Faculty of Science

Executive Function Correlates of Borderline Personality Features in Early Adolescence: A community based study.

Dr Rebekah Helyer
School of Psychology
EXECUTIVE FUNCTION CORRELATES OF BORDERLINE PERSONALITY FEATURES IN EARLY ADOLESCENCE

A Community-Based Study

DR REBEKAH HELYER Clinical Psychologist
SCHOOL OF PSYCHOLOGY

THE UNIVERSITY OF SYDNEY
Extend current research investigating the developmental precipitants of Borderline Personality Disorder (BPD).
Beauchaine et al., 2009

Early inherited biological risk for impulsivity

Genetic susceptibility loci
- MAOA (Xp11.23-11.4)
- COMT (22q11)
- DRD4 (11p15.5)
- DAT1 (5p15.3)
- DRD2 (11q23)
- 5-HTT (17q11.2)

High Risk Environment

Parent
- Coercive attempts at power assertion & control; negative reinforcement of arousal & aggression

Child
- Behavioral reactivity, impulsivity, oppositionality

Repeated invalidation, conflict escalation, negative reinforcement of emotional lability & anger

Inherited impulsivity is met with weak emotion regulation skills

Oppositional defiant disorder, chronic mood dysregulation

Boys
- Exposure to deviant peers, neighborhood violence, criminality, drug use
- Conduct problems; antisocial personality development

Girls
- Exposure to deviant peers, self-injury, relational aggression, drug use
- Conduct problems; borderline personality development

Protective Environment

Parent
- Avoidance of power struggles; calm, firm limit setting; de-escalation of arousal; clear consequences for aggression

Child
- Behavioral reactivity, impulsivity, oppositionality

Repeated validation, conflict de-escalation, positive reinforcement of prosocial behaviors

Inherited impulsivity is met with strong emotion regulation skills

Healthy peer group affiliations

Neighborhood cohesion

Socialized/regulated impulsivity
Cognitive disturbance has always been thought of as a key feature of BPD.

There is consistent evidence of deficits in tasks assessing:

- intellectual ability
- working memory
- delayed recall
- cognitive control
- passive avoidance
- planning and problem solving
- verbal recall
- recognition
THE ATTENTION NETWORK TASK

**Attentional functions**
- Alerting
- Orienting
- Executive control

**Attentional networks**
- Alerting network
- Orienting network
- Executive-control network

**Transmitters and genes**
- Noradrenaline: ADRA2A, NET
- Acetylcholine: CHRNA4, CHRNA7
- Dopamine: COMT, DAT1, DRD4, DBH

*Nature Reviews | Neuroscience*
Executive Function Correlates of BPD

The Attention Network Task
Fan, Bruce, McCandliss, Sommer, Raz, & Posner (2002)

Neuroimaging studies have identified three anatomically distinct networks of attention:

1. **Alerting**: achieving and maintaining a state of high sensitivity to incoming stimuli

2. **Orienting**: the selection of information from sensory input

3. **Executive attention**: involves mechanisms for monitoring and resolving conflict among thoughts, feelings, and responses (i.e. conflict attention network)
EXECUTIVE FUNCTION CORRELATES OF BPD

STUDIES UTILISING THE ATTENTION NETWORK TEST IN ADULTS

› Posner et al. (2002)
Fertuck et al. (2005) - also found that reduced conflict attention efficiency predicted higher levels of BPF, but this effect disappeared once controlling for age.

- Impairment in the orienting attention network predicted greater levels of BPF irrespective of age and medication status.

Table 5. Exploratory forced-entry regression analysis of ANT dimensions in relation to the BPD dimensional score (n = 22) controlling for age

<table>
<thead>
<tr>
<th>ANT</th>
<th>B</th>
<th>SEB</th>
<th>β</th>
<th>pr</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflict</td>
<td>7.41</td>
<td>4.37</td>
<td>0.31</td>
<td>0.19</td>
<td>1.70</td>
<td>0.11</td>
</tr>
<tr>
<td>Orienting</td>
<td>26.26</td>
<td>9.07</td>
<td>0.52</td>
<td>0.56</td>
<td>2.90</td>
<td>0.01</td>
</tr>
<tr>
<td>Alerting</td>
<td>16.05</td>
<td>9.24</td>
<td>0.30</td>
<td>0.39</td>
<td>1.74</td>
<td>0.10</td>
</tr>
</tbody>
</table>

