme responding and risk of relapse following cognitive therapy (CT) for depression.

1. Positive versus negative extreme responding

Perhaps discrepant findings regarding extreme responding on the ASQ and DAS are due to extreme responses on these measures having different underlying causes. The frequency of positive vs. negative extreme responses differs across instruments. PER is defined as extreme agreement with functionally keyed items and extreme disagreement with dysfunctionally keyed items, whereas negative extreme responding is the reverse. On the ASQ, individuals tend provide roughly equal numbers of positive and negative extreme responses (Peterson et al., 2007; Teasdale et al., 2001), whereas respondents to the DAS tend to provide far more positive than negative extreme responses (Beevers et al., 2003; Forand & DeRubeis, 2014; Jacobs et al., 2010). These different patterns of responses could reflect differences in questionnaire design or more fundamental differences in the causal processes at work in determining how one responds to these measures. Both the correlation of extreme responses across measures and the similarity or distinctiveness of the correlates of these measures could be used to evaluate these possibilities.

To the extent that extreme responses are related to different processes, one key concept is the distinction between style and content (Forand & DeRubeis, 2014). Extreme responses might be accounted for either by a general style of responding or by a legitimate endorsement of the item content. "Style" extreme responses are thought to bear little relation to the specific questionnaire item, but rather are automatic, impulsive, and occur without careful consideration of the item content. In contrast, "content" extreme responses are made when respondent deliberately and legitimately endorses extreme agreement or disagreement with this content. Content responses are thought to accurately indicate high levels of dysfunctional attitudes (DAS), very negative attributional style (ASQ), or the opposite extreme (high levels of healthy, functional beliefs).

The style versus content distinction is important for understanding the relationship between extreme responding and relapse, and is the reason to prefer PER as an index of extreme response style. PERs include both content responses (legitimate denials of dysfunction) and style responses (potentially indicating the presence of dysfunction). Whereas the content responses are functional and expected to predict lower risk of relapse, the style responses are thought to be dysfunctional and are expected to predict greater risk of relapse. Whereas content and style PER are expected to be associated with risk of relapse in opposite directions, negative extreme responding of either type would be expected to predict greater relapse risk. In our recent paper, we demonstrated a method that reliably distinguished between style and content PER on the DAS, and found that greater proportions of style responses versus content PER (but not total PER) predicted relapse after CT for depression (Forand & DeRubeis, 2014). Because the relation of PER with risk of relapse (and other constructs) is more informative in determining the role of content vs. style, we focus on PER in this paper.

2. Potential mechanisms of positive extreme responding and links to relapse

Whatever the mechanism underlying extreme responding, that mechanism would be expected to predict greater risk for relapse. Consistent with this, Teasdale et al.s (2001) original hypothesis was that extreme responding was the result of rapid, automatic information processing, rather than a more controlled mode of processing involved in reappraisal. However, as we argued in Forand and DeRubeis (2014), the hypothesized automatic negative emotional reaction to item content would not be expected when one is providing PERs. Both Teasdale et al. (2001) and Forand and DeRubeis (2014) proposed an alternative hypothesis: PER might be a form of cognitive avoidance, or a set of strategies including suppression and thought substitution that are used to manage and minimize distressing cognitions. Such avoidant strategies have been linked to greater vulnerability to depression (Beevers & Meyer, 2004; Bockting et al., 2006). Avoidant individuals might find the content of cognitive questionnaires to be distressing and avoid contemplating them for long enough to determine their actual degree of agreement. As a result, they may "default" to the strongest possible denial of dysfunction.

If cognitive avoidance underlies PER, we would expect PER to correlate with avoidant strategies assessed via coping questionnaires. Insofar as patients rely on these strategies, we would also expect them to be at a disadvantage for acquiring the skills taught in CT, as these skills involve identifying and processing negative emotions and thoughts. Strunk, DeRubeis, Chiu, and Alvarez (2007) found that ratings of patients' use of CT skills predicted protection from relapse. We suspected that a reluctance to fully engage with dysfunctional thinking would be associated with lower ratings of one's use of CT strategies.

Interestingly, there is also evidence that extreme responding is correlated with characteristics unrelated to depression. For example, extreme responding is negatively associated with measures of intelligence and years of education (Greenleaf, 1992; Light, Zax, & Gardiner, 1965; Meisenberg & Williams, 2008). It has also been found to increase with age (Greenleaf, 1992; Meisenberg & Williams, 2008). Others have found evidence that extreme responding, particularly PER, is related to certain simplistic, concrete and rigid thinking styles (Harvey, 1965; Naemi, Beal, & Payne, 2009; White & Harvey, 1965). This set of findings suggests that extreme responding — and particularly PER — might be related to certain cognitive limitations, including lower cognitive abilities, and trait-related or age-related rigidity. Cognitive limitations might interfere with individuals ability to learn and apply CT skills, thus impairing their ability to adapt to novel stressful situations post-treatment. Constructs related to cognitive limitations or ability include age, years of education, and estimated IQ.

3. Purpose of this study

In this study, we explore the correlations between two measures

of PER (derived from the ASQ and the DAS, respectively) and several theoretically related constructs in a sample of patients who participated in CT for depression. We examine correlations between PER and CT skills in three separate domains: behavioral activation, automatic thoughts, and schemas. In addition to CT skills, we also examined self-reported coping styles and indicators of cognitive ability (i.e., age, years of education, and estimated IQ). The secondary purpose of the study is to test whether any constructs that are significantly correlated with PER account for the relationship between PER and risk of relapse. Constructs correlated with PER and accounting for the relationship between PER and relapse are reasonable candidates for mechanisms that lead patients to provide extreme responses and be at increased risk of relapse.

