Studying social interaction in Borderline Personality Disorder

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Thank you:



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Mentors: Phil Corlett, John Krystal

Connecticut Mental Health Center Neuroscience Research Training Program

- Mary Zanarini, John Gunderson, and Lois Choi-Kain
- Emotions Matter, Families for BPD Research
- Research participants and patients



Plan for this webinar

• Quick review about BPD

- What is BPD?
- What is the prognosis?
- What are the current treatments?

• What can science offer? 3 examples of BPD science.

- Measuring social networks
- Measuring social approach and closeness
- Measuring social decisions

Core BPD symptoms:

AFFECTIVE

- Changeable mood from minute to minute, hour to hour
- Depressed, anxious mood
- Emptiness

IMPULSIVE

- Aggression
- Driving
- Sex
- Alcohol/Drugs
- Financial
- Self-harm

COGNITIVE

- Odd ideas
- Magical ideas
- Paranoia
- Hearing voices

INTERPERSONAL

- Difficult relationships with lots of ups and downs
- Strongly conflicted relationships
- Other symptoms come and go with interpersonal problems

Diagnostic Interview for BPD

BPD epidemiology:

- Prevalence: 1-5% in the general population 10-20% in psychiatric settings
- Heritability 55-68% (SCZ 85%, MDD 45%).
- Not related to schizophrenia
- Remission (no longer meeting criteria) is common
- **Recovery** is less common:
 - Remission <u>and</u>
 - 1+ emotionally sustaining relationship
 - Full time work or school



Zanarini, et al. Mclean study of adult development (recovery/remission) Lyons & Plomin/Smoller Torgerson 2001 (genetics) Gunderson 1983 (BPD vs. schizophrenia)

"Having BPD is like bleeding out."

Merri Lisa Johnson <u>Girl in Need of a Tourniquet</u>

Psychopharmacology for BPD:





Zanarini, et al. J Clin Psychopharm (2015). 35(1): 63-67.

Psychopharmacology for BPD:

- Data is recent, inconclusive, practice guidelines still recommend no meds
- Polypharmacy is common, and inversely related to improvement
- Meds work for the expected symptom clusters:

	Mood stabilizer	Anti- depressant	Anti- psychotic	Placebo
Affect regulation	++	+	+/-	+
Impulsivity	++		+	
Psychotic-like symptoms			+	

Relevant meta-analyses: Vita et al. 2011 Mercer 2009 Binks 2006 Cochrane Review

Considerations in psychopharmacology:

Treating symptoms

- Symptoms can be debilitating
- Symptoms fluctuate as part of the disease

Maintaining safety

- Impulsivity many medications are risky in overdose
- Suicidality and self-harm
- Co-morbidities: PTSD, panic disorder, substance use disorders...

Meaning of medications

• Adding and decreasing medications can trigger strong feelings of being judged to be sick, having help withdrawn etc...

Psychotherapy for BPD:

- Good Psychiatric Management (John Gunderson, Paul Links, Lois Choi-Kain)
- Dialectical Behavioral Therapy (Marsha Linehan)
- Transference-focused Psychotherapy (Otto Kernberg and Cornell group)
- Mentalization Based Treatment (Peter Fonagy and Anthony Bateman)

Some resources for learning more about BPD-specific psychotherapy BPD training Institute at Mclean Hospital <u>https://www.appi.org/videos/gunderson-video-psychiatric-management-bpd</u> Workshops at the American Psychiatric Association

Family psychoeducation and Advocacy:

- Borderline Personality Disorder Resource Center http://www.bpdresourcecenter.org/
- Emotions Matter

http://emotionsmatterbpd.org/

• NAMI

https://www.nami.org/Learn-More/Mental-Health-Conditions/Borderline-Personality-Disorder

• NEA-BPD + Family Connections

http://www.borderlinepersonalitydisorder.com/family-connections/

• TARA

http://www.tara4bpd.org/

• Personality Disorders Awareness Network (PDAN) http://www.pdan.org

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Intro to Social Interaction Science:

• People with BPD are at a social disadvantage

• Social Network Analysis (SNA) is a way to measure this difficulty

Social network analysis: The Egonet

Ingredients for a social network analysis:

- 1. List people significant in your life.
- 2. What is the nature and quality of these relationships?
- 3. How are these people connected to each other?

