Trauma and Altered States of Consciousness: Toward the Rebirth of the Self

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Objectives

- Describe the effects of trauma on psychopathology and its relationship to attachment

Discuss 5 dimensions of consciousness that are often affected by trauma-related psychopathology:

- TIME (temporarility)
- THOUGHT (narrative)
- BODY (embodiment)
- EMOTION (affect)
- INTERSUBJECTIVITY

Discuss the role of the reptilian (subconscious) brain

Body, emotion, and intersubjectivity
Psychiatric Comorbidity of Chronic Early Trauma

Repeted Early Trauma

- Substance Use Disorders
- Anxiety Disorders
- Depression
- PTSD
- Brief Psychoses
- Somatisation Disorders
- Eating Disorders
- Dissociative Disorders
- Borderline Personality Disorder

Fraser, 1998
Psychiatric Comorbidity of Chronic Early Trauma

Fraser, 1998
How Do We Develop Adequate Emotion Regulation Capacities?
The Attachment Relationship: A Prerequisite for an Adequate Window of Emotional Arousal
The more repetitive the traumatic experience or the attachment dysregulation, the greater likelihood of developing severe emotion dysregulation, altered states of consciousness, and dissociation…
“Extreme states induced by stress and trauma are robustly different on state-defining variables (i.e., dissociated) from normal states of consciousness. The more severe the trauma, at least on certain indices, the greater the likelihood that an individual will be driven into an altered state of consciousness. Chronic or repetitive trauma leads to a greater number of altered states, which coevolve with time.” (Putnam, 1996, p. 176)
Four Dimensions of Consciousness Affected by Psychological Trauma

**Time**
Experience of “now” (continuous transition between immediate past, present, and future)

**Thought**
“Story-like” structural organization of consciousness (content, plot, narrator)

**Body**
Thoughts, feelings, and actions originate from the body

**Emotion**
Refers to valence, arousal, and distinct emotional feelings

Dan Zahavi & Evan Thompson (2007); Frewen & Lanius, 2015
Dissociative

Infrequency

Thought

Body

Emotion

Flashbacks-
Reliving,
Fragmentation

Time

Intrusive
Recall,
Reminder
Distress

Voice-
hearing

Thought

Negative
Self-Other-
Referential
Thinking

Depersonal-
-ization

Body

Physiological
Hyper-
 arousal

Emotional
Numbing,
Compartmentalized
Emotion

General
Negative
Affect

Frewen & Lanius, 2015
Endel Tulving (2005)
Episodic memory and autonoesis: Uniquely human?

- Episodic memory differs from other kinds of memory in that its operations require a self. It is the self that engages in the mental activity that is referred to as mental time travel: there can be no travel without a traveler...
Mental Time Travel and Absorption in Recall is ‘Partial’. The “I”-Ego resides in the Present Self. Attention is directed, by choice, from Present Self to Past Self. The experience is of being in the present, and remembering the past (autonoesis). Awareness of Present Self is thus maintained; the representation of the Present Self outweighs that of the Past Self. Referring to ‘mental time travel’, in effect, the present self travels back to visit a past self. Considered part of normal waking consciousness.

Mental Time Travel and Absorption in Recall is ‘in Full’. Recall is not by choice but typically prompted by an external event matching a Past Self State and bypassing a weakened representation of Present Self. The “I”-Ego now resides as if in the Past Self, and attention is directed from Past Self to itself, with Present Self unattended. The experience is thus of being in the past. Awareness of Present Self is reduced; the representation of the Past Self outweighs that of the Present Self. In effect, referring to mental time travel, “there can be no travel without a traveler”. 

