

Chronometric explorations of disordered minds

Raymond M. Klein

2003

Introduction:



F.C. Donders

- Mid 19th century: scientists exploring the brain wondered whether there was any hope of objectively exploring the workings of the mind.
- F.C. Donders: a factor of mental processing was susceptible to measurement; the time required for simple mental processes.

Mental chronometry and the measurement of reaction time:

- Posner: a range of chronometric methods (such as the measurement of reaction times) can be used to answer fundamental questions about the mind, particularly relating to 'attention'.
- Three subsystems of attention have been proposed; alerting, orienting and control.

- Michael Posner



Michael Posner

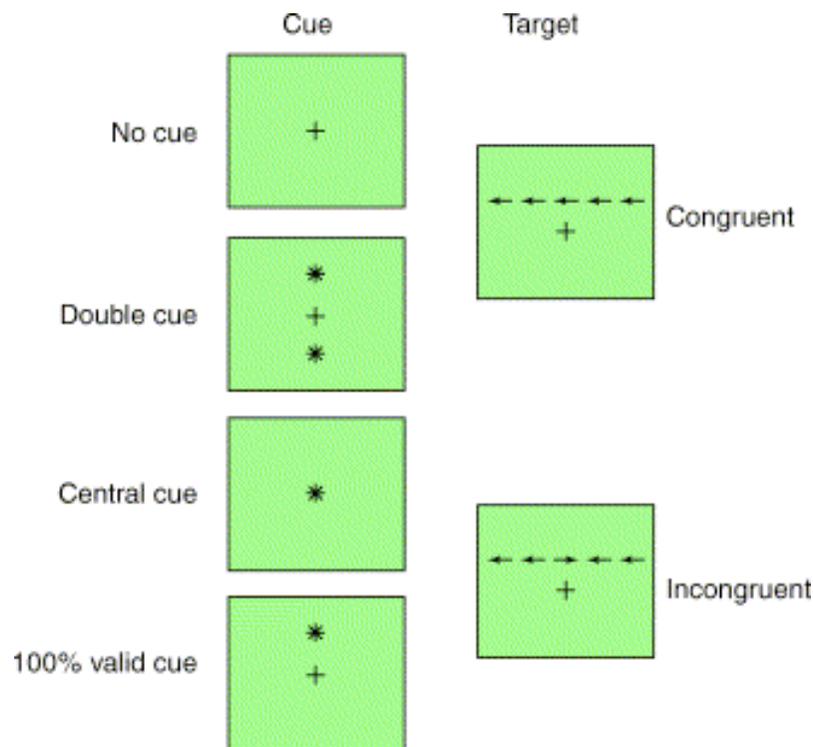
- Converging evidence for this division of attentional labour would be provided by demonstrating that different disturbances of behaviour and thought result when different subsystems fail to operate normally.
- Thus, Posner and his colleagues decided to explore the attentional mechanisms of borderline personality disorder.

Measuring attention in borderline personality disorder:

- Borderline personality disorder affects an estimated 2% of the population (mostly women)
- Its essential feature is instability of: emotion, self-image and of interpersonal relationships.
- Posner et al. hypothesized that BPD individuals might suffer from a deficit in the attentional subsystem related to control but not in those related to alertness or orienting.

Measuring attention in borderline personality disorder:

- Fig. 1. Measuring the components of attention. In the experiment of Posner *et al.* [12] the participants' task was to determine, in various conditions, whether the central stimulus in a string of five is an arrow pointing to the left or the right. The speed of this response (RT) was the dependent variable measured. The target string was presented equally often above (as shown here) or below a central fixation stimulus (+), and was preceded by one of four kinds of warning cue: No cue; Double (the cue, an asterisk, is presented at both target locations); Central (the cue is presented at fixation); and 100% valid (the cue is presented in the peripheral location where the upcoming target will be presented). The following subtractions were used to assess the efficacy of three isolable components of attention:



$$\begin{aligned} \text{Alerting} &= \text{RT (Nocue)} - \text{RT (Doublecue)} \\ \text{Orienting} &= \text{RT (Centralcue)} - \text{RT (Validcue)} \\ \text{Conflictresolution} &= \text{RT (Incongruent)} - \text{RT (Congruent)} \end{aligned}$$

Measuring attention in borderline personality disorder:

Attention assessed using reaction times;