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Features of a social network:

Ego: The participant <u>Alter:</u> Person in participant's network <u>Edges:</u> Connections between alters

<u>Centrality:</u> How connected a person is in a network <u>Density:</u> How connected the network is overall



Social network analysis: The Egonet



BPD symptoms are associated with:

- reduced closeness
- more negative interactions

Mixed Effects Models: Borderline Personality Disorder Dimensional Scores Predicting Participant Self-Report on Social Network Members

Estimate		SE	F(1, 141)
Closeness and support			
Closeness	04	.01	12.15***
Trust	04	.01	15.14***
Advice	03	.01	7.83**
Support	02	.01	ns
Attachment strength			
Proximity seeking	.00	.02	ns
Separation	.00	.00	ns
Safe haven	.04	.02	ns
Secure base	01	.03	ns
Negative interactions			
Argue	.03	.01	7.75**
Criticism	.04	.02	5.58*

In relationships, people with high vs low BPD symptoms:

• Have partners less central to their networks





In relationships, people with high vs low BPD symptoms:

- Have partners less central to their networks
- Spend less in person time with their partner



low **BPD**

Beeney et al. Personality Disorders: Theory Research and Treatment (Jan 2018)

Social networks in BPD

In relationships, people with high vs low BPD symptoms:

- Have partners less central to their networks
- Spend less in person time with their partner \bullet
- Feel less attached to their partner



low BPD

For control subjects, more central relationships have:

- More positive experiences
- More conflict

For BPD subjects, more central relationships have:

- The same <u>low level</u> of positive interactions
- More conflict
- AND all relationships have more conflict than controls



Social Networks and BPD



- Social networks can provide webs of support, closeness, and connection with people in our lives.
- People with BPD often have social worlds that provide less support and have more conflict than people without BPD symptoms.
- <u>Future research</u>: How do interpersonal challenges in people with BPD contribute to differences in their social networks?
 - Trust and cooperation
 - Mentalization
 - Interpersonal sensitivity
 - Ability to change social beliefs

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Personal space regulation

- Rodents prefer shelter
- Anxious rodents explore less

• Measuring anxiety: the open field test



control mouse

anxious mouse



Personal space regulation



Standing at the edge of a stadium

Walz et al. Biol Psychiatry. 2016 Sep 1;80(5):390-7.

Personal space regulation

Imagine yourself:

Preparing to throw a free throw in front of a large crowd.

Giving a speech to a big audience.

Walking through a crowded market to haggle with a merchant.

Sitting in the middle of a crowded movie theater.





0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 Distance from experimenter (m)





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Amygdala is hyper-active in BPD



- Negative attribution bias in BPD has been linked to amygdala hyper-activity
- Finding not present in BPD patients on medication

Schultz et al. Biol Psychiatry. 2016 Jan 15;79(2):97-106



In BPD,

Is preferred social distance a way to measure amygdala activity or negative attribution bias in BPD?

First step: do people with BPD choose a different distance than controls?

Subject demographics

ž. ž	Control	BPD	statistics
n	30	23	
Age (yrs)	33.4 +/- 13.05	36.9 +/- 12.5	t = 0.10, p = 0.32
Education (yrs)	15.2 +/- 2.69	14.0 +/- 2.52	t = 1.66, p = 0.10
NAART (reading test)	21.2 +/- 9.04	19.77 +/- 7.55	t = 0.59, p = 0.55

Taking psychiatric meds	0	52.2%
Anti-depressant	0	26.1%
Mood stabilizer	0	26.1%
Anti-psychotic	0	13%
Benzodiazepine	0	21.7%

Fineberg et al. (2017) Psychiatry Res. 260:384-390

Subject demographics

	<u>.</u>	Control	BPD	statistics
borderline	BSL			
	n Mean +/- SD	26 5.08 +/- 6.2	21 32.19 +/- 19.06	t = -6.26, p < 0.001
depression	BDI			
	n Mean +/- SD	27 2.56 +/- 4.3	20 21.4 +/- 13.9	t = -6.15, p < 0.001
anxiety	BAI			
-	n Mean +/- SD	27 6.52 +/- 9.2	20 23.0 +/- 12.8	t = -4.90, p < 0.001
impulsivity	BIS			
	n Mean +/- SD	25 51.10 +/- 9.59	21 71.0 +/- 16.5	t = -5.10, p < 0.001

Fineberg et al. (2017) Psychiatry Res. 260:384-390

Preferred social distance expands in BPD



Fineberg et al. (2017) Psychiatry Res. 260:384-390

Personal space regulation in BPD:

People with BPD prefer a larger social distance.

