The interplay of emotional and interpersonal processes in borderline personality disorder
From Experimental Research to Clinical Practice

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Borderline Personality Disorder

“...instability of interpersonal relationships, self-image, and affects, and marked impulsivity....”

- Frantic efforts to avoid real or imagined abandonment
- A pattern of unstable and/or intense interpersonal relationships
- Persistent and markedly unstable self-image or sense of self
- Impulsivity in at least two potentially self-damaging areas
- Recurrent self-harming or suicidal behaviors or communications
- Intense, usually brief, mood swings
- Chronic feelings of emptiness
- Inappropriate, intense anger
- Transient, stress-related paranoid ideation or severe dissociation

American Psychiatric Association, 2001; p. 650
Domains of Dysfunction in BPD

- Interpersonal hypersensitivity
- Emotional instability & dysregulation
- Impulsivity

Gunderson, 2007; Trull et al., 2010
BPD & Emotion Dysfunction

Emotional Vulnerability

Subjective
- More frequent and intense negative emotions (Levine et al., 1997; Stiglmayr et al., 2005; Trull et al., 2008)
- More affective lability (Trull et al., 2008)

Objective
- Brain imaging (Herpertz et al., 2001; Minzenberg et al., 2007; 2008)
- Mixed physiological findings: hypo- (Herpertz et al., 2000) or hyper-arousal (Ebner-Priemer et al., 2005)
BPD & Emotion Dysfunction

Emotion Dysregulation (Gratz & Roemer, 2004)

- **Lack of clarity and awareness of emotions**
  (Leible & Snell, 2004; Wolff et al., 2007)

- **Emotional non-acceptance**
  (Sauer & Baer, 2009; Yen et al., 2002)

- **Lack of impulse control**
  (Chapman, Dixon-Gordon et al., 2010; Chapman, Leung, & Lynch, 2008; Coffey et al., 2011; Gratz et al., 2009, Links, 1999)

- **Lack of strategies to modulate emotions**
  (Bijttebier & Vertommen, 1999; Rosenthal et al., 2005; Salsman & Linehan, 2012)

- **Unwillingness to experience distress in order to engage in goal-directed behavior**
  (Gratz et al., 2006)
BPD & Interpersonal Dysfunction

Multiple areas of dysfunction

- **Conflict in romantic relationships** (Hill et al., 2011)
- **More polarity in relationships** (Coifman et al., 2012)
- **Interpersonal aggression** (Barnow et al., 2009; Lejuez et al., 2003)
- **Interpersonal hypersensitivity** (Ayduk et al., 2008)
- **Deficits in mentalization** (Sharp et al., 2011)
- **Poor social problem solving and decisions** (e.g., Bray et al., 2007; McMurrnan, Duggan, Christopher, & Huband, 2007; Polgar et al., 2014)

**Interpersonal problems precipitate suicide attempts and self-harm in BPD** (Brodksy et al., 2006)
Developmental Models of BPD

Existing models of BPD emphasize the transaction between interpersonal dysfunction and emotion dysregulation

- **Social Baseline Theory** (Hughes, Crowell, Uyeji & Coan, 2012)
- **Biosocial Theory** (Linehan, 1993)
- **Mentalization-based Model**
  (Bateman & Fonagy, 2004; Fonagy & Bateman, 2007)
Are people with high BPD features more emotionally reactive to social rejection?

Emotional Reactivity in BPD

There are mixed findings regarding emotional reactivity in BPD \(\text{(Rosenthal \textit{et al.}, 2008)}\)

- Several studies have found evidence of subjective, and sometimes biological, reactivity \(\text{(Limberg \textit{et al.}, 2011; Schmahl \textit{et al.}, 2004)}\)

- Other studies find no evidence of reactivity, or reactivity only in some domains
  \(\text{(e.g., Herpertz \textit{et al.}, 2000 Jacob \textit{et al.}, 2009)}\)

Evidence suggests heightened emotional reactivity to rejection-related stimuli \(\text{(Limberg \textit{et al.}, 2011)}\)
Hypothesis

High-BPD group will show heightened emotional reactivity to social rejection, but not academic failure
Participants

- Undergraduates (N = 287) completed a questionnaire of BPD symptoms (Personality Assessment Inventory – Borderline scale; PAI-BOR)
- 70% female, between ages of 18 and 60 years
- Mean age 22.08 (SD = 6.68)
- 39% White, 33% Asian/Asian Canadian