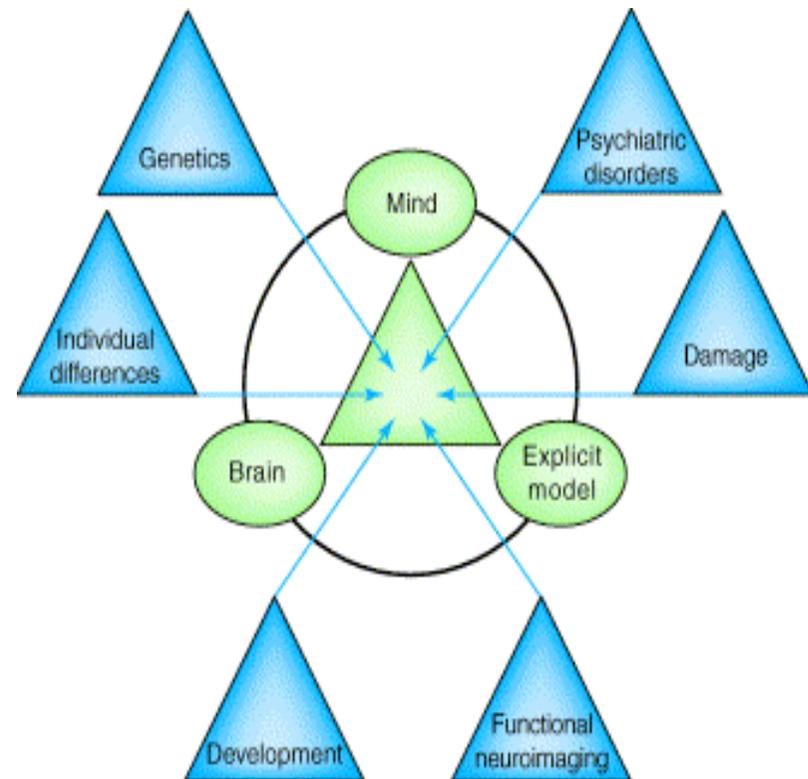
- alerting assessed by degree to which RT was slower in the 'no cue' than in the 'Double cue' condition;
- orienting by the degree to which RT was reduced by foreknowledge of the target's location;
- conflict resolution by the degree to which RT was affected by the congruency of the irrelevant flanking arrows.

Borderline Personality Disorder Patients:

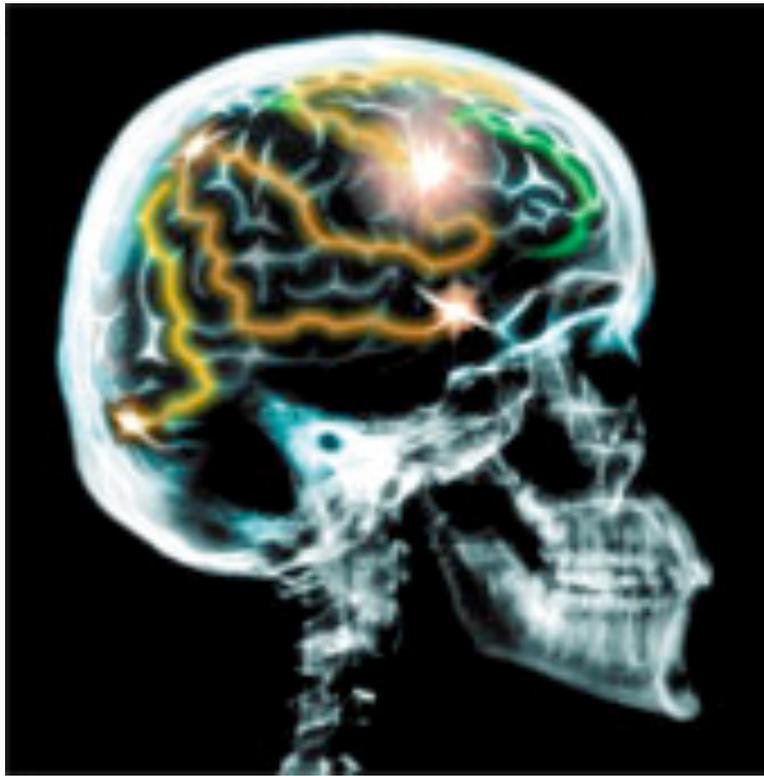
- Patients were worse than controls at ignoring irrelevant distracters yet alertness and orienting scores were in the normal range.
- It seems likely that the deficits BPD patients show when trying to filter out emotionally neutral arrows would be magnified if they were required to filter out stimuli with emotional valence.

A strategy for research linking mind and brain:

- Posner's research strategy uses a diverse sources of evidence to explore the mind-brain interface: neuroimaging, development, genetics, brain damage, psychiatric disorders and individual differences.



A strategy for research linking mind and brain:



- Through such converging evidence and with the development of computationally explicit theories exploration will eventually give way to understanding

Personality: Traits and Disorder

Leslie C. Morey and Mary C. Zanarini

Examination of borderline personality, as diagnosed by the DSM- 1V, in relation to the five factor Model.

Borderline Personality

The latest version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) defines Borderline Personality Disorder (BPD) as 'a pervasive pattern of instability of interpersonal relationships, self-image and affects, as well as marked impulsivity, beginning by early adulthood and present in a variety of contexts'.

Background

- Many studies have examined the relationship between borderline personality disorder and the FFM.
- Clarkin and colleagues in 1993 found that BP group was characterised by very high neuroticism alongside low agreeableness and low conscientiousness.
- However, whilst some features of BPD were associated with the 5 factors others were not, such as liable affect and intense anger.
- Other work has suggested that the BDP diagnosis and the FFM made 'unique contributions' to the prediction of social adjustment.

Aim of current study

Explore implications and nature of the relationship between both representations of BP.

- Examine the relationship between FFM and the categorical model.
- Determine if there is anything in the categorical diagnosis that is not captured by the FFM.

Participants

- 378 inpatients at the Mclean hospital in Belmont, between 18 and 35, of normal or better intelligence, no history or current symptoms of a serious organic condition, schizophrenia or bipolar 1 disorder and had been assigned a definite or probable Axis 2 diagnosis (personality disorder).

