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Poster

# I-Change: A Randomized Controlled Trial of Cognitive Bias Modification-Interpretation as an Augmentation to Partial Hospitalization

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## Abstract

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**Background:** The tendency to resolve ambiguity in a negative manner (ie, interpretation bias) has been implicated in the etiology and maintenance of a range of emotional disorders. Cognitive bias modification computer training tasks targeting interpretation (CBM-I) have successfully improved interpretation bias in anxiety and depression, with subsequent positive effects on symptoms and behavior. CBM-I has great potential for dissemination as it targets a transdiagnostic mechanism, is computerized, can be reliably administered across settings, and does not require clinician contact or patients to apply complicated concepts. However, few studies have tested CBM-I's effectiveness in real-world settings. Moreover, few studies have examined patient experiences with this type of intervention.

**Objective:** The current study tested the effectiveness of CBM-I as an augmentation to a cognitive behavioral therapy (CBT) based partial hospital. We also examined patient acceptability, experience, and perceived mechanisms of action.

**Methods:** Patients (N=62) were randomly assigned to complete a word-sentence association paradigm (WSAP) that reinforced patients ("you are correct!") for making benign interpretations and rejecting negative interpretations of ambiguous scenarios or to a neutral control task. Patients completed the 10-minute task daily while attending the partial hospital (average duration=8 days). The primary outcome measure was the patient-rated Clinical Global Improvement Scale, and treatment response was defined as a rating of "very much improved." We assessed patient experiences with an exit questionnaire completed on discharge day. Three authors independently coded qualitative data and generated a potential coding scheme. We then met and reached a consensus on the final themes.

**Results:** Patients successfully learned the interpretation contingencies in the task (ie, significant increase in benign interpretations and decrease in negative interpretations,  $P<.001$ ). In patients who demonstrated an interpretation bias at baseline, 36% of patients completing CBM-I were classified as responders ("very much improved") compared to 0% in the control,  $\chi^2 = 4.41$ ,  $P<.04$ . There was also a moderate between-group effect size for improvement in well-being ( $d=0.6$ ). Qualitative data revealed that patients believed CBM encouraged them to broaden their interpretations of situations and to question initial reactions. Patients identified the repetitive nature of the task as a crucial aspect of the program, stating that the repetition facilitated their ability to make positive interpretations in everyday life. Patients also appeared to be quite engaged in the task, often verbalizing that they were striving to improve their accuracy and that the task felt like a game. However, a few patients initially expressed concerns that the program was "bogus" and that they disliked being told that their subjective interpretation of a situation was "incorrect."

**Conclusions:** In a subgroup of patients with interpretation bias, CBM-I may be an effective augmentation to psychiatric hospitalization. Patients understood the purpose of the task and felt that it reinforced information learned in other treatment modalities (eg, CBT). This very brief and simple task has the potential to improve outcomes in a high-risk population characterized

by comorbidity, suicidality, and chronic mental health problems. We will present data from the final sample (N=100), including moderators of treatment response.


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**KEYWORDS**

cognitive bias modification; interpretation bias; emotional disorders

This poster was presented at the Connected Health Symposium 2016, October 20-21, Boston, MA, United States. The poster is displayed as an image in [Figure 1](#) and as a PDF in [Multimedia Appendix 1](#).

Figure 1. Poster.



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**I-Change: A Randomized Controlled Trial of Cognitive Bias Modification- Interpretation as an Augmentation to Partial Hospitalization**

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**Background**

Biases in interpretation play a role in the maintenance of a wide range of emotional disorders.

Cognitive Bias Modification computer training tasks targeting interpretation (CBM-I) have successfully changed interpretation bias in anxiety and depression, with positive effects on symptoms and behavior.

CBM-I has great potential for dissemination:

- targets a transdiagnostic mechanism
- computerized
- can be reliably administered across settings
- does not require clinician contact
- does not require patients to apply complicated concepts

CBM-I may also be an ideal adjunctive therapy to CBT as it targets similar cognitive mechanisms.

Few studies have tested CBM-I's efficacy in clinical samples or its effectiveness in real-world settings.

The current study tested the effectiveness of a CBM-I intervention called "I-Change" as an augmentation treatment in a CBT-based partial hospital.