<table>
<thead>
<tr>
<th>Groups</th>
<th>Low BPD</th>
<th>High BPD</th>
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<tbody>
<tr>
<td></td>
<td>• &lt; 23 on PAI-BOR</td>
<td>• &gt;38 on PAI-BOR</td>
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<td></td>
<td>• n = 44</td>
<td>• n = 30</td>
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</table>
Experimental Design

- Neutral video
  - State Emotion Rating
- Positive and Negative Affect Schedule (PANAS) (Watson et al., 1988)

Vanilla Baseline

Academic Failure
- Social Rejection
- State Emotion Rating
- Debrief

Write an essay
Trade with “another participant”
Receive negative evaluation

Answer questions about yourself
Trade with “another participant”
Receive negative evaluation

Jennings, Kamarck, Stewart, Eddy, & Johnson, 1992
Negative Emotional Reactivity

Group x Condition x Time  \( F(1, 70) = 6.24^*, \eta_p^2 = .08 \)
Does this emotional reactivity contribute to social problem solving deficits in BPD?

Interpersonal difficulties have been associated with deficits in social problem solving (SPS) (Davila, Hammen, Burge, Daley, & Paley, 1996; Metts & Cupach, 1990)

Individuals with BPD...

- More passive and fewer active solutions (Kehrer & Linehan, 1996; Linehan et al., 1987)
- Fewer active / adaptive solutions (Zeigler-Hill & Abraham, 2006)
- Impulsive or careless problem solving styles (McMurran, Duggan, Christopher, & Huband, 2007)
- Negative problem orientation (Bray et al., 2007)
SPS deficits may be emotion-dependent

- Negative emotion inductions preceded poor SPS (Mitchell & Madigan, 1984)
- SPS has been associated with levels of dysphoria (Heppner & Anderson, 1985)
Hypotheses

1: BPD features would be associated with emotional reactivity to rejection

2: BPD features would be associated with decrements in SPS in response to rejection

3: Emotional reactivity would partially mediate the relationship between BPD features and SPS
Participants

- Undergraduates (N = 287) completed a measure of BPD symptoms (PAI-BOR)
- Female & between ages of 18 and 60 years
- Mean age 21.59 (SD = 5.57)
- 44% White, 37% Asian/Asian Canadian

<table>
<thead>
<tr>
<th>Groups</th>
<th>Low BPD</th>
<th>Mid BPD</th>
<th>High BPD</th>
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<tbody>
<tr>
<td></td>
<td>• &lt; 23 on PAI-BOR</td>
<td>• 23-38 on PAI-BOR</td>
<td>• &gt; 38 on PAI-BOR</td>
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<tr>
<td></td>
<td>• n = 29</td>
<td>• n = 32</td>
<td>• n = 26</td>
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MEPS
Participant to brainstorm the middle of the story, and the quantity and relevance of solutions are coded.
Yields three scores:
1. relevant/irrelevant (ICC = .93)
2. active/passive (ICC = .91)
3. inappropriate means (ICC = .72)

Jennings, Kamarck, Stewart, Eddy, & Johnson, 1992; Platt & Spivack, 1975; Robins, 1988
# Measures of Current Emotional State

<table>
<thead>
<tr>
<th>Measure</th>
<th>Assesses…</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANAS (Watson et al., 1988)</td>
<td>Negative emotional state</td>
</tr>
<tr>
<td>Skin Conductance Response (SCRs)</td>
<td>Skin conductance responses associated with emotional arousal</td>
</tr>
<tr>
<td>Heart Rate Variability (HRV)</td>
<td>Beat to beat variability, associated with parasympathetic activation</td>
</tr>
</tbody>
</table>
Emotional Reactivity

Self-Reported Negative Emotions

![Graph showing emotional reactivity with time and group factors.](image)

- **Baseline**
- **Emotion Induction**
- **After MEPS**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Effect Size</th>
<th>p-Value</th>
</tr>
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<tbody>
<tr>
<td>Time</td>
<td>F(2, 81) = 26.87***, $\eta_p^2 = .40$</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>F(2, 82) = 10.17***, $\eta_p^2 = .20$</td>
<td></td>
</tr>
<tr>
<td>Group x Time</td>
<td>F(4, 164) = 2.72*, $\eta_p^2 = .06$</td>
<td></td>
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</tbody>
</table>
Emotional Reactivity