4. Methods

4.1. Participants and treatment

Treatment protocols, sample characteristics, and main outcomes of this research have been reported previously (DeRubeis et al., 2005; Hollon et al., 2005). The sample consisted of 60 individuals randomized to CT (n = 35 CT responders). Inclusion criteria included a diagnosis of major depression and two successive scores of 20 or above the 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) and given 1 week apart. Participants were 58% female and 78% Caucasian, with an average age of 40 (SD = 12). Six therapists provided CT following the guidelines laid out in Beck, Rush, Shaw, and Emery (1979). The CT response rate was 58% (n = 35). The criteria for relapse or recurrence were met if a participant (a) scored a 14 on HRSD for 2 consecutive weeks or (b) met the diagnostic criteria for major depressive disorder for 2 consecutive weeks. Among those who provided data, 25% of participants exhibited a sustained response across the two year follow-up period (Hollon et al., 2005). Of note, this sample of individuals receiving CT is partially overlapping with the sample of CT responders in Forand and DeRubeis (2014) and Strunk et al. (2007), with the difference being our inclusion of CT non-responders in the initial series of analyses (see Data Analysis).

4.2. Measures

4.2.1. COPE (Carver, Scheier, & Weintraub, 1989)

The COPE is a 60-item questionnaire assessing 15 separate types of coping, including strategies classified as "avoidant coping" (e.g., denial, mental disengagement, behavioral disengagement, Lyne & Roger, 2000). The individual COPE scales have shown evidence of acceptable reliability and validity (Carver et al., 1989). Cronbach's αs for the individual scales are listed in Table 1.

4.2.2. The Shipley-Hartford Living Scale (Shipley, 1940)

The Shipley is a self-report screen measuring general cognitive ability. The scale comprises two subscales, a 40-item vocabulary test and a 20-item abstract-thinking test. The author-calculated split-half reliability for the total score is 0.92. The total score of the Shipley was scaled to correspond to IQ scores on the WAIS-R (Zachary, 1986).

4.2.3. Positive extreme responding on the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978)

The DAS form A is a 40-item measure of dysfunctional beliefs related to happiness, perfectionism, and social dependency. Respondents are asked to rate the degree to which they agree with statements on a 7-point scale from *totally agree* to *totally disagree*. The 40-item version of the DAS has acceptable psychometric properties (Oliver & Baumgart, 1985).

In Forand and DeRubeis (2014), we developed the following rating method to discriminate individuals who provide healthy content responses from those with an "extreme response style." We asked 6 Ph.D. level clinical psychologists to provide ratings of "optimal responses" to DAS items, using the following instructions (note that individuals rated "blank" DAS items):

> "Examine the following questions and, using your best judgment, determine what the "best" response would be. The best response is the one you judge would promote optimal individual and interpersonal functioning. In other words, if your patient was completing the DAS, indicate how you would like them to answer".

Raters provided the optimal response for each DAS item using the instrument's 1–7 scale. The intraclass correlation adjusted for 6 raters was 0.81. As expected, several items were rated as having "optimal" responses at less than total agreement or disagreement. For example, the average of the raters' "optimal" score for the item "I should be upset if I make a mistake" was 3.6, suggesting that a positive extreme response (7 = "totally disagree") would "overshoot" the best response. In contrast, the average of raters' optimal response for the item "If I ask a question, it makes me look inferior" was 6.7, suggesting an extreme positive response (7 = "totally disagree") would be reasonable. The first item type is classified as *style-PER* item, meaning that positive extreme responses to this item are more likely to be made by those with an extreme response style. In contrast, the latter item is a *content-PER* item, meaning that we expect "content" and "style" respondents to be equally likely to provide positive extreme responses to this item. Items were classified as *style-PER* if mean "optimal" responses were ≥0.5 points from the end of the scale, otherwise they were classified as *content-PER*. Using this approach, we identified 17 content-PER items and 23 style-PER items.

Due to high correlations between *style-PER* and *content-PER*, we used Essex, Klein, Cho and Kraemer's (2003) technique to separate the shared and unique variance of these variables: (1) content-PER and style-PER were standardized; (2) the shared term, *total positive extremity*, was created by averaging these scores and (3) the unshared term, *style vs. content*, was created by taking the half-difference score. These terms, equivalent to the first and second principle components, are completely uncorrelated. High scores on *total positive extremity* represent greater levels of both content-PER and style-PER. Positive scores on *style vs. content* (DAS PER S/C) represent relatively higher levels of style-PER; negative scores represent relatively higher levels of content-PER.

4.2.4. PER on the Attributional Style Questionnaire (ASQ; Peterson et al., 1982)

The ASQ is a measure of depressotypic attributional style, in which respondents rate the degree negative and positive events are attributable to external/internal, unstable/stable, and specific/global causes on 7-point scales. The method described above to separate content vs. style responses was not applied to PER on the ASQ. When we subjected ASQ items to a similar rating exercise, all extreme positive responses were judged to be suboptimal, thus it is unclear whether any specific response is more likely, on balance, to be due to an extreme response style. Therefore, PER on the ASQ (ASQ PER) was calculated in the manner of previous studies, by summing instances of extreme internal, stable, and global attributions for positive events, and extreme external, unstable, and specific attributions to negative events.

Table 1
Means, standards deviations, and correlations with PER variables.