**Methods**

Patients attending the CBT-based Behavioral Health Partial Hospital Program (BHP) at McLean Hospital who endorsed clinically significant depressive symptoms were eligible.

The most common primary diagnosis was Major Depressive Disorder.

**Self-Report Assessments**

- Patient Health Questionnaire (PHQ-9)
- Schwartz Outcome Scale (SOS-10)
- Clinical Global Improvement Scale (CGIS; discharge only)
- Exit Questionnaire (discharge only)

Participants were randomly assigned to complete I-Change or a similar placebo task (both ~10 minutes) daily while attending the partial hospital program (M = 8 days).

**Methods Cont.**

**I-Change**

I-Change is based on the word-sentence association paradigm (WSAP; Beard & Amir, 2009). Participants are reinforced for making benign interpretations and rejecting negative interpretations of ambiguous situations.

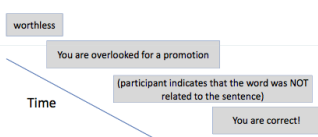


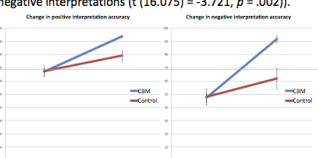
Table 1. Demographic Characteristics for Treatment (n = 46) and Control (n = 19) Groups

Demographic Characteristics	Treatment N (%)	Control N (%)
Female	28 (60.9%)	9 (47.4%)
Age (M, SD)	32 (10.3)	37 (13.3)
Ethnicity		
Non-Latino/a	44 (95.7%)	19 (100%)
White	42 (91.3%)	17 (89.5)
Black & African American	0 (0%)	2 (10.5%)
Asian	4 (8.7%)	0 (0%)
American Indian/Alaskan Native	2 (4.3%)	0 (0%)
Marital Status		
Single	27 (58.7%)	12 (63.2%)
Married/Living with Partner	14 (30.4%)	5 (26.3)
Divorced/Widowed	5 (10.9%)	2 (10.5%)
Highest Level of Education		
At least high school or GED	17 (37.0%)	9 (47.4%)
At least 4-year college	29 (63.0%)	10 (52.6%)

\*Note that patients may endorse multiple races

**Results**

Patients successfully learned the interpretation contingencies in the task (i.e., significant increase in accuracy for benign interpretations (t (14.079) = -3.456, p = .004) and negative interpretations (t (16.075) = -3.721, p = .002)).



**Results Cont.**

In an a priori subgroup of patients who demonstrated an interpretation bias at baseline (accuracy for negative interpretations less than 60%):

- Patients who completed I-Change reported **greater global overall improvement** on the CGIS compared to patients who completed the placebo task (t (35) = 2.632, p = .013).
- A trend indicated that patients who completed I-Change reported **greater improvement in well-being (SOS)** compared to patients completing the placebo task (F (1, 35) = 2.10, p = .156, d = .60).
- There were **no significant differences in overall depression symptom severity** between participants completing I-Change and participants in the placebo task.

**Patient Perceptions of I-Change**

Themes in participant comments:

- Helped slow down thinking and challenge automatic assumptions
- Broadened interpretations of what certain situations mean
- Repetitive aspect of task helped change thinking
- Engaging, fun, and game-like
- Disliked nature of feedback (i.e. "incorrect")
- Would like more variety in stimuli and more neutral words

**Conclusions**

I-Change was feasible and acceptable to deliver to patients in a partial hospital. Patients found the task engaging and understood its purpose.

I-Change successfully engaged interpretation bias and may improve overall treatment response in those patients who exhibit biased interpretation.

We are currently testing a refined version of the task which includes: (1) more variety of stimuli, (2) a score counter, and (3) gradual shift in interpretation from neutral to positive. We are comparing this to a new test-retest control condition, as the placebo task included many active components.

This very brief and simple task has the potential to improve outcomes in a high-risk population characterized by comorbidity, suicidality, and chronic mental health problems.

For more information, contact Courtney Beard, PhD at [cbeard@mclean.harvard.edu](mailto:cbeard@mclean.harvard.edu)

**Multimedia Appendix 1**

Poster.

[\[PDF File \(Adobe PDF File\), 133KB-Multimedia Appendix 1\]](#)

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