How does preferred social distance change with:

- Familiarity?
- Social difficulty?
- Treatment?

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Learning in BPD:

How are social attributions acquired and updated in BPD?

Start with looking at <u>all</u> learning:

- Working memory deficits (Stevens et al Psychiatry Res. 2004)
- Reversal learning not different from controls (Berlin et al. AJP 2005, Paret 2015)
- Acquisition not different from controls (Paret 2015)

Social exchange game:

What about social learning?

• predictions from the clinic \rightarrow bias to extreme views, reversing from neg. is tough



Trust game image adapted from Cecada et al. PLoS ONE 9(9):e108733 · September 2014 Trust game data from King-Casas et al. 2008

Computational models of social behavior:

- Mathematical models can improve on initial descriptions of behavior
- A new model of trust game data found two features that influence behavior

Risk Aversion (Belief) ω ($b(\omega)$)	{0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8}	Value of money kept over (potential) money gained.	_
Irritability ζ	{0, 0.25, 0.5, 0.75, 1.0}	Tendency to retaliate on worse than expected partner actions.	
Irritation Belief $q(\zeta)$	{0, 1, 2, 3, 4}	Initial belief on likelihood of the partner being irritable.	ignorant optimistic

optimistic realistic pessimistic fatalistic

Hula et al. PLoS Comput Biol. 2018 Feb 15;14(2):e1005935

Computational models of social behavior:



Hula et al. PLoS Comput Biol. 2018 Feb 15;14(2):e1005935

Computational models of social behavior:



More BPD trustees are "0" = ignorant about their partner's irritability



More BPD trustees have low level guilt

Hula et al. PLoS Comput Biol. 2018 Feb 15;14(2):e1005935

Social exchange:

- People with BPD cooperate less
- Amygdala signal in trustees decreases with bigger investor investments in controls, <u>but not BPD subjects</u>
- People with BPD coax a defecting partner less.
- Computational modelling shows that BPD trustees may coax less because of:
 - Not noticing their partner's irritability
 - Not acting "guilty"

Trust game data from King-Casas et al. 2008 Hula et al. PLoS Comput Biol. 2018 Feb 15;14(2):e1005935

Testing a new possible treatment:

- Ketamine is a medication used in anaesthesia
- It rapidly decreases depression and suicidal thinking in people with major depressive disorder

Will people with BPD get the same benefits?

- decreased depression
- decreased suicidal thinking

How will people with BPD feel as ketamine wears off?



- In animal models of depression, ketamine increases neuroplasticity
- The increase lasts ~ 3 days

More neuroplasticity means:

- nerve cells make new connections
- nerve cells strengthen new circuits

This can promote new learning

- In animal models of depression, ketamine increases neuroplasticity
- The increase lasts ~ 3 days

• We hypothesize that the postketamine neuroplasticity may offer an opportunity to revise old social beliefs More neuroplasticity means:

- nerve cells make new connections
- nerve cells strengthen new circuits

This can promote new learning

- New randomized controlled trial of ketamine vs. placebo for adults with Borderline Personality Disorder
- Each participant gets one dose: either ketamine or placebo
- Outcomes:
 - Suicidality
 - Mood Symptoms (depression / anxiety)
 - BPD Symptoms
 - Pain
 - Social



 Real-world social experiences



• Social distance





• Trust Game

• Real-world social experiences



- clinicaltrials.gov
- Search "Borderline Personality Disorder"

• Social distance



• Trust Game



Review of this webinar

Quick review about BPD:

- What is BPD?
 4 core symptom clusters
- What is the prognosis? many people remit, fewer recover
- What are the current treatments? PSYCHOTHERAPIES and medications Family interventions

Measuring social interaction:



Social distance



Social exchange

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Ketamine in BPD Study

clinicaltrials.gov

Follow and support research organizations: BBRF with Families for BPD Research, NIMH, AFSP