Mood priming challenge and psychotherapy: Using experimental methodologies to evaluate theory-driven investigations of vulnerability to- and mechanisms of action in recovery from depression

David M. Fresco
It’s a pleasure to be here with all of you today. Before I begin, I would like to acknowledge my co-authors on this paper, Jeremy Schumm, Keith Dobson of University of Calgary, and Rick Heimberg of Temple University.
Before I launch into a discussion of the studies we have conducted, let me tell you little bit about where we are coming from. Most approaches to the treatment of illness, medical, psychological, or otherwise take the perspective that the goal is the elimination of suffering—a laudable goal to be sure. However, a tacit assumption of all of these approaches, and in turn an expectation that individuals come to have, is that there is some optimal functioning that must be achieved and maintained. Even from a traditional cognitive behavioral perspective, a high premium is placed on being optimistic or not having dysfunctional or pessimistic thoughts. The frequency and intensity of an individual’s negative thought content is an important component in the cessation of suffering.

Flexibility on the other hand, at least in the way that we think about it is not related to the content of one’s thinking. Rather, it is trying to assess the process by which individuals use to confront the various situations that occur in our lives. It places no premium on being Pollyanna and no criticism for being Eeyore. Rather, flexibility is knowing when to be Pollyanna and when to be Eeyore. Flexibility is not automatically seeing it as a bad thing to experience sadness and fear. It is not expecting to be happy all the time. Finally, flexibility is not always finding a reason to be glad.

Explanatory flexibility is an extension of explanatory style, the cognitive content vulnerability factor central to the learned helplessness and hopelessness theories of depression.

A depressogenic or pessimistic Explanatory style is defined as the tendency to see negative events as arising from stable, global, and internal causes. It is scored using a self-report instrument called the Attributional Style Questionnaire or ASQ.

The traditional way to score the ASQ is to calculate the generality index or the average of the stable and global items for these negative events. A large score is characteristic of a depressogenic or pessimistic explanatory style and a small score is regarded as an optimistic explanatory style is the tendency to assign specific, and unstable causes to negative events.

Early on, Helplessness theorists suggested that a goal of cognitive therapy was to change an individual’s explanatory style from pessimistic to optimistic.

However, is an optimistic explanatory style the most adaptive way to approach the actual events that occur in one’s life? Or rather, is a flexible style, one that allows an individual to make use of contextual information and adjust to the situation more adaptive?
To date, we have conducted a series of studies, mostly with college students, indicating that explanatory flexibility demonstrates meaningful relationships to major depression, generalized anxiety disorder, worry, self-report measures of emotion regulation, and is sensitive to a mood priming challenge.

Briefly …. (summarize results).
So, our second study used the mood priming paradigm with a methodology similar to studies by Persons and Miranda as well as Segal and colleagues. The thinking behind this paradigm is that cognitive vulnerabilities to depression exist, but need to be primed by the onset of a negative mood before being activated. The majority of the mood priming studies have examined changes in cognitive content measures, such as the Dysfunctional Attitudes Scale to show that previously depressed, but presently nondysphoric individuals differ from never depressed individuals only after undergoing a mood priming task.

So, the purpose of this study was to see whether explanatory flexibility, a measure of cognitive process would change as a function of a mood priming challenge.

In this study, we screened approximately 700 college students to find participants who were currently nondysphoric, as assessed by the BDI but who varied as to whether they had ever experienced major depression. In this case, history of depression was assessed with the self-report measure, the Inventory to Diagnose Depression-Lifetime version. The final sample consisted of 88 participants, 40 of whom said that they had experienced at least one episode of DSM-III major depression.

Participants who agreed to participate for the study, filled out a BDI upon arrival as well as the Mood and Affect Adjective Checklist, also called the MAACL, the ASQ, and the Dysfunctional Attitudes Scale.

All participants then listened to about 8 minutes of Prokofiev's Russia under the Mongolian Yoke, a piece of music that is already pretty dour, but that was slowed to half speed to make it especially potent. It is the same piece of music used by Segal, Teasdale, and others in their mood priming studies.

Afterwards, participants again completed the MAACL, ASQ, and DAS.

Participants next listened to a piece of music that we believed would be uplifting, in hopes of sending them home in a mood state equivalent to their baseline. They listened to Beethoven’s Symphony No. 5, 4th Movement, and were instructed to think about a recent or important happy event. They finished by completing another MAACL, but not the ASQ or DAS.
Now, the interesting findings. This graph shows explanatory flexibility scores by group prior to- and directly after the sad music priming task.

Previously depressed individuals show a dramatic drop in flexibility scores following a mood priming challenge whereas never depressed individuals do not!

