

Attentional Networks as Predictors of Treatment Outcome in Adolescents with MDD

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INTRODUCTION

Major Depressive Disorder is a highly prevalent mental illness affecting 350 million people worldwide. Particularly in adolescence, 11% of population experiences depression by the age of 18.

Although various treatment approaches are available for adolescents with MDD, 30 to 50% of patients fail to respond to those interventions (March et al., 2004). Depression is a highly heterogeneous disorder displaying a wide spectrum of different neurobiological patterns and symptomatic expressions. There is some preliminary evidence that neurobiological anomalies evident in depression may be used to aid in treatment selection. Therefore, attempts to identify pre-treatment biomarkers may give clinicians reliable estimates of whether patients will respond to a treatment. Depression is associated with an interrupted interactional network of cortical and limbic regions (Mayberg, 1997). Lessened activity in dorsal frontal regions and ACC is linked with significant deficits in various domains of executive function including attention. Previous studies documented that conflict-monitoring network of attention differentiates depressed and healthy individuals. Depressed patients have significantly reduced performance of conflict. Also, preliminary evidence suggests that there may be broad array of attention problems in depression.

Present study aimed to identify whether conflict detection can be used as a reliable bio-marker for treatment response in adolescents. Neurocognitive tasks are designed to tap into functioning of critical neural networks that may highlight deficits associated with MDD, which may indicate biomarkers relevant to treatment response. This study used Attention Network Task to assess critical aspects of attention (alerting, orienting) and executive control (conflict detection) as markers that were hypothesized to predict treatment outcome in depressed adolescents.

METHOD

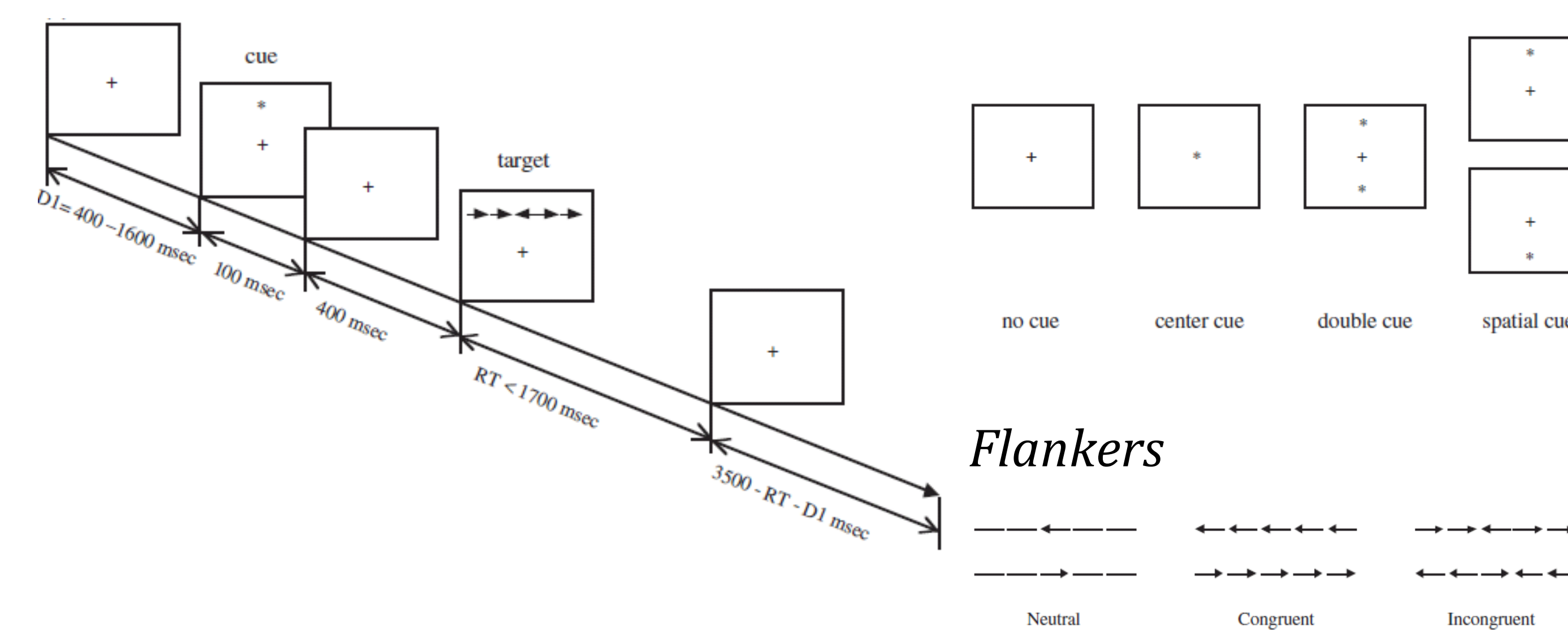
Participants were 15 adolescents diagnosed with MDD with ages ranged from 12 to 20 years. Depression severity of participants was measured by their CDRS-R and BDI scores. All participants started Interpersonal Psychotherapy (IPT) with 12 therapy sessions over the course of 16 weeks. Either four or eight weeks after, improvement

made by therapy was assessed. If a participant made a good progress, he/she continued with the initial therapy plan. On the other hand, if a participant did not improve enough, he/she received either additional therapy sessions or fluoxetine. Treatment response of participants was evaluated after the appointment at the week 16 with their BDI and CDRS-R scores.