$R^2 = 0.51; \text{pr} = \text{part (or semipartial) correlation coefficient.}$
EXECUTIVE FUNCTION CORRELATES OF BPD

STUDIES UTILISING THE ATTENTION NETWORK TEST IN ADULTS

Lampe et al. (2007)
Controlled for the presence of co-morbid ADHD in adults and did not find the aforementioned deficits in cognitive control for individuals with BPD
Figure 1
*Schematic of the Attention Network Task for Children* (appropriated from Rueda et al, 2004)
EXECUTIVE FUNCTION CORRELATES OF BPD

STUDIES UTILISING THE ANT IN CHILDREN AND ADOLESCENTS

› Rogosch & Cicchetti (2005)
STUDIES UTISING THE ANT IN CHILDREN AND ADOLESCENTS

› Biskin, Paris, Renaud, Raz, & Zelkowitz (2011)
  - Sample of adolescents diagnosed with BPD
  - No differences were found on measures of alerting, orienting or executive attention compared to controls and a group of BPD remitted patients
THE CURRENT STUDY

MAIN AIM

› Examine
  - EF correlates of BPF during early adolescence using a dimensional framework.
THE CURRENT STUDY

PARTICIPANTS

› Two hundred and five, male and female adolescents, aged 11-15.
› The participants were recruited from independent schools in NSW.

MEASURES

› BPF ➔ BPFS-C & CPNI-BP
› EF ➔ ANT-C
› Child Psychopathology ➔ SDQ
BPF ASSOCIATED WITH LESS EFFICIENT FUNCTIONING OF THE ALERTING NETWORK IN FEMALES

Figure 2. Regression lines illustrating the interaction of the Alerting effect and sex in their effects on Borderline Personality Features.
THE CURRENT STUDY

IMPLICATIONS OF THE FINDINGS

› These results are consistent with the hypothesis that poor impulse control and emotional sensitivity are early biological vulnerabilities for BPD.
THE CURRENT STUDY

IMPLIEDATIONS OF FINDINGS

 › Alerting network efficiency may be more strongly related to BPD at early stages of the disorder.
THE CURRENT STUDY

IMPLICATIONS OF THE FINDINGS

› Perhaps adolescent females with BPF like girls with high social inhibition pay too much attention to monitoring potential threats, resulting in fewer attentional resources available to process neutral stimuli.
THE CURRENT STUDY

IMPLICATIONS OF RESULTS

› Less efficient functioning of the alerting network appears directly related to the BPD trait of impulsivity.
RELEVANCE OF THE FINDINGS TO THE LITERATURE

› Conflict attentional network was unrelated to BPF, indicating that it may only be related to more severe forms of psychopathology, representing a later stage of BPD.

› There are more possible reasons for these results.
  - Sample demographics
  - Sample size
  - Measurement
THE CURRENT STUDY

CLINICAL IMPLICATIONS

› The current study provides evidence that ADHD and BPD may represent different manifestations of the same underlying dysfunction.

› This finding suggests a dimensional understanding of attention problems is warranted.

› Early intervention and identification.
THE CURRENT STUDY

STRENGTHS

› The current study is the first to examine the relationship between BPF and EF profile by using a non-clinical sample of both males and females in early adolescence.
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LIMITATIONS

› Self-report measures vs clinician assessment.

› Effect sizes were small albeit significant.
This is the first study to directly implicate the alerting network in the prediction of BPF.

Parietal lobe
These results are consistent with the hypotheses that ADHD and BPD represent different manifestations of the same underlying dysfunction, and add to past research finding unique relationships between EF deficits and borderline pathology.
The inefficiency of the alerting attentional network represents a potential target for early identification and intervention.

frontal lobe
SUMMARY AND CONCLUSIONS

› The validation of the BPFS-C in an Australian sample facilitates exploration of the developmental pathways of BPD.
These findings contribute to our understanding of the nature of the biological precursors and the development of BPD, and thus have potential applications in treatment settings.