**SCRs**
- Baseline
- Emotion Induction
- After MEPS

**HRV**
- Baseline
- Emotion Induction
- After MEPS

- **Time**
  - $F(2, 62) = 2.52^*, \eta_p^2 = .10$

- **Group**
  - $F(2, 62) = 2.52^*, \eta_p^2 = .10$

All $p$'s $> .45$
Social Problem Solving Strategies

**Relevant**

- Low-BP
- Mid-BP
- High-BP

**Inappropriate**

- Low-BP
- Mid-BP
- High-BP

Group x Time: $F(2, 75) = 5.85^{* *}, \eta_p^2 = .14$

Group x Time: $F(2, 75) = 3.70^{*}, \eta_p^2 = .08$
Emotional Reactivity as a Mediator

BPD Features → Δ Negative Emotion

Δ Negative Emotion → Δ Relevant Social Problem Solving

a: β = .37**

b: β = -.40***

c/c': β = -.24*/.12
Conclusions

- Heightened reactivity to social stimuli in high-BPD samples
- This emotional reactivity impairs social problem solving in high-BPD samples

Next steps

- Emotional reactivity vs. emotion regulation
- BPD samples
Do emotion regulation difficulties contribute to responses to social rejection in BPD?

Emotion regulation

- Theorized to transact with interpersonal functioning (e.g., Gunderson & Lyons-Ruth, 2008; Linehan, 1993)
- Linked to better social functioning (Lopes et al., 2005)
- Buffers from relational conflict (Gyurak & Ayduk, 2008)
- Partially accounts for mentalization deficits in BPD (Sharp et al., 2011)
- Emotion dysregulation may deplete resources necessary for effective interpersonal functioning (Baumeister et al., 1998)
Aims

1: Examine effects of BPD on emotional responses to social rejection

2: Examine effects of BPD on cognitive responses to social rejection

3: Explore whether emotion dysregulation mediates the relationship between BPD and responses to social rejection
**Participants**

- Mean age 25 ($SD = 10.50$)
- 63% female
- 45% White, 25% African American

<table>
<thead>
<tr>
<th>Groups</th>
<th>BPD</th>
<th>Control</th>
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<tbody>
<tr>
<td></td>
<td>5+ BPD sx</td>
<td>≤ 3 BPD sx</td>
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<td></td>
<td>No current SUD, psychosis, or mood episode</td>
<td>No current SUD, psychosis, or mood episode</td>
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<tr>
<td></td>
<td>$n = 53$</td>
<td>$n = 34$</td>
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<tr>
<td>Measures</td>
<td>Trait Measures</td>
<td>State Measures</td>
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<td>-------------------</td>
<td>---------------------------------------------------------------------------------</td>
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<tr>
<td><strong>Assesses...</strong></td>
<td><strong>Difficulties in Emotion Regulation Scale (DERS)</strong> (Gratz &amp; Roemer, 2004)</td>
<td><strong>Cognitive Responses to Rejection</strong> (Williams et al., 2000)</td>
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<tr>
<td></td>
<td>Emotion dysregulation</td>
<td>- Lack of belonging</td>
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<td></td>
<td></td>
<td>- Lack of control</td>
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<td></td>
<td></td>
<td>- Low self-esteem</td>
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<td></td>
<td></td>
<td>- Lack of meaningful existence</td>
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<td><strong>Measures</strong></td>
<td><strong>Trait Measures</strong></td>
<td><strong>State Measures</strong></td>
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<td><strong>PANAS</strong> (Watson et al., 1988)</td>
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<td></td>
<td>Emotion dysregulation</td>
<td>Negative affect</td>
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<td></td>
<td></td>
<td>“Distress” &amp; “Upset”</td>
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<tr>
<td><strong>State Measures</strong></td>
<td><strong>PANAS</strong> (Watson et al., 1988)</td>
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<tr>
<td></td>
<td>Negative affect</td>
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<td></td>
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<tr>
<td></td>
<td><strong>Distress Composite from the PANAS</strong> (Watson et al., 1988)</td>
<td></td>
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<tr>
<td></td>
<td>“Distress” &amp; “Upset”</td>
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Experimental Design