This finding is solidly in the range of a medium effect size according to Cohen.
In this graph, we see changes in explanatory style for negative events prior to- and directly after the negative music priming task.

Here we found no condition by time interaction.

So, it would seem that this sad mood priming task did not make individuals more pessimistic.

Rather, based on the findings from the previous graph, participants with a history of depression got significantly more rigid in their view of negative events.
And quickly, we have replicated and extended the mood priming findings in a sample of 58 students, 21 of whom endorsed DSM-IV criteria for GAD. We have recently essentially replicated the findings in a sample of students whose major depression or GAD status was confirmed with structured interviews. And drops in explanatory flexibility interacted with intervening life events to predict subsequent levels of depression symptoms.
Dismantling study of Cognitive Therapy of Depression

- Our study is a secondary analysis of two previously published studies:

So the research I have summarized so far utilizes a mood priming challenge as an experimental methodology designed to examine potential mechanisms of action associated with vulnerability to depression. However, mood priming represents one experimental methodology.

Similarly, psychotherapy represents another experimental methodology where theoretically predicted changes in hypothesized mechanisms of action can be assessed as a function of treatment response.
Dismantling study of Cognitive Therapy of Depression

Beck, Rush, Shaw, & Emery (1979)

• First manualized treatment for depression
• Proposed session by session interventions
• Beginning with activities designed to address motivational deficits
• Then identification of automatic thoughts
• Followed by identification and challenge of maladaptive core beliefs

• A yoked, randomized clinical trial was conducted to compare theoretical mechanisms of change involved in Beck’s manualized CT for depression.
• I will discuss results from 2 studies examining the relative success of interventions based on various aspects of Beck’s theory.
• First, I will explain the intervention conditions.
• There are 3 treatment conditions. Each condition involved 20 sessions.
  1. Behavioral activation (BA) – In this condition, all sessions exclusively involved the 1st stage of Beck’s manualized treatment. That is, helping clients to reengage naturally occurring reinforcers.
  2. Activation and modification of dysfunctional thoughts (AT) – In this condition, all sessions exclusively focused on the 2nd stage of Beck’s manualized treatment. That is, helping clients to examine and change dysfunctional thoughts.
  3. Entire CT package (CT) – The third condition incorporated components of both the BA & CT condition with the addition of focusing at least 8 sessions upon examining and modifying core beliefs.
Dismantling study of Cognitive Therapy of Depression

Jacobson et al. (1996), Gortner et al. (1998)

• Component analysis examining theoretical mechanisms of change in cognitive therapy for depression

Conditions
1. Behavioral Activation (BA)
2. BA plus modification of automatic thoughts (AT)
3. Entire Beck et al. (1979) package (CT)

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**Dismantling Study: Method**

**Participants**
- 152 patients with DSM-III-R diagnosis of major depressive disorder

**Therapists**
- Experienced in CBT
- Adherence ratings & supervision

**Outcome measures**
- Longitudinal Interval Follow-up Evaluation II (LIFE)
- Hamilton Rating Scale for Depression (HSRD)
- Beck Depression Inventory (BDI)

- 152 individuals meeting DSM-III-R criteria for MDD were recruited & randomly assigned to 1 of the 3 conditions.
- Individuals exhibiting other major Axis I disorders or being treated with psychotropic medications were excluded.
- Therapists were experienced in CBT & averaged 10 years of postgraduate clinical experience.
- To assure adherence to treatment protocol, sessions were audiotaped & rated by lead investigators. In addition, lead investigators provided monthly supervision to review treatment protocol.
- 3 outcome measures were used:
  1. **LIFE** – The Longitudinal Interval Follow-up Evaluation II was used to assess DSM-III-R diagnosis of MDD
  2. **HSRD** – Clinician’s administered the Hamilton Rating Scale for Depression to measure depression severity.
  3. **BDI** – Finally, the Beck Depression Inventory was used as a 2nd self-reported measure of depression severity.
Dismantling Study: Results

- Equivalent post-treatment recovery rates across conditions (62%; Jacobson et al., 1996)
- Equivalent well weeks through 2 years post-treatment (75%; Gortner et al., 1998)

Implications
- CT components equivalent in recovery from- and prevention of MDD
- Do CT components have differential cognitive mechanisms of change?

I will now summarize the impact of the interventions as reported by Jacobson and colleagues and Gortner and colleagues.

First, posttreatment recovery rates from depression were statistically equivalent across interventions, averaging 62% for the entire sample.

The equivalent effects of the interventions were sustained through 2 years posttreatment with clients averaging 75% of the cumulative weeks from posttreatment to 2 years follow-up with minimal to no depressive symptoms.

These results suggest that components of Beck’s CBT treatment for depression are equally efficacious. Further, results imply that the overall CBT package is not superior to its individual subcomponents.