Attention Network Task (ANT)

ANT was administered prior to the treatment in order to measure the efficiency of three attentional networks

Procedure



Attentional Networks

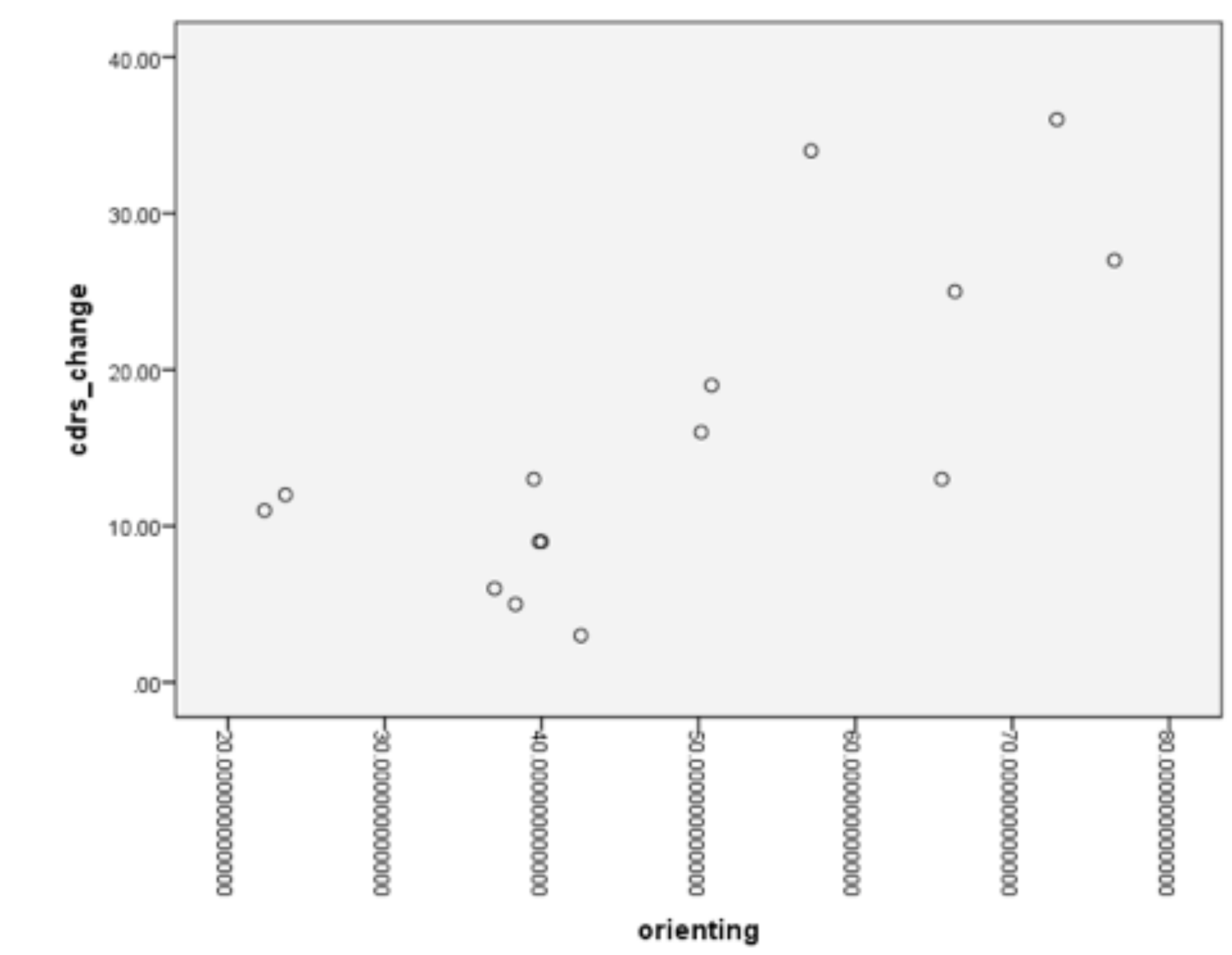
	Function	Flanks	Cues
Alerting	Attains and maintains an alert state	Neutral & Congruent	No Cue - Double Cue
Orienting	Selects information from perceptual input	Neutral & Congruent	Center Cue - Spatial Cue
Conflict	Resolves conflict between multiple response possibilities	Incongruent - Congruent	All cue types

RESULTS

Analyses failed to document a significant relationship between pre-treatment conflict score reaction time and treatment response [$F(1,13) = 2.75, p = .12$]. These results do not support the hypothesis that reaction times of depressed adolescents to a conflicting stimulus might be used to determine whether the patient will remit or not before the onset of treatment.

However, correlational analyses revealed significant results between the change in CDRS score over the treatment and the orienting network of attention [$r = .731, p = .001$]. The results are replicated with the change in BDI scores for orienting [$r = .518, p = 0.24$]. No correlation has been found between the improvement in depression and conflict detection and alerting networks of attention

Correlation between the improvement in CDRS scores and pre-treatment orienting scores.



DISCUSSION

The results did not support the hypothesis that conflict detection can differentiate eventual responders and non-responders of Interpersonal Psychotherapy treatment. However, the orienting network of attention can hold promise for being a potential treatment bio-marker by predicting treatment prognosis with two different depression ratings (CDRS, BDI). Orienting is the ability to select an information from sensory input. It deals with disengaging attention from its current focus, moving to a new location, and engaging at the new target or focus. The reduced orienting performance of individuals who did not respond to treatment might be having problems with disengaging their attention from the obstacles they face and moving on their lives. Orienting can be exerted both voluntarily and reflexively. Thus, IPT might have helped better to individuals who could better disengage their attention from problematic stimulus.

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