State Emotion Rating (PANAS) → Cyberball Social Ostracism Task → State Emotion Rating (PANAS)

Cognitive Responses:
- Lack of belonging
- Lack of control
- Low self-esteem
- Lack of meaningful existence

- Told they are playing with 3 “other participants”
- After receiving a toss from each player, participant is “ostracized”
- Continues for 30 ball tosses (~5 min)

Williams et al., 2000; Williams & Jarvis, 2006
Overall effect of Time

$t = 1.67^*$

Overall effect of Group

$Fs > 7.00^*$

Group Differences in Reactivity

$F = 1.33, \text{ ns}$
Distress Composite Responses

Overall effect of Time  \( t = 2.23^* \)

Group Differences in Reactivity  \( F = 11.36^*, \eta_p^2 = .12 \)
Cognitive Responses

\[ Fs = 3.83-11.11^*, \ \eta_p^2s = .04-.12 \]
Emotion Dysregulation as a Mediator

- Emotion Dysregulation
  - a = 21.30**
  - b = .06*
  - a x b = 1.22*
  - c/c' = 2.08* / .86

BPD

Lack of Meaningful Existence
Emotion Dysregulation as a Mediator

Lack of Effective ER Strategies

BPD

a: B = 5.98**

a x b: B = 1.20*

c/c’: B = 2.08*/.88

b: B = .20*

Lack of Meaningful Existence

a: B = 2.08*/.88
Emotion Dysregulation as a Mediator

Lack of Emotional Clarity

BPD

Nonspecific Distress

a: $B = 2.91^{**}$

b: $B = .06^{*}$

$a \times b: B = .18^{**}$

c/c': $B = .91^{**}/.73^{**}$
Implications

Emotion dysregulation may contribute to responses to interpersonal stressors in BPD

- Lack of emotional clarity may actually contribute to the heightened distress
- Lack of emotion modulation strategies may lead to some of the cognitive responses to interpersonal triggers

Suggests a pathway by which to enhance emotional and interpersonal functioning

- Emotional clarity and emotion regulation strategies may reduce ineffective responses to interpersonal triggers in BPD
Implications of Laboratory Studies

• Individuals with BPD are especially emotionally reactive to social rejection stimuli
• Such emotional reactivity in BPD may contribute to state-dependent interpersonal deficits
• Emotion dysregulation may account for the relationship between BPD and maladaptive responses to interpersonal triggers

→ Suggests a need for better emotion regulation skills
Does emotion regulation skills training enhance interpersonal functioning in BPD?
A pilot study


Supported by the American Group Psychotherapy Foundation
Emotion Dysregulation

Emotion dysregulation is a key mechanism in BPD

DBT skills training alone has yielded benefits for patients with BPD (e.g., Harley, Baity, Blais, & Jacobo, 2007)

Limited research on the actual effects of ER skills on emotional processes or aspects of emotion regulation specifically
To examine whether DBT Emotion Regulation skills training has unique effects on emotion dysregulation, compared with DBT Interpersonal Effectiveness and a Control Group, and also if it has wider ranging effects on other relevant outcomes.
Hypotheses

1: DBT ER would lead to better emotion regulation and less emotional reactivity
   - Self-report
   - Psychophysiology

2: DBT ER would lead to better interpersonal effectiveness
   - Self-report
   - Behavioral task
<table>
<thead>
<tr>
<th>DBT Emotion Regulation (ER)</th>
<th>DBT Interpersonal Effectiveness (IE)</th>
<th>Attention-Placebo Activities Group (AG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model of Emotions</td>
<td>Identifying Relationship Priorities</td>
<td>Psycho-education</td>
</tr>
<tr>
<td>Changing Emotions (Problem Solving)</td>
<td>Making Requests (DEAR MAN)</td>
<td>Expressing Emotions</td>
</tr>
<tr>
<td>Changing Emotions (Opposite Action)</td>
<td>Strengthening Relationships (GIVE) &amp; Values-Consistent Behavior (FAST)</td>
<td>Medication and Mood</td>
</tr>
<tr>
<td>Decreasing Emotional Vulnerability (ABC)</td>
<td>Intensity for Asking/Saying No</td>
<td>Using Diet to Alter Mood</td>
</tr>
<tr>
<td>Decreasing Emotional Vulnerability (PLEASE)</td>
<td>Building New Relationships/Ending Destructive Relationships</td>
<td>Using Exercise to Alter Mood</td>
</tr>
<tr>
<td>Mindfulness of Current Emotions</td>
<td>Balancing Extremes &amp; Using Validation</td>
<td>Dealing with Stigma</td>
</tr>
</tbody>
</table>
### Participants