Remembering

Reliving
The Default Mode Network as a Model for the Sense of Self/Mental Time Traveller...
Controls (n=16): Positive Correlation

PTSD (n=18): Positive Correlation

Bluhm...Lanius J of Psychiatry & Neuroscience, 2009
Functional Connectivity Analyses [-14 -16 4]  
CONTROL (n=11) versus Flashback/Reliving (n=13)

Control > PTSD  
PTSD > Control

Lanius et al., AJP, 2004
Clinical Implications

- **PRESENT CENTERED THERAPIES:**
  Strengthening the self (e.g., building of safe relationships, including the therapeutic relationship, attachment resources, grounding skills, resource building, positive imagery, increasing positive affect tolerance, increased capacity for emotion regulation)

- **PAST CENTERED THERAPIES:**
  Exposure based treatments
Present vs Past Centered Therapies

Effects for present centered therapy was similar to a evidence-based trauma focused treatments (Frost et al., 2014; King et al., 2016)

Mindfulness based treatments are also showing efficacy for PTSD (e.g., Heffner et al., 2016; Frewen et al., 2015; Garland et al., 2015)
1st Person Perspective: Thoughts
Non-Dissociative

I hate myself

2nd Person Perspective: Voices
Dissociative

I hate you
I hate you
Dissociative Change in Narrative Perspective

• No longer is person the sole orator of his or her lived experience; another narrative voice(s) also speaks inside his or her head.

• The tale of one’s moment-to-moment phenomenal experience becomes shared among several speakers, a group conceivably differing in terms of interpretation (e.g., as evaluating an event as good vs. bad), emphasis (e.g., what is worthy of one’s attention), affect (e.g., negative vs. positive), goals (e.g., what choices one should make), and sense of time (e.g., present vs. past).
Fragmentation of the Self
Voice Hearing and Trauma-Related Disorders

• Studies have identified an association between early psychological trauma histories and voice hearing (Longdon et al., *Psych Bull*, 2012)

• Prevalence of voice hearing in individuals with trauma-related disorders did not differ significantly from individuals with schizophrenia

• Strong relationship between voice hearing and dissociation \( (r=0.52) \) (Pilton et al., *Clinical Psychology Review*, 2015)
Differentiating Psychotic Disorders from Dissociation

• Individuals with dissociative disorders were
  – more likely to experience voices before reaching adult age
  – more likely to experience three or more voices
  – were more likely to experience both child and adult voices (individuals with schizophrenia experienced almost exclusively adult-age voices)

Dorahy et al. (2009)
Working with the internalized voice of the perpetrator...
Toward Self-Compassion: Fostering Empathy and Mentilization Among Different Parts of the Self
“The Body Keeps the Score.”

Bessel van der Kolk
Defense Cascade Model

Hyperarousal & Hypervigilance Responses

Tonic Immobility

Depersonalization & Derealization Responses

Fight or Flight Response
- Active Defense
  - Sympathetic Dominance

Baseline Arousal

Tonic Immobility

Unresponsive Immobility
- Passive Defense
  - Parasympathetic Dominance

adapted from Schauer & Elbert, 2010; Kozlowska, 2015
The Reptilian Brain: The Subconscious Brain

Hardwired Defensive Responses

MacLean, 1990
The Reptilian Brain and the Innate Alarm System

Lanius et al., *Current Opinion in Psychology*, 2017
Periaqueductal Gray (PAG)

- Small tube-shaped region in midbrain
- Critical for autonomic regulation and for defensive responses
- Crucial role in basic emotional systems
- Comprised of multiple subdivisions that vary in function
PAG Subdivisions

Dorsolateral PAG = Sympathetic Fight/Flight

Ventrolateral PAG = Parasympathetic/Freezing & Shut Down

(Bandler et al., 2000; adapted by Linmann et al., 2012)
Dissociative PTSD: Greater Ventrolateral PAG Connectivity

Left TPJ
Right Rolandic Operculum

Increased Depersonalization

(Blanke & Arzy, 2005; Muscatelli et al., 2010;)