Variable	Mean (median)	SD (range)	Corr[a] with ASQ PER	Corr with DAS S/C
ASQ PER (n = 49)	(1)	(1–24)	–	−0.17
DAS style vs. content (n = 52)	0	0.92	−0.17	–
Age (n = 60)	40.30	11.51	−0.17	−0.03
Years of education (n = 60)	14.57	2.49	−0.20	0.20
Shipley IQ[b] (n = 53)	109.49	11.49	−0.39**	0.09
PCTS total[c] (n = 57)	0	0.87	0.09	−0.22
PCTS – behavior activation	0	1	0.15	−0.20
PCTS – automatic thoughts	0	1	0.22	−0.36**
PCTS – schemas	0	1	−0.13	0.03
COPE scales				
Active coping (0.72)	10.37	2.46	0.10	−0.25‡
Acceptance (0.96)	9.87	2.68	−0.07	−0.18
Behavioral disengagement (0.59)	6.93	2.07	0.00	0.35*
Denial (0.79)	5.06	1.82	−0.01	0.12
Venting emotions (0.87)	9.84	3.31	0.05	0.11
Humor (0.96)	7.83	3.51	−0.05	0.15
Mental disengagement (0.50)	8.87	2.38	0.04	0.12
Positive reinterpretation & growth (0.84)	10.29	2.82	0.22	−0.21
Planning (0.84)	10.98	2.49	0.20	−0.28*
Religious coping (0.96)	9.14	2.34	0.14	−0.09
Restraint (0.78)	9.38	4.36	0.17	−0.22
Suppression of competing activities (0.60)	8.40	2.07	0.15	−0.07
Use of emotional social support (0.87)	9.37	3.34	0.25	−0.07
Use of instrumental social support (0.84)	10.31	2.75	0.22	−0.03
Substance use (0.96)	4.85	2.12	−0.23	0.25‡

Note. ‡ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, DAS = Dysfunctional Attitudes Scale, ASQ = Attributional Style Questionnaire, alphas for COPE scales included in parentheses ( ).
[a] Spearman correlations.
[b] n = 46 for ASQ PER, n = 48 for DAS Style vs. Content.
[c] n = 47 for ASQ PER, n = 50 for DAS Style vs. Content.

4.2.5. Performance of CT Strategies (PCTS)

Raters reviewed recordings of CT sessions (Week 12, week 14 and final) to assess the patients' performance of CT skills in three domains: behavioral activation, automatic thoughts, and schemas. Performance was judged by patients in-session use of skills, their reports of use out of the session, and stated intentions to continue using the skills. Four raters read *Cognitive Therapy of Depression* (Beck et al., 1979) and completed approximately 70 h of training. Two raters coded the recordings of each patient and raters were blind to treatment outcome and relapse. Audio recordings were used when videos were not available. The subscale scores were standardized and averaged to create a total PCTS score. The ICCs adjusted for 2 raters for the PCTS behavioral activation, automatic thoughts, and schemas subscales were 0.74, 0.78, and 0.83, respectively. The ICC for the overall PCTS score was 0.87. Strunk et al. (2007) report in detail on the development of the PCTS, and the same ratings utilized for that study were used in the current study

4.3. Data analysis

Age, years of education, and estimated IQ were ascertained at intake. The PCTS scores reflected behavior rated up to the final CT session, and the COPE, ASQ and DAS were administered at post-treatment. The first step in the analytic plan was to examine bivariate correlations between ASQ PER, and DAS PER S/C, and each of these two variables with putatively related constructs. This procedure was intended to identify candidate constructs for further analysis. Although a large number of tests were conducted (22 per PER variable), the primary aim of the study is exploratory and the overall cost of a false positive (Type 1 error) was judged to be low. Therefore no family-wise error rate correction was applied. To further explore potential mechanisms underlying the behavior of extreme responding, we also chose to examine the correlations between PER and the constitute items of any of the COPE scales that reached significance in the initial set of tests.

At the next step, all significant correlates of PER (at the level of scales) were entered into multivariable regressions as predictors of PER. Separate regressions were conducted for ASQ PER and DAS PER S/C. Variables that remained significant predictors of PER at this step were then considered as possible confounders of the relationship between PER and relapse/recurrence. PER variables and putatively related constructs were entered into Cox regressions (Cox & Oakes, 1984) as predictors of relapse or recurrence during the two year post-treatment period, controlling for study site. Observations were censored following either the last time at which the patient provided follow-up data or at the time the patient was understood to have begun treatment outside the study protocol. The presence of a confounder was determined by the criteria outlined in Hosmer, Lemeshow, and May (2008) for Cox regression models. In this procedure, we applied the formula $100^*(\beta_1 - \beta_2)/\beta_2$, where β_1 is the coefficient of the PER variable in the single predictor model, and β_2 is coefficient in the model that includes the potential confounder (Hosmer et al., 2008). Variables are considered as potential confounders if the percent change of the beta exceeds 15%. A confounding relationship between a putatively related construct and PER suggests that the relationship between PER and depressive relapse is at least partially explained by the construct. All analyses were performed using SAS Version 9.4 (SAS Institute, Cary, NC).