Method

- 3 semi-structured diagnostic interviews administered to each patient by an interviewer who was unaware of the patients clinical diagnosis. As part of these interviews patients were assessed for history of self mutilation and suicide attempts and number of such events was recorded.

(The Structured Clinical Interview for *DSM-III-R* Axis I Disorders, the Revised Diagnostic Interview for Borderlines and the Diagnostic Interview for *DSM-III-R* Personality Disorders).

- The variables of the FFM were assessed with the self reported version of the **NEO five factor inventory**. Difficult Childhood experiences rated on the '**Revised childhood experiences questionnaire**'.
- Information about concurrent symptoms associated with BPD assessed by the '**Dissociative Experiences Scale**' and the '**Dysphoric Affect Scale**'.

- Several measures were used for evaluating global outcome at follow up.
- Global Assessment of Functioning Scale is provided as Axis V of the DSM-IV

Psychosocial functioning was assessed with the Background Information Schedule at baseline and the Revised Borderline Follow-up Interview at the 2-year and 4-year follow-ups.

- These analogous instruments are semi-structured interviews that assess both vocational and psychosocial functioning and history of psychiatric treatment

Results

- 378 inpatients interviewed. 290 patients met both DIB-R and DSM-3-revised criteria for BPD. 72 met DSM 3 R criteria for at least 1 non borderline Axis 2 disorder. 16 others were excluded.
- Borderline and control patients were similar in age, marital status and racial background.
- BUT borderline patients were from significantly lower socioeconomic backgrounds and a significantly higher number of borderline patients were female.
- Neuroticism had the largest differentiation between borderline and non-borderline patients, with former scoring nearly a standard deviation above the latter.
- The only other personality factor to achieve significance was conscientiousness> suggests conscientiousness acts as a suppressor variable in combination with neuroticism- where high levels of conscientiousness serve to remove unwanted portion in the neuroticism variable.

So FFM does capture a sizable proportion of the variance associated with a borderline diagnosis- multiple correlation of .46.

What does this residual represent? Essential features of the diagnosis that are missed by the five-factors representation OR is it just error variance?

Results summary

- Diagnosis of BP was related to FFM, especially Neuroticism.
- Certain definitional factors of BPD are not fully captured by the FFM (particularly those in the domain of impulse actions).
- Those diagnostic elements that are independent of the FFM representation of BPD are valid elements of the disorder.

Discussion

- The important aspects of BPD diagnosis that were not fully captured by the FFM representation included aspects within each of the four content sections of the Revised Diagnostic Interview for Borderlines.
- The area least well represented was the section addressing **impulse action patterns** such as substance abuse, sexual deviance, self mutilation and suicidality.

What does this residual represent? Essential features of the diagnosis that are missed by the five-factors representation OR is it just error variance?

- Residual aspects of BPD were correlated with theoretically relevant markers within antecedent, concurrent and predictive domains.
- These results indicated that these residual elements DID seem to represent viable aspects of the disorder.
- Strongest relationships appeared to be with concurrent symptoms but history of childhood abuse and family history of mood and substance use disorders were also found to be related to this residual.

- The BDP residual was only weakly related to a 2 year outcome and an even smaller relationship was found with the 4 year outcome.
- In addressing why this was the case, it has been proposed that one reason could lie in the distinction between a disorder (BPD) and a trait (Neuroticism). Where BPD may represent a disorder that waxes and wanes in severity over time, whereas Neuroticism as a trait is stable.

Conclusion

- The trait (N) could be expected to provide better estimates of outcome (of BPD) over time, whereas manifestations of the disorder could still make meaningful predictions but only within specific sectors.

So the FFM could indicate temperamental vulnerability to a disorder that is then triggered by developmental events, such as childhood abuse or neglect. This then results in functional levels that can be variable in response to situational elements even though underlying traits remain relatively stable.

The Construct of Effortful Control: An Approach to Borderline Personality Disorder Heterogeneity

Simone Hoermann, John F.
Clarkin, James W. Hull, Kenneth
N. Levy

An investigation into the heterogeneity of the DSM-IV borderline personality disorder (BPD) diagnosis as a function of the construct of effortful control

- Effortful control: is related to a specific executive attentional network that allows individuals to deal with conflict among stimulus dimensions
- It is related to conscience development and negatively related to the expression of aggression

Hypothesized that 3 subgroups could be identified based on 3 subscales of
effortful control

- Inhibitory control: The capacity to suppress positively toned impulses and resist inappropriate approach tendencies
- Activation control: The capacity to suppress negatively toned impulses and resist inappropriate avoidance tendencies
- Attentional control: The capacity to intentionally shift and focus attention.

Predictions:

- Low effortful control: Increased hostility, depression and psychoticism
- Low effortful control: More problems in alienation, social potency and social closeness
- High effortful control: fewer problems in these symptom areas
- High effortful control: less difficulties with identity diffusion, primitive defences and reality testing compared to other subgroups.