Harricharan et al., 2016
The Midbrain Periaqueductal Gray Control of Respiration

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The midbrain periaqueductal gray (PAG) organizes basic survival behavior, which includes respiration. How the PAG controls respiration is not known. We studied the PAG control of respiration by injecting 5,1-homocysteic acid in the PAG in unanesthetized precoclinually decerebrated cats. Injections in different parts of the PAG caused different respiratory effects. Stimulation in the dorsomedial PAG induced slow and deep breathing and dyspnea. Stimulation in the dorsolateral PAG resulted in active breathing and tachypnea consistent with the respiratory changes during fright and flight. Stimulation in the medial part of lateral PAG caused inspiratory apneas. Stimulation in lateral parts of the lateral and ventrolateral PAG produced respiratory changes associated with vocalization (mews, alternating mews and hisses, or hisses). 5,1-Homocysteic acid injections in the caudal ventrolateral PAG induced irregular breathing. These results demonstrate that the PAG exerts a strong influence on respiration, suggesting that it serves as the behavioral modulator of breathing.

Key words: midbrain; emotional breathing control; pattern generation; periaqueductal gray; brainstem; respiration
Clinical Implications

• The use of body scans (e.g., Kabat-Zin) adapted for traumatized clients
A Case Example:
Using Body Scans and Neurofeedback to Work with Dissociation and a Fragmented Self
EEG
### Patient EEG 1 Compared to Normative Database

<table>
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<th>Delta</th>
<th>Theta</th>
<th>Alpha</th>
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<td>6.22 p&lt;0.005</td>
<td>6.17 p&lt;0.000</td>
<td>8.23 p&lt;0.000</td>
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<td>0.83 p&lt;0.206</td>
<td>72.50 p&lt;0.013</td>
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EEG Neurofeedback (downtraining alpha amplitude) as an Adjunct Treatment for Complex PTSD ...
After four sessions of neurofeedback in conjunction with longterm psychotherapy...
### Patient EEG 2 Compared to Normative Database

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<td>23.39 p&lt;0.111</td>
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</tr>
<tr>
<td>O1-AvW</td>
<td>1.02 p&lt;0.326</td>
<td><strong>9.11 p&lt;0.002 16.03 p&lt;0.031</strong></td>
<td>1.09 p&lt;0.146</td>
<td>0.85 p&lt;0.093</td>
<td>0.75 p&lt;0.175</td>
<td>28.48 p&lt;0.081</td>
<td></td>
</tr>
<tr>
<td>O2-AvW</td>
<td>3.44 p&lt;0.075</td>
<td><strong>14.15 p&lt;0.001 16.57 p&lt;0.045</strong></td>
<td>1.58 p&lt;0.088</td>
<td>1.30 p&lt;0.050</td>
<td>1.65 p&lt;0.087</td>
<td>34.96 p&lt;0.077</td>
<td></td>
</tr>
</tbody>
</table>
Consciousness of Emotion

- Theorists have increasingly pointed out the significant role likely played by emotional processing in the across-species evolution of consciousness (e.g., Panksepp, 2008).
• Active and passive defensive responses
• Important role in all basic emotional systems (fear, rage, seeking, panic)
• Consciousness
# Panksepp’s Basic Emotional Systems

<table>
<thead>
<tr>
<th>Basic Emotional Systems</th>
<th>Key Brain Areas</th>
<th>Key Neuromodulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Pos. Motivation SEEKING/ Expectancy System</td>
<td>Nucleus Accumbens – VTA</td>
<td>DA (+), glutamate (+), opioids (+), <strong>neurotensin</strong> (+), orexin (+), Many other neuropeptides</td>
</tr>
<tr>
<td>RAGE/ Anger</td>
<td>Mesolimbic and mesocortical outputs Lateral hypothalamus – PAG</td>
<td>Substance P (+), Ach (+), glutamate (+)</td>
</tr>
<tr>
<td>FEAR/ Anxiety</td>
<td>Medial amygdala to Bed Nucleus of Stria Terminalis (BNST). Medial and perifornical