5. Results

Descriptive statistics for all variables are provided in Table 1. Note that *ns* for each of these analyses differ based on rates of missing data as listed in the footnotes of the table. Spearman correlations between ASQ PER, DAS PER S/C, and putatively related constructs are also listed in Table 1. Of note, ASQ PER and DAS PER S/C were weakly negatively correlated, providing evidence that these

metrics might index distinct processes. ASQ PER was negatively associated with IQ ($r = -0.39$, $p < 0.01$). A scatterplot of this relationship for treatment responders, indexed by follow-up status (relapsed/recurred vs. survived) can be seen in Fig. 1. Of note are the four outliers that show both lower IQ and very high levels of PER on the ASQ, all of whom relapsed early in the follow-up period. As this was the only significant association with ASQ PER, we did not examine multiple predictors of the ASQ PER. We next examined correlates of DAS PER S/C, which was calculated such that higher scores indicated more style PER, relative to content PER. DAS PER S/C was associated negatively with PCTS-Automatic thoughts ($r = -0.36$, $p <. 01$) and COPE Planning ($r = -0.28$, $p < 0.05$), both of which are meant to be fostered in CT, and associated positively with COPE Behavioral Disengagement ($r = 0.35$, $p < 0.05$), which is discouraged in CT. Two other COPE scales were associated with DAS PER S/C at the level of a trend (Active Coping (−) and Substance Use (+)).

5.1. Multivariable prediction of PER

DAS PER S/C was normally distributed and therefore was entered as a dependent variable into a standard regression model along with PCTS-Automatic thoughts, and COPE Planning and COPE Behavioral Disengagement as predictors. Results showed that only PCTS-Automatic thoughts ($b = -0.44$, $t = -3.19$, $p < 0.01$) remained a significant predictor of DAS PER S/C.

5.2. Prediction of relapse or recurrence

In separate models, each of the two PER variables predicted relapse/recurrence: DAS PER S/C $\chi^2 = 4.477$, $p < 0.05$, HR: 2.54 [95% CI: 1.16–6.41]; ASQ-PER $\chi^2 = 5.554$, $p < 0.05$, HR: 1.13 [95% CI: 1.01–1.26]. Significant predictors of the PER variables were entered into independent Cox regressions predicting relapse/recurrence with their respective PER variable. For the models containing ASQ PER, IQ emerged as a confounder ($100^*(\beta_1 - \beta_2)/\beta_2 = 133\%$), and was nearly significant as a protective factor against relapse/recurrence ($\chi^2 = 3.094$, $p = 0.08$) in the model that included ASQ PER, whereas ASQ PER was no longer significant in this model ($\chi^2 = 0.561$, $p = 0.45$). In the model that included DAS PER S/C and PCTS-Automatic thoughts, PCTS-Automatic thoughts did not meet confounder criterion, nor was it a significant predictor of relapse/recurrence ($p = 0.39$).

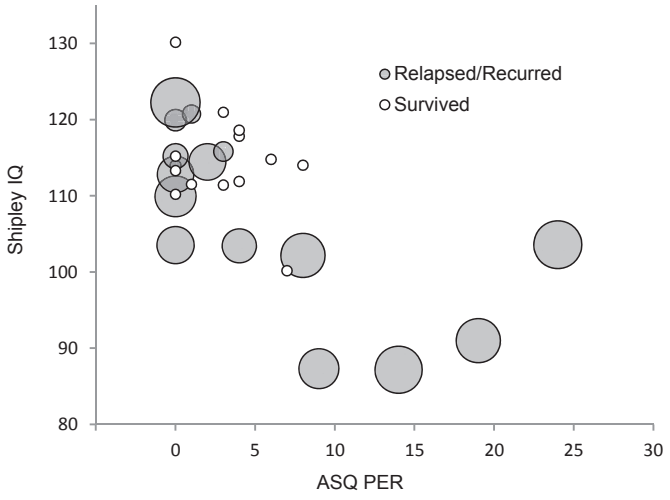

Fig. 1. Scatterplot of ASQ PER by IQ, indexed by Patient Follow-up Status. *Note.* ASQ = Attributional Style Questionnaire. This figure displays the relation between estimated IQ and ASQ PER for CT responders (N = 30; 2 individuals were excluded due to missing data and 3 individuals were excluded because they were censored during the follow-up period). Circle fill indicates status over the follow-up period. For individuals who relapsed/recurred, circle size indicates time to the event, with larger circles representing shorter time to the event. As can be seen, there are four outliers in the lower right indicating low IQ and high PER, with all four of them experiencing a relapse early during the follow-up period (after 6.25, 2, 3.75, and 1.5 months, from left to right).

5.3. Exploration of COPE items

To more fully explore the potential mechanisms underlying extreme responding, we examined the correlations between DAS PER S/C and the items that make up the COPE Planning and Behavioral Disengagement scales. Results can be seen in Table 2. For COPE Planning, three of the four items showed significant negative correlations with DAS PER S/C, with the fourth, "I make a plan of action," showing no relationship ($r = 0.00$). The Behavioral Disengagement scale achieved a low estimate of internal consistency ($\alpha = 0.59$), suggesting that some parts of this scale are likely to be more highly related to DAS PER S/C than others. The results bore this out. The items, "I admit to myself that I can't deal with it and quit trying," and "I act as though it hasn't even happened" were significantly positively correlated with DAS PER S/C, whereas two others were moderately but non-significantly correlated.

6. Discussion

In conducting empirical tests of a hypothesized vulnerability process, it is important to establish convergent validity with other markers of vulnerability. This is particularly the case for the vulnerability reflected by extreme responding, as multiple conceptualizations of extreme responding have been proposed. An understanding of the nomological network of extreme responding is needed to advance our understanding of the processes that give rise to these types of responses. To our knowledge, this is the first study in the depression literature to test a relationship between PER and variables that potentially inform our understanding of this process. Our findings suggest that extreme responding has multiple determinants, one of which (viz., IQ) may have a relationship with relapse independent of its relationship with PER.