- Participants: 47 clinically referred individuals who met criteria for DSM-IV BPD
- Effortful control was measured with the Adult Temperament Questionnaire
- This scale has 3 subscales:
 - Inhibitory control
 - Activation control
 - Attentional control

Results:

- Cluster 1 consisted of subjects high in all subscales of effortful control
- Cluster 3 contained subjects low on all scales
- Cluster 2 contained subjects low on attentional control, moderate on inhibitory control and high on activation control
- Significant differences between the 3 scales in anxiety and psychoticism but not in hostility and depression

- High effortful control exhibited low anxiety, psychoticism and alienation and low identity diffusion and primitive defences.
- Second subgroup was high in activation control, but low in inhibitory and attentional control and exhibited low anxiety and medium psychoticism, low ratings of alienation and medium level of identity diffusion and primitive defences, ranging midway between groups 1 and 3
- The third group exhibited low self-ratings of effortful control on all subscales with high anxiety and psychoticism high alienation as well as high self-reported identity diffusion and primitive defences.

Limitations:

- Small sample size
- Lack of control group
- Question of whether effortful control moderates borderline symptoms or whether it reflects a level of current symptom severity
- The use of self-report measures in order to assess effortful control, symptoms, interpersonal functioning and personality

AD/HD and the dopamine receptor gene- Relationship with attention? Swanson et al (2000)

Dopamine is important in processes of attention.

The Dopamine Receptor D4 (DRD4) gene has been linked to performance on attentional tasks.

There has been linkage of DRD4 gene with AD/HD, however several attempts at replication have failed.

The 7-repeat allele of DRD4, suggested to encode for insensitive dopamine receptors, is neither necessary nor sufficient for the expression of AD/HD – but this does not mean it isn't important.

The present study

- Aims to analyse the relationship between the presence of the DRD4 7-repeat allele in AD/HD children and performance on attention tasks.

Hypothesis

- The authors hypothesised that the DRD4 7-repeat allele would code for insensitive dopamine receptors in the frontal lobes – producing under activity in the neural networks involved in executive functions. Thus the AD/HD group with the DRD4 7-repeat allele were expected to show larger abnormalities in attention tasks.

Method

- 96 AD/HD children and 48 controls. 57% of AD/HD participants were usually medicated, however all were un-medicated for at least 24hrs before testing.
- Attention tasks were selected to test the function of 3 brain regions implicated in attentional deficits in AD/HD (anterior cingulate, right dorsolateral prefrontal and posterior parietal cortex – Posner's attentional network).
- 32 of the AD/HD ptps underwent genotyping – 40.6% had at least one 7-repeat allele (7-rep present group); 59.4% did not (7-rep absent group).

Results

- Large group differences across all attention tasks for AD/HD vs. Control groups: the AD/HD group were slower and more variable.
- The 7rep absent vs. present group did not differ in severity of AD/HD symptoms, intellectual ability, academic achievement or medication.
- Contrary to the hypothesis, the 7rep present group did not differ from the controls on any of the attention tasks.
- However, the 7rep absent group performed significantly worse than controls on all attention tasks – they were both slower and more variable.

Slight diversion.....

Temperament

- Temperament is defined as ‘the dynamic organization within the individual of the psychophysical systems that determine his unique adjustment to his environment.’
- Rothbart et al. suggest that both reactivity (responsivity of an individual to their environment) and self-regulation (neural and behavioural processes which modulate reactivity) are important determiners in the maturation of temperament.
- Temperament provides the foundations of personality
- 4 dimensions of temperament have been identified: Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (P).

Temperament and Attention

- Developmental studies suggest that temperament is not sufficient to explain behaviour – for example, fear and inhibitory control are independent (as opposed to positively correlated) – this suggests that another central system might also be involved in the ability to inhibit action – Attentional processes.
- The anterior attentional network includes the anterior cingulate which has links with areas involved in human pain thus allows a linkage between attention and emotion.

Discussion - could AD/HD be viewed as a personality/ temperament construct?

- The results of Swanson et al. suggest that the 7repeat allele may identify a subgroup with the **behavioural** but not the **cognitive** components of AD/HD
- The 7repeat allele may be associated with extreme placement on the dimension of personality (e.g. Extraversion) or dimensions of temperament such as Novelty Seeking or Effortful Processing – an association between NS and DRD4 has been reported previously
- In contrast, the 7repeat-absent subgroup is most likely non-homogenous and composed of individuals with other genetic abnormalities or non-genetic etiologies.
- Rothbart et al. suggest that for children whose reactive inhibition system is not strong, control will be more difficult and other forms of regulation, such as attentional control, appear to be more important. This may relate to the DRD4 7absent subgroup

Conclusions and Questions

- AD/HD is not a unitary disorder.
- There may be a need to more definitely distinguish Attention Deficit from Hyperactivity.
- Consideration should be given to evolutionary history – the distinction of subgroups may be aided by the evaluation of which ‘symptoms’ of AD/HD persist through conferring/having previously conferred adaptive advantage.
- Do we need an integrated model of attention with temperament/ personality? – at what level would attention operate?
- Research is needed to elucidate how much of an influence attention has on personality development.