However, the question remains as to whether the different CBT components might produce differential mechanisms of change and whether clients with differing cognitive processing styles might respond differently between components of CBT.
Current Study

• Secondary analysis of 111 participants with complete ASQ data
  – BA ($n = 42$)
  – AT ($n = 28$)
  – CT ($n = 41$)

• Post-treatment ASQ data missing on 41 participants
  – *No differences between ASQ completers and non-completers*
Hypotheses and Design

1. Recovery from MDD with BA associated with increased explanatory flexibility
2. Recovery from MDD with AT associated with decreased explanatory style
3. High post-treatment explanatory flexibility predicts low depression during no-treatment follow-up for BA responders
4. Low post-treatment explanatory style predicts low depression during no-treatment follow-up for AT responders

Note: Comparable findings when using post-treatment explanatory flexibility and explanatory style scores OR residual change in explanatory flexibility and explanatory style
Recovery from Depression

1. Tx. Condition (3: BA, AT, CT) by Response Status (2: Yes/No) MANOVA with explanatory flexibility and explanatory style as dependent measures

2. Follow-up Tx. Condition by Response Status univariate ANOVAs

3. One-way ANOVAs for each Tx. Condition examining explanatory flexibility and explanatory style as dependent measures
Recovery from MDD Findings

MANOVA
• Findings indicated a significant Tx. Condition by Responder Status interaction
  – $F(4, 208) = 3.83, p = .005$, Cohen’s $f = .27$

Univariate ANOVAs
• Explanatory Flexibility $F(2, 105) = 3.49, p = .03$, Cohen’s $f = .26$
• Explanatory Style $F(2, 105) = 2.08, p = .08$, Cohen’s $f = .22$

Note. Cohen’s $f$: Small = .10, Medium = .25, Large = .40
Recovery from MDD Findings

Time 2 Explanatory Flexibility (FLEX) by Condition by Responder Status

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<tr>
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<th>F</th>
<th>df</th>
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<td>BA</td>
<td>1.24</td>
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<td></td>
<td>(0.39)</td>
<td>(0.50)</td>
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<tr>
<td>CT</td>
<td>1.40</td>
<td>1.50</td>
<td>0.47</td>
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<td>(0.53)</td>
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Note. Cohen’s d Small = .20, Medium = .50, Large = .80

• I will
## Recovery from MDD Findings

### Time 2 Explanatory Style (GENBAD) by Condition by Responder Status

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<td>(1.06)</td>
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<td>CT</td>
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<td>(0.66)</td>
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*Note.* Cohen's $d$: Small = .20, Medium = .50, Large = .80

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Analyses

Follow-up Depression
1. Hierarchical linear regression analysis using post-treatment explanatory flexibility, explanatory style, and their interaction to predict number of well weeks in the 2-year follow-up (104 wks maximum)
2. Regression run on all treatment responders without regard to condition first, and then separately by condition
## Follow-up Depression Findings

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<th>pr</th>
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<tr>
<td>FLEX*GENBAD</td>
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<td>-.25</td>
<td>-1.94*</td>
<td>.08</td>
</tr>
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</table>

Note: *p = .057; FLEX = Time 2 Explanatory Flexibility; GENBAD = Time 2 Explanatory Style; Interaction ES corresponds to Cohen’s $\eta^2 = .07$ Cohen’s $\eta^2$ Conventions: Small = .02, Medium = .15, Large = .35

• Talk about regression findings …

• To decompose the interaction we conducted an analysis of partial variance as per Cohen and Cohen were the full model regression equation was solved at different levels of the predictors

• So high explanatory flexibility was represented as 1 SD about the sample mean; low explanatory flexibility was represented by -1 SD below the sample mean

• Likewise high and low explanatory style was represented as +1 and -1 SD of the sample mean respectively
Follow-up Depression Findings

Number of Well Weeks

Overall  BA  AT  CT

Flexible Pessimists
Flexible Optimists
Rigid Pessimists
Rigid Optimists

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Conclusions

Mood Priming
• Leads to drops in explanatory flexibility but not to increases in explanatory style

Cognitive Therapy and its components
• Behavioral Activation responders evidenced increases in explanatory flexibility
• BA plus Automatic Thoughts Challenging responders evidenced drops in explanatory style
• “Flexible Optimism” confers greatest protection against depression relapse
Future Directions

Why is high explanatory flexibility adaptive?
- Associated with behavioral versatility?
- Associated with increased perseverance?
- Both?
- Other things?

What other interventions will promote flexibility?
- Mindfulness?
- Emotional Awareness/Emotional Intelligence?
- ACT & Third Wave Behavior Therapies?