6.1. PER on the ASQ

We observed a relation between ASQ PER and a measure of IQ, such that higher levels of ASQ PER were associated with lower IQ estimates. Moreover, the ability to predict relapse/recurrence from the ASQ PER was accounted for entirely by IQ.

Studies in the non-clinical literature have observed similar correlations between IQ and extreme responding (Greenleaf, 1992; Light et al., 1965; Meisenberg & Williams, 2008). Others have linked "simplistic thinking" to extreme responding among individuals who complete questionnaires quickly (Naemi et al., 2009). These authors conjectured that individuals with this type of thinking might find making fine distinctions among gradations of endorsement on Likert-type scale difficult and thus prefer simpler dichotomous responses. As applied to the measures used in the present study, such individuals would be expected to find the deliberation over whether the cause of an event is, for example, "due to others" at the level of a 5 or a 6 on the ASQ to be difficult. They then may default to the most extreme response as a means of reducing the ambiguity associated with the middle responses. Indeed, the ASQ might be particularly prone to this problem. In our experience, many research participants find the ASQ to be a "difficult" measure, perhaps because it has a relatively complex procedure – first generating causes for events and then rating features of those

Table 2
Correlations between DAS PER S/C and COPE items.

Variable	Correlation with DAS PER S/C[a]
COPE planning	
I make a plan of action.	0.00
I try to come up with a strategy about what to do.	−0.28*
I think about how I might best handle the problem.	−0.31*
I think hard about what steps to take.	−0.35*
COPE Behavioral disengagement	
I admit to myself that I can't deal with it, and quit trying.	0.29*
I just give up trying to reach my goal.	0.21
I give up the attempt to get what I want.	0.24
I act as though it hasn't even happened.	0.34*

Note. *p < 0.05, ns range from 49 to 52, DAS = Dysfunctional attitudes scale.
[a] Spearman correlations.

causes – that provides ample opportunity for ambiguities to arise.

To our knowledge, this the first study to suggest a link between intelligence and symptom return after CT, albeit at the level of a non-significant trend. Previous researchers have found conflicting evidence about the influence of intelligence on acute CT outcome. Some have found no relationship (Haaga, DeRubeis, Stewart, & Beck, 1991), whereas others have found that IQ is positively associated with outcome (Fournier et al., 2009). It stands to reason that intelligence might be protective in that those with higher IQ might be better able to apply learned skills flexibly when they cope with novel problems. Considering that many skills taught in CT involve engaging with ambiguous and subjective cognitions, the relationship between intelligence, CT skills, and relapse is an area deserving of further study. Such individuals might require alternative and perhaps more concrete relapse prevention strategies.

6.2. PER on the DAS

The relationships observed between DAS PER S/C and putatively related constructs were different than those observed on the ASQ, perhaps because these indices tap different underlying processes, as indicated also by the weak negative correlation between the two PER measures. Individuals who tended to provide more style responses scored lower on CT skills related to identifying and restructuring automatic thoughts. PCTS-Automatic thoughts did not emerge as a confounder of the relationship between Style vs. Content and relapse/recurrence, indicating that these constructs are related, yet patients performance of CT relating to automatic thoughts did not explain the relationship between PER and relapse or recurrence. Indeed, it is notable that DAS Style/Content PER was not associated with the total score on the skills measure, which Strunk et al. (2007) found to be a strong predictor of relapse. Rather, only the automatic thought subscale, and not the behavioral activation or schemas subscale, was related to DAS PER S/C.[1] This result is consistent with our hypothesis that DAS PER S/C might represent a kind of cognitive avoidance, in that individuals with this style are likely to avoid, deny, or suppress automatic and emotionally charged negative cognitions, and thus might be reluctant to engage with cognitions during or outside of a CT session.

It is unclear, however, why the schemas subscale was not related to DAS PER S/C, as it too would presumably involve engaging with painful cognitions. It may also be that the constructs reflected in the automatic thoughts versus schema ratings differ in important ways. The automatic thought ratings focus largely on one's ability to re-evaluate automatic thoughts in the moment. Schema skills, on the other hand, involve the ability to recognize the themes of beliefs that underlie one's automatic thoughts as well as articulate factors that may have contributed to the development and maintenance of one's core beliefs. So, it could be that schema skills involve an awareness of one's own thinking patterns that is somewhat removed from moment to moment engagement with dysfunctional automatic thoughts and accompanying negative affect. Individuals with high levels of PER might be more likely to avoid the latter.

Although they did not reach significance in the multiple predictor regression, individuals scoring high on Style vs. Content also had higher scores on behavioral disengagement coping and lower scores on planning. Behavioral disengagement coping includes giving up or reducing effort when tasks or goals become difficult, whereas planning coping refers to strategizing, planning, and effortful goal directed cognition. An item-level analysis further highlights the potential role of cognitive avoidance. The planning items negatively correlated with DAS PER S/C each feature a phrase denoting cognitive effort, i.e., "I try to come up with …" "I think about …", and "I think hard …", whereas the uncorrelated item has relatively neutral phrasing regarding cognitive effort: "I make a plan of action." The wordings of these items suggest that individuals high in DAS PER S/C endorse low levels of intentional and effortful cognitive activity in the face of stress. Furthermore, the behavioral disengagement items that were uncorrelated with DAS PER S/C each include the phrase "I give up," which may denote a conscious and perhaps deliberate decision to stop engaging in goal directed behavior. On the other hand, the significantly correlated items suggest a more passive and avoidant approach, i.e., "I act as though it hasn't even happened." Although we cannot draw firm conclusions from item-level correlations, when taken together, these results suggest individuals with high scores on DAS PER S/C tend to have a number of coping deficits related to effortful cognitive engagement in goal-oriented tasks. This pattern appears consistent with our proposal that these individuals are reluctant to engage in sustained focus on difficult or painful cognitive material, and would rather disengage or avoid it when possible.