Attentional mechanisms of borderline personality disorder

Posner, Rothbart, Vizueta, Levy,
Evans, Thomas and Clarkin

2002

Attentional mechanisms of borderline personality disorder

- This paper considers whether disruption of a specific neural circuit related to **self regulation** is an **underlying biological deficit in BPD**.
- BPD patients exhibit poor ability to regulate negative affect; it may be possible that brain mechanisms thought to be involved in self regulation are functioning abnormally.
- **This study compares efficiency of attentional networks in BPD patients with controls.**

Attentional mechanisms of borderline personality disorder

Background

Borderline personality disorder- failure to integrate interpersonal relationships with the self image. Instability of affect and impulsivity.

Prevalence- 0.3-1.8% of population in US
75% engage in self destructive behaviour.

Attentional mechanisms of borderline personality disorder

Hypothesis

BPD patients will be high in negative affect and low in effortful control.

* Negative feelings and poor control of emotion are at the heart of BPD symptoms and are likely to provide the basis for poor interpersonal relations.

* Sense of conscience among children has been related to effortful control and BPD patients have problems with appropriate behaviour in social settings, may therefore be a specific disorder of mechanisms related to effortful control in BPD patients.

Attentional mechanisms of borderline personality disorder

Measurements

Adult temperament questionnaire (ATQ)
assesses negative affect and effortful control.

Attentional network test (ANT)
measures reaction times and evaluates
efficiency in three aspects of attention.

2 Control groups

- 1) Temperamentally matched - similar levels of negative affect and effortful control.
- 2) Average Controls – mean temperament levels.

Attentional mechanisms of borderline personality disorder

Method

Tested 39 BPD patients, 22 temperamentally matched controls and 70 average controls.

Temperament measurement taken using the ATQ.

Procedure – All subjects completed the ANT, evaluates efficiency in 3 aspects of attention:

- 1) Alerting** – warning signal containing no information about where target will occur.
- 2) Orienting** – spatial cue, indicates where the target will be located.
- 3) Conflict resolution** – flankers surround target that are incongruent.

Attentional mechanisms of borderline personality disorder

- Their task was to press the left key if arrow pointed left and right key if arrow pointed right.
- Target arrows were surrounded by flanker arrows that either pointed in the same or the opposite direction to the target.
- One of four cue conditions was presented at the beginning of the trial; no cue, a double cue, a single cue at the location of the target, or a single central cue. This was then followed by a congruent, incongruent or neutral target.

Attentional mechanisms of borderline personality disorder

Results

- No differences between groups in overall RT, error rate or alerting or orientating network scores.
- Found significant effect between groups for conflict network score: BPD patients differed from average controls but not temperamental.
- Differences in age and medication found to be insignificant.
- Significant correlation found between adjusted conflict scores and effortful control measured by the ATQ.
- Effortful control found to be negatively related to reported negative effect.

Attentional mechanisms of borderline personality disorder

Discussion

- **2 important findings about BPD:**
 - 1) specific abnormality in BPD patients in an attentional network involved in conflict resolution and cognitive control.
 - 2) abnormality measured by the ANT is present only in the BPD patients.

Attentional mechanisms of borderline personality disorder

A number of assumptions can be drawn from this research about the etiology of the disorder.

- Temperament plays a role in BPD. It possibly predisposes the individual to develop it.
- Aspects of socialisation may act together with a lack of effortful control to produce the other symptoms of BPD.
- Also, difficulties in socialisation themselves may produce inappropriate development of attentional mechanisms for control of cognition and emotion.
- Provides evidence on anatomy of deficit. Important part of conflict network located in anterior cingulate gyrus. Lesions in this area result in a tendency toward poor interpersonal skills and antisocial behaviour.

Attentional mechanisms of borderline personality disorder

- Development of conflict network occurs between the ages of 2 and 7. Ability to regulate our cognition and emotion corresponds to these ages.
- If abusive event occur in this period (often common in BPD patients), these may influence the developing attentional system.
- High effortful control has been related to high empathy levels, a lack of empathy is likely to be related to the difficulties with interpersonal relations found in BPD.
- Effortful control likely to play a role in the development of conscience, and the link to empathy is consistent with this.
- Likely that temperament characteristics of BPD can predispose them to socialisation difficulties.

Association Between Attentional and Executive Controls in the Expression of BPD Features: A Preliminary Study

Fertuck, Lenzenweger and Clarkin
(2003). *Psychopathology*, 38, 75-81.

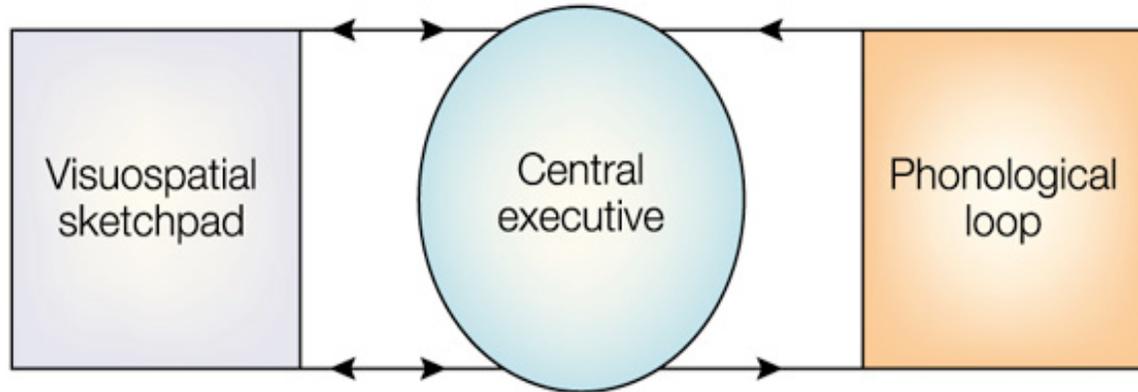
Introduction

- Neurocognitive functions such as executive control and attention potentially provide insight into possible endophenotypes for BPD.
- May improve understanding into the development and expression of BPD.
- Previous work has been reliant on clinical methods , however there has been a recent shift leading to the use of experimental psychopathological methods.