- Mean age 33.74 (\(SD = 11.70\))
- Female, age 19-60
- 57% White, 11% Asian/Asian Canadian
- Stratified by age/BPD severity and randomized

<table>
<thead>
<tr>
<th>Groups</th>
<th>Emotion Regulation</th>
<th>Interpersonal Effectiveness</th>
<th>Activities Group</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• 5+ BPD sx</td>
<td>• 5+ BPD sx</td>
<td>• 5+ BPD sx</td>
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<tr>
<td></td>
<td>• No mania/psychotic disorder</td>
<td>• No mania/psychotic disorder</td>
<td>• No mania/psychotic disorder</td>
</tr>
<tr>
<td></td>
<td>• n = 7</td>
<td>• n = 6</td>
<td>• n = 6</td>
</tr>
</tbody>
</table>
ICCs .72-.93.
1. Relevant Active
2. Relevant Passive
3. Irrelevant
4. Positive Self Regulation
5. Inappropriate

Baseline → MEPS → Neutral Emotion Induction → Idiographic Emotion Script → Recovery Period

State Emotion Rating (VAS) → State Emotion Rating (VAS)

PSYCHOPHYSIOLOGY
skin conductance
heart rate variability
BPD Symptoms

Group x Time  \( F = 1.77 \)
Univariate tests of Time
AG \( F = 2.66 \)
DBT-IE \( F = 2.66 \)
DBT-ER \( F = 3.89^* \)
Self-harm on the DSHI

Time $\chi^2_3 = 8.71^*$
Group $\chi^2_2 = 6.11^*$
Group x Time $\chi^2_5 = 33.75^{**}$
Difficulties in Emotion Regulation Scale

Group x Time  $F = .85$

Univariate tests of Time

AG  $F = 2.16$

DBT-IE  $F = .17$

DBT-ER  $F = 4.22^*$
Univariate tests of Time

Group x Time  $F = 0.36$

Univariate tests of Time

AG  $F = 0.48$

DBT-IE  $F = 1.13$

DBT-ER  $F = 4.24^*$
Mindfulness

Group x Time  $F = 2.95^*$
Univariate tests of Time
AG  $F = 1.61$
DBT-IE  $F = 2.31$
DBT-ER  $F = 6.81^{**}$
**Self-Reported Reactivity in the Lab**

Group x Time  $F = 1.55$

Univariate tests of Time

AG  $F = .79$

DBT-IE  $F = 2.66$

DBT-ER  $F = 8.10^*$
Means-Ends Problem Solving

Active
Group x Time  $F = 1.93$
Univariate tests of Time
AG  $F = .07$
DBT-IE  $F = .79$
DBT-ER  $F = 7.12^*$

Inappropriate
Group x Time  $F = 4.58^*$
Univariate tests of Time
AG  $F = .24$
DBT-IE  $F = 11.17^{**}$
DBT-ER  $F = .00$
**Conclusions**

- Possible for patients to benefit from 6 weeks of DBT ER skills training
- ER skills seem to target ER deficits
- ER skills training could have broader ranging impacts than other skills modules

**Future steps**

- Larger scale study
- May other skills modules be more efficacious if ER skills are taught first?
**General Conclusions**

**Interpersonal and emotional dysfunction in BPD are linked**
- High BPD features are associated with heightened reactivity to social (not non-social) stressors
- Social problem solving problems in BPD only emerged under conditions of distress
- Emotion regulation difficulties lead to some emotional and cognitive responses to social rejection
- DBT emotion regulation skills improves emotion regulation domains, and results in relatively more improvement in NSSI and mindfulness

**Future steps**
- Examine social consequences of emotion regulation strategies in BPD
- Replicate and extend work examining DBT skills modules to provide targeted and briefer treatments
Thanks

Mentors and Collaborators
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- Personality and Emotion Research and Treatment Lab at UMC

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