Cognitive avoidance therefore meets criteria for a plausible construct underlying some kinds of PER. While completing the DAS, individuals who employ this strategy are unlikely to contemplate their own dysfunctional attitudes carefully, and may be motivated to provide the strongest possible denial of dysfunction. During CT, they may thus be less willing to engage with the emotionally painful and difficult work of identifying and evaluating negative automatic thoughts. Although their poorer acquisition of skills for managing automatic thoughts did not account for PER's relationship with relapse, it appears to be part of a larger tendency towards

[1] PCTS total score predicted relapse over one year after CT in Strunk et al. (2007). The current analysis uses two years of follow-up, however, total score is a nearly significant predictor of relapse and recurrence in the expected direction ($p = 0.06$), and remains so when DAS PER S/C is entered into the analyses ($p = 0.09$), suggesting that overall performance of CT skills is independent of PER.

avoidance that might lead individuals ill-prepared to manage stress be at a greater risk for mood pathology in the future.

6.3. Variation in PER by questionnaire

In this study we observed distinct patterns of correlations emerging from the two separate measures of PER. As this study was only intended as a preliminary investigation of PER, we can only speculate as to why PER on the ASQ was correlated with different constructs than PER on the DAS. As reviewed previously, patterns of extreme responding on these two instruments differ considerably, including the distribution of positive to negative extreme responses and changes in the tendency to engage in extreme responding over the course of treatment (Beevers et al., 2003; Ching & Dobson, 2010; Forand & DeRubeis, 2014; Jacobs et al., 2010; T. J.; Peterson et al., 2007; Teasdale et al., 2001). It is known that the structure of questionnaires, including the wording of the items, the type of questions asked, and even the response scales used can affect how individuals respond (Schwarz, 2008). It could be that the specific demands or structure of the ASQ are such that it is more prone to extreme responding by individuals who find it difficult to complete. In contrast, the procedure on the DAS is relatively straightforward, but it asks individuals to rate their agreement with uncomfortable or distressing beliefs, which may trigger avoidance responses in a way that the ASQ does not.

It also is likely that our methods of scoring extreme responding affected the patterns of correlations that were observed. The ASQ PER variable was a simple count of PER, which has been criticized as a method for calculating an extreme responding index (Greenleaf, 1992; Hamilton, 1968). Correlations between this count and scores on scales that have Likert-type scales for rating agreement might be inflated if these scales are also vulnerable to PER. A positive correlation might only indicate a general tendency to provide PER.[2] The Style vs. Content score, however, is based on ratings of reasonable responses to the DAS, and accounts for the relative proportion of so-called style responses versus (potentially reasonable) content responses given. Those who score high tend to provide relatively more style responses than average, whereas those who score low tend to provide relatively more content responses. Correlations between rating scales and this index should be less problematic than such count based measures.

6.4. Implications and future directions

Although preliminary, we hope our findings begin to shed light on why previous findings concerning extreme responding have been inconsistent with predictions made by the cognitive model. If extreme responding can be the product of two or more distinct sources, some of which are associated with depressive symptoms and some of which are not, the relationship between depression and extreme responding will not be simple. For example, we might predict that PER related to characteristics such as IQ would remain relatively stable across the course of treatment, and thus extreme responding scores might not change. Unfortunately, due to the pattern of missing data from pre to post-treatment (several likely positive extreme responders on the post-treatment ASQ had missing ASQ's at intake) we were unable to test this hypothesis in the current dataset. Furthermore, the identification of possible underlying causes of PER might lead to a better understanding of risk factors for depressive relapse, and could lead to modifications of treatment procedures that might better address these specific vulnerabilities. Indeed, if such relationships can be reliably established it may be desirable to shift research attention away from extreme responding – which can be challenging to operationalize and interpret – and toward the underlying causal factors. Therefore, future research should focus on replicating and extending these findings in larger samples. Such research might attempt to identify profiles of extreme responders who are characterized by different combinations of features. This work might draw on modeling approaches such as latent profile modeling (e.g., Herman, Ostrander, Walkup, Silva, & March 2007), which can identify classes of individuals based on covariance patterns across multiple continuous indicators. Further research of this type will help us understand this promising but as of yet poorly understood predictor of depression vulnerability.

6.5. Limitations

In addition to the limitation of our scoring procedures, limitations of the current study include the relatively small sample, which limited our power to detect relationships among our variables. We also conducted multiple tests without correction to the significance level, which increases the chance of Type 1 error. Also, because these data were not collected to test associations with extreme responding, we were limited with respect to the potential covariates available. For example, we had no direct means of measuring cognitive avoidance. Finally, we examined extreme responding variables at the end of acute treatment, so our findings may not reflect what variables would correlate with change in the PER. We selected end of treatment PER scores to examine in contrast with change for two reasons: 1) it is consistent with how extreme responding has been measured in previous studies (Forand & DeRubeis, 2014; Teasdale et al., 2001) and 2) patterns of change are divergent between instruments, which would have complicated these analyses. Analysis of change in extreme responding should be examined in future work.