The Study ...

- Association between attentional and executive controls in the presence of BPD.
- Performance scores measuring attention and organisation in those with BPD.

What they were measuring ...



Baddeley, 1986

- Organisation
- Planning
- Determine goals
- Plus attention!!!!

How they measured it ...

- 2 assessments measuring attention and executive control.
 - Attentional Network Task (ANT)
 - Wisconsin Card Sorting Task (WCST)
- Validated by previous research.
 - Posner, Rothbart, Vizueta, Levey, Evans *et al.* (2002)
 - Strauss, Hunter & Wada (1993)

The ANT

- Assesses 3 independent attentional functions:
 - Alert cognitive state
 - Orienting (identification & selection)
 - Conflict – deciding among competing categories

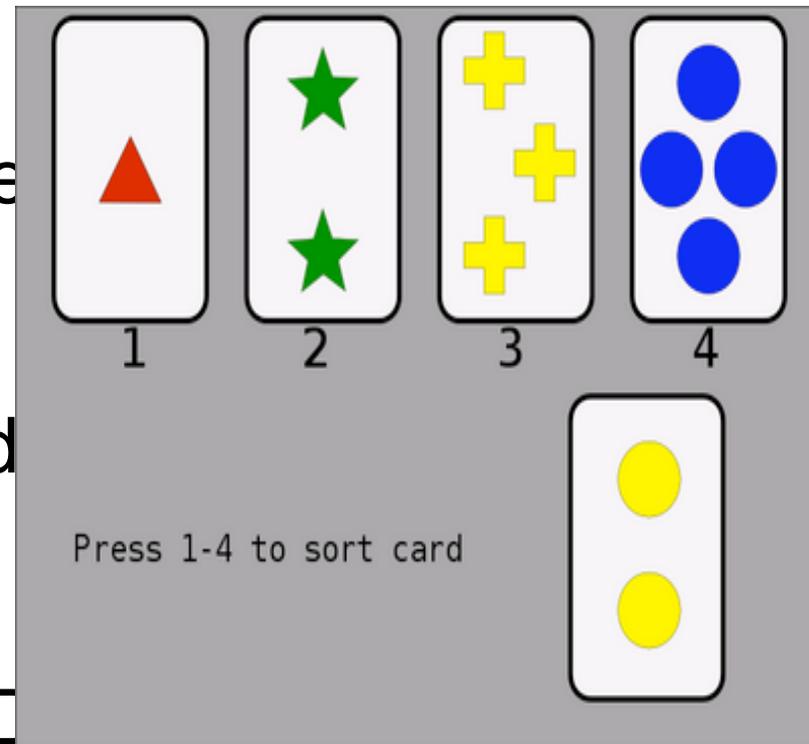
Represent executive control!!!



- Previous research has shown deficits in BPD patient performance.

The WCST

- Well established measure of executive function.
- Shows ability to understand rules and changes.
- Previous work has shown deficits in BPD performance on the WCST.



Two Hypotheses

- Are ANT conflict scores a measure of effortful control associated with deficits on neighbouring test/functions of effortful control, such as the WCST, in a BPD sample?
 - Correlation between performance on tests.
- Is the degree of impairment on neurocognitive functions associated with the extent of BPD symptoms?
 - Correlation between impairment on performance and severity of symptoms.

Who they measured ...

- N = 22, all female.
- Age range 18-50 years.
- Mean = 32.3 years (SD 9.2 years)
- Various exclusion criteria:
 - Psychiatric disorders
 - Mental retardation
 - Substance dependence

What they found ...

- Support for first hypothesis:
 - Correlation between impaired performance on the ANT and WCSI.
 - Conflict scores on ANT (task measuring executive control).
- Partial support for the second hypothesis:
 - ANT orienting & alertness tasks significantly correlated with BPD symptoms.
 - Not found on conflict score.
 - Also, only found with ANT not WCST.
- Both results remained when age was accounted for.
- Medication not shown to have significant impact.

Their conclusions ...

- Preliminary nature of study - discuss findings but doesn't draw conclusions.
- Acknowledges its limitations:
 - Small sample size
 - All females
 - Doesn't differentiate between subtypes of BPD
- Unexpected finding: WCST not correlating with BPD symptoms.
 - Potential general nature of the test in measuring executive control.

Relationship to other research and Further investigation

- Fits with existing research on executive control and BPD - e.g. Hoerman, Clarkin, Hull & Levy (2005).
- Suggests further research into establishing an endophenotype for BPD.
- Potential areas of future research:
 - Development of BPD (inc. genetics)
 - Emotional dysfunction and executive control
 - Neurocognitive functions and attachment systems
 - Higher personality variables e.g. morality/religion
 - Clinical applications

Defining the Mechanisms of Borderline Personality Disorder

J.F. Clarkin and M.I. Posner

Introduction

- BPD is behaviourally complex and lacks organic markers making it difficult to understand its psychobiological development
- Collaborative effort:

Experts	Approaches
<ul style="list-style-type: none">-Neurocognitive scientists-Psychoanalyst-Attachment style experts-Psychotherapy researchers	<ul style="list-style-type: none">-Brain imaging-Temperament and personality-Normal attention

Outline

- BPD symptoms
 - Negative affect
 - Poor self control
- Relationships
 - Concept of self and others
 - Attachment to others
- Research plan and findings

BPD Symptoms

- Temperament and personality organization
 - Relationship to biological systems creates a framework to study personality disorders
- Negative affect and defective self-regulation
 - Negative affect effects information processing and personal and interpersonal experiences
 - Impulsivity and/or impulsive aggression
 - Dysregulation of negative affect
- Identity diffusion
 - Cannot integrate concept of self and others
- Attachment
 - Insecure attachment developed in childhood

A working model of BPD

- BPD is an interaction of temperament, low effortful control, lack of sense of self and others, and an insecure, anxious attachment style
- They suggest that treatment should focus on the information-processing system that results from this symptom interaction

Research Plan and Findings so far

- Temperament
 - BPD patients are higher in negative affect and lower in effortful control than their controls
 - Measured by the Adult Temperament Questionnaire
- Attention Network Task
 - BPD patients differed from controls in conflict resolution
 - Measured using the Attention Network Task which looks at alerting, orienting and conflict resolution
- Conceptualization of interpersonal relations
 - Effortful control is developed via childhood attachment

Treatment

- Psychotherapy is the most widely used
- Others include: psychodynamic treatment, dialectical-behaviour therapy, and transference-focused therapy
- These researchers suggest that the variables assessed in their studies should be incorporated into treatment plans

Suggested Treatment Influences

- Process of interaction between patient and therapist
- Neurocognitive impediments to treatment
- Emotion processing
- Sense of self and others

Summary

- The researchers are seeking to understand the development of the neural networks that underlie the abnormalities found in adult BPD sufferers
- In doing so they hope to eventually work out the interaction between temperament, genes and experience that produce the disorder

Progress and Controversy in the Study of Posttraumatic Stress Disorder

Richard J. McNally

Introduction

- The purpose of this article is to examine the evidence regarding the most controversial issues in the field of PTSD studies.

The Emergence of PTSD

- Roots can be traced back to the Vietnam War.
- Psychiatrists noticed veterans continued to suffer severe stress symptoms upon returning home from war.
- Criteria introduced in DSM-III (1980)
- Criteria for diagnosis included victims of traumatic events other than war such as rape, natural disaster, car accident, etc...

Conceptual Bracket Creep in Definition of Trauma

- DSM-III states that in order for a diagnosis of PTSD one has to be exposed to a traumatic stressor. (combat, earthquake) e.g. direct exposure
- DSM-IV broadens the diagnosis stating that criteria for traumatic exposure is “the person experienced, witnessed, or was *confronted with* an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others,” (second-hand exposure)
- Lines between disorder and common stressful event are blurring.
- Difficult to determine what constitutes a traumatic event. (e.g. are being picked on at work and rape both traumatic events?)

Problems with Dose-Response Model of PTSD

- Dose-Response Model states that PTSD symptoms get worse as severity of the stressors increases. (e.g. Ex-servicemen wounded in Vietnam 2-3 times more likely to have PTSD than those not wounded)
- This is consistent with stimulus-response model (Pavlov's Dogs) which parallels human response in trauma.
- However debate over this model as there is research to suggest dose-trauma relationship not linear. (e.g. Person tortured twice might have more symptoms than those never tortured, however they have same symptoms as someone tortured a dozen times)

Distortion in Recollection

- Majority of trauma research relies on retrospective self-reports of survivors for measuring stressor magnitude
- Are PTSD survivors' accounts reliable and objective while they are under distress?
- Memory retrieval is never 100% reliable and it becomes less reliable when one's emotions and clinical state is affected.
- Memory distortion not dishonesty

“Phony Combat Vet”

- Two major problems
 - 1. Deliberate exaggeration of symptoms in Vietnam Vets seeking disability or compensation.
 - 2. Men who claim to have PTSD from combat, however never saw any combat. Some even lying about military experience
 - Burkett & Whitley (1998) estimated 75% of those receiving PTSD compensations are fakers.

Suggest clinicians be more thorough by obtaining military history records to verify military experiences.

Guilt, Shame, and Trauma

- Guilt and shame as the result of committing atrocities can lead to PTSD symptoms as well.
- These symptoms occur only if actions violate the person's sense of right and wrong or morals
- Very difficult for researchers to measure guilt as it does not fit into prior dose-model and animal conditioning models of trauma.
- Another possible limitation of animal conditioning model of PTSD
- Reducing trauma to biological basis cannot capture effects of guilt.

Risk Factors for PTSD

- Only a minority of those who experience trauma get PTSD
 - only 8.2% of the men & 20.4% of the women (Kessler et al. 1995)
- Some risk factors putative (e.g. lack of social support – cause or consequence?)

Risk Factors Unlikely to be Consequences of PTSD

- Lower intelligence
- Neurological soft signs (CNS impairment)
- Neuroticism (5 Factor)
- Elevation in (MMPI):
 - hypochondriasis
 - masculinity-femininity
 - psychopathic deviate
 - paranoia
- Negativistic personality traits
- Self-report based factors:
 - Unstable family in childhood
 - pre-existing mood or anxiety disorder
 - sexual or physical abuse during childhood

Peritraumatic (during trauma) Risk Factors

- Feelings of unreality
- Sense of time-distortion
- Sense of bodily distortion
- Measured just after trauma:
 - Emotional numbing
 - Depersonalisation
 - Motor restlessness
 - Sense of reliving the trauma
 - Elevated heartrate measured in A&E

Does traumatic stress alter the brain?

- Glucocorticoids (cortisol in primates) released in fight or flight response
 - prolonged exposure can cause hippocampal atrophy (seen in rats and monkeys) (Bremner 2001)
 - hippocampi of PTSD sufferers smaller than those of others (e.g. Bremner et al. 1995)
 - however:
 - cortisol in PTSD is not maintained high long enough to cause this
 - PTSD severity not predicted by hippocampal volume (Bonne et al. 2001)
 - hippocampal volume caused by genes (Gilbertson et al. 2002)

Does traumatic stress alter the brain? (Cont.)

- But:
 - small hippocampi can increase vulnerability for PTSD
 - and, PTSD patients have more neurodevelopmental abnormalities than other trauma-exposed people

Memory Factor in PTSD

- Much debate on the subject of so-called repressed and false memories
- Repressed memory subjects report more PTSD and depression symptoms than continuous memory subjects, and recovered memory subjects
 - RMS:s more prone to false memory effects than continuous memory subjects (McNally et al. 2000)

McNally, R.J. (2006) **Cognitive Abnormalities in post-traumatic stress disorder.** *Trends in Cognitive Sciences.* Vol 10
No. 6

Post-traumatic stress disorder (PTSD)

- usually in response to a traumatic and/or life threatening event.

- Symptoms include

- irritability

- avoidance of reminders of trauma

- sleep disturbance

Specific feature - recurrent, involuntary recollection of trauma

- intrusive thoughts

- nightmares

- 'flashbacks'

Phenomenological and meta-cognitive findings

Hackman et al (2004) - **Content of PTSD patients intrusive thoughts**

- repetitive negative thoughts about the trauma (*Why did this happen to me?*)
- invasive memories of the traumatic event - vivid flashbacks etc
 - usually involving the direct lead-up to the central trauma
- visual involvement was found to be more common than other senses

Gray and Lombardo (2001) - **Organisation of trauma memories**

- trauma memories more disorganised in patients with PTSD symptoms
- severity of disorganisation predicts course of PTSD

Dunmore et al (2001) - **Effect of meta-cognitive appraisal**

- Individual appraisal of PTS symptoms predicts development of PTSD

Brewin (2003) - **Dual representational system for encoding trauma**

Intrusive cognition and the emotional Stroop effect

- PTSD patients slower to name the colours of trauma-relevant words
- Buckley et al (2003) - used actors to simulate PTSD behaviour on the task
 - poor performance in all conditions
- Neural mechanisms of the emotional Stroop effect
 - reduced anterior cingulate cortex activation (ACC)
 - links to overactivity in amygdala
- Pathophysiological model of PTSD
 - abnormalities in the prefrontal cortex (PFC) and amygdala
 - PFC essential for extinguishing conditioned fear
- Further supported through research on neurological responses to
 - facial expressions of happiness and fear
 - trauma related pictures and sounds
- ACC volume as a potential vulnerability factor for PTSD

Neurocognitive impairment, cognitive ability and PTSD

- Neurocognitive abnormalities as potential risk factors for PTSD
 - learning and memory deficits
 - early signs in childhood (ADD, developmental delays)
 - lower pre-trauma IQ scores
- IQ: Risk vs. Resilience
 - *Breslau et al* - good IQ at age 6 - decreased:
 - risk of exposure to trauma by age 17
 - reduced risk of developing PTSD if exposed to trauma
 - Twin Studies - reinforce resilience factor of IQ
- Over-general autobiographical memory
 - emotion-regulation function
- Hippocampal Volume
 - potential vulnerability for PTSD - reinforced by twin studies

Conclusions and additional thoughts

- Intrusive reliving of traumatic events potentially mediated by functional abnormalities in PFC and amygdala
 - evidence from emotional Stroop tasks and neuroimaging
- Dual representation of traumatic events has been suggested
 - evidence from phenomenological studies
- Potential vulnerability factors have been suggested including
 - low IQ
 - over general memory
 - small hippocampi
- Variety of novel approaches to investigation of PTSD
 - diverse range of stressors - possible differences between the samples
- Widening of the definition of 'Trauma'
 - PTSD becoming less meaningful as a disorder