6.6. Conclusions

In this study, we identified several correlations with PER and other putatively related constructs, several of which had been observed previously, or proposed in the literature. We anticipate the results of this paper will be a starting point for future explorations of this potentially important vulnerability factor.

Conflict of interest

No authors have relevant conflicts of interest to disclose.

Acknowledgements

The data presented in this article come from a clinical trial conducted between 1998 and 2003. The findings described have not been published elsewhere; however, subsets of the findings were presented at the 2014 Convention of the European Association for Behavioral and Cognitive Therapies, The Hague, Netherlands. This research was supported by National Institute of Mental Health Grants MH55877 (R10), MH55875 (R10), MH01697 (K02), and MH01741 (K24). No authors have relevant conflicts of interest to disclose.

We thank our colleagues for making this research possible. Paula R. Young and Margaret L. Lovett served as the two study coordinators. Steven D. Hollon, Robert J. DeRubeis, Cory P. Newman, Karl N. Jannasch, Frances Shusman, and Sandra Seidel served as the cognitive therapists. Aaron T. Beck, Judith Beck, Christine Johnson,

[2] Of note, the self-report scale employed in this study, the COPE, does not use a Likert-type rating of agreement but rather a frequency rating of engagement in coping behavior.

and Leslie Sokol provided consultation on the implementation of cognitive therapy. Madeline M. Gladis and Kirsten L. Haman oversaw the training of the clinical interviewers. David Appelbaum, Laurel L. Brown, Richard C. Carson, Barrie Franklin, Nana A. Landenberger, Jessica Londa-Jacobs, Julie L. Pickholtz, Pamela Fawcett-Pressman, Sabine Schmid, Ellen D. Stoddard, Michael Suminski, and Dorothy Tucker served as the clinical interviewers. Joyce L. Bell, Brent B. Freeman, Cara C. Grugan, Nathaniel R. Herr, Mary B. Hooper, Miriam Hundert, Veni Linos, and Tynya Patton provided research support.

References

Beck, A. T., Rush, A. J., Shaw, B. T., & Emery, G. (1979). *Cognitive therapy of depression*. Guilford Press.

Beevers, C. G., Keitner, G. I., Ryan, C. E., & Miller, I. W. (2003). Cognitive predictors of symptom return following depression treatment. *Journal of Abnormal Psychology, 112*(3), 488–496.

Beevers, C. G., & Meyer, B. (2004). Thought suppression and depression risk. *Cognition and Emotion, 18*(6), 859–867. http://dx.doi.org/10.1080/02699930341000220.

Bockting, C. L. H., Spinhoven, P., Koeter, M. W. J., Wouters, L. F., Visser, I., & Schene, A. H. (2006). Differential predictors of response to preventive cognitive therapy in recurrent depression: a 2-Year prospective study. *Psychotherapy and Psychosomatics, 75*(4), 229–236. http://dx.doi.org/10.1159/000092893.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267–283. http://dx.doi.org/10.1037/0022-3514.56.2.267.

Ching, L. E., & Dobson, K. S. (2010). An investigation of extreme responding as a mediator of cognitive therapy for depression. *Behaviour Research and Therapy, 48*(4), 266–274. http://dx.doi.org/10.1016/j.brat.2009.12.007.

Cox, D. R., & Oakes, D. (1984). *Analysis of survival data*. CRC Press.

DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., … Gallop, R. (2005). Cognitive therapy vs medications in the treatment of moderate to severe depression. *Archives of General Psychiatry, 62*(4), 409–416. http://dx.doi.org/10.1001/archpsyc.62.4.409.

Essex, M. J., Klein, M. H., Cho, E., & Kraemer, H. C. (2003). Exposure to maternal depression and marital conflict: gender differences in children's later mental health symptoms. *Journal of the American Academy of Child and Adolescent Psychiatry, 42*(6), 728–737. http://dx.doi.org/10.1097/01.CHI.0000046849.56865.1D.

Forand, N. R., & DeRubeis, R. J. (2014). Extreme response style and symptom return after depression treatment: the role of positive extreme responding. *Journal of Consulting and Clinical Psychology, 82*(3), 500–509. http://dx.doi.org/10.1037/a0035755.

Fournier, J. C., DeRubeis, R. J., Shelton, R. C., Hollon, S. D., Amsterdam, J. D., & Gallop, R. (2009). Prediction of response to medication and cognitive therapy in the treatment of moderate to severe depression. *Journal of Consulting and Clinical Psychology, 77*(4), 775–787. http://dx.doi.org/10.1037/a0015401.

Greenleaf, E. A. (1992). Measuring extreme response style. *Public Opinion Quarterly, 56*(3), 328–351. http://dx.doi.org/10.1086/269326.

Haaga, D. A., DeRubeis, R. J., Stewart, B. L., & Beck, A. T. (1991). Relationship of intelligence with cognitive therapy outcome. *Behaviour Research and Therapy, 29*(3), 277–281.

Haaga, D. A., Dyck, M. J., & Ernst, D. (1991). Empirical status of cognitive theory of depression. *Psychological Bulletin, 110*(2), 215–236. http://dx.doi.org/10.1037/0033-2909.110.2.215.

Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, 23*, 56–61. http://dx.doi.org/10.1136/jnnp.23.1.56.

Hamilton, D. L. (1968). Personality characteristics associated with extreme response style. *Psychological Bulletin, 69*(3), 192–203. http://dx.doi.org/10.1037/h0025606.

Harvey, O. J. (1965). Some situational and cognitive determinants of dissonance resolution. *Journal of Personality and Social Psychology, 1*(4), 349–355. http://dx.doi.org/10.1037/h0021873.

Herman, K. C., Ostrander, R., Walkup, J. T., Silva, S. G., & March, J. S. (2007). Empirically derived subtypes of adolescent depression: latent profile analysis of co-occurring symptoms in the Treatment for Adolescents with Depression Study (TADS). *Journal of Consulting and Clinical Psychology, 75*(5), 716–728. http://dx.doi.org/10.1037/0022-006X.75.5.716.

Hollon, S. D., Jarrett, R. B., Nierenberg, A. A., Thase, M. E., Trivedi, M., & Rush, A. J. (2005). Psychotherapy and medication in the treatment of adult and geriatric depression: which monotherapy or combined treatment? *The Journal of Clinical Psychiatry, 66*(4), 455–468.

Hosmer, D. W., Lemeshow, S., & May, S. (2008). *Applied survival Analysis: Regression modeling of time to event data* (2nd ed.). Hoboken, NJ: Wiley.

Jacobs, R. H., Reinecke, M. A., Gollan, J. K., Jordan, N., Silva, S. G., & March, J. S. (2010). Extreme thinking in clinically depressed adolescents: results from the treatment for Adolescents with depression study (TADS). *Behaviour Research and Therapy, 48*(11), 1155–1159. http://dx.doi.org/10.1016/j.brat.2010.08.001.

Kovacs, M., & Beck, A. T. (1978). Maladaptive cognitive structures in depression. *The American Journal of Psychiatry, 135*(5), 525–533.

Light, C. S., Zax, M., & Gardiner, D. H. (1965). Relationship of age, sex, and intelligence level to extreme response style. *Journal of Personality and Social Psychology, 2*(6), 907–909. http://dx.doi.org/10.1037/h0022746.

Lyne, K., & Roger, D. (2000). A psychometric re-assessment of the COPE questionnaire. *Personality and Individual Differences, 29*(2), 321–335. http://dx.doi.org/10.1016/S0191-8869(99)00196-8.

Meisenberg, G., & Williams, A. (2008). Are acquiescent and extreme response styles related to low intelligence and education? *Personality and Individual Differences, 44*(7), 1539–1550. http://dx.doi.org/10.1016/j.paid.2008.01.010.

Naemi, B. D., Beal, D. J., & Payne, S. C. (2009). Personality predictors of extreme response style. *Journal of Personality, 77*(1), 261–286. http://dx.doi.org/10.1111/j.1467-6494.2008.00545.x.

Oliver, J. M., & Baumgart, E. P. (1985). The Dysfunctional Attitude Scale: psychometric properties and relation to depression in an unselected adult population. *Cognitive Therapy and Research, 9*(2), 161–167. http://dx.doi.org/10.1007/BF01204847.

Peterson, T. J., Feldman, G., Harley, R., Fresco, D. M., Graves, L., Holmes, A., … Segal, Z. V. (2007). Extreme response style in recurrent and chronically depressed patients: change with antidepressant administration and stability during continuation treatment. *Journal of Consulting and Clinical Psychology, 75*(1), 145–153. http://dx.doi.org/10.1037/0022-006X.75.1.145.

Peterson, C., Semmel, A., Baeyer, C., Abramson, L. Y., Metalsky, G. I., & Seligman, M. E. P. (1982). The attributional style questionnaire. *Cognitive Therapy and Research, 6*(3), 287–300. http://dx.doi.org/10.1007/BF01173577.

Schwarz, N. (2008). Self-reports: how the questions shape the answers. In R. H. Fazio, & R. E. Petty (Eds.), *Attitudes: Their structure, function, and consequences* (pp. 49–67). New York, NY, US: Psychology Press.

Shipley, W. C. (1940). A self-administering scale for measuring intellectual impairment and deterioration. *Journal of Psychology: Interdisciplinary and Applied, 9*, 371–377. http://dx.doi.org/10.1080/00223980.1940.9917704.

Strunk, D. R., DeRubeis, R. J., Chiu, A. W., & Alvarez, J. (2007). Patients' competence in and performance of cognitive therapy skills: relation to the reduction of relapse risk following treatment for depression. *Journal of Consulting and Clinical Psychology, 75*(4), 523–530. http://dx.doi.org/10.1037/0022-006X.75.4.523.

Teasdale, J. D., Scott, J., Moore, R. G., Hayhurst, H., Pope, M., & Paykel, E. S. (2001). How does cognitive therapy prevent relapse in residual depression? Evidence from a controlled trial. *Journal of Consulting and Clinical Psychology, 69*(3), 347–357. http://dx.doi.org/10.1037/0022-006X.69.3.347.

Weissman, A. N., & Beck, A. T. (1978). Development and validation of the dysfunctional attitude scale: a preliminary investigation. In *Paper presented at the 62nd Annual meeting of the American educational research association, Toronto, Ontario, Canada*.

White, B. J., & Harvey, O. J. (1965). Effects of personality and own stand on judgment and production of statements about a central issue. *Journal of Experimental Social Psychology, 1*(4), 334–347. http://dx.doi.org/10.1016/0022-1031(65)90013-2.

Zachary, R. A. (1986). *Shipley Institute of living scale: Revised manual*. Los Angeles: Western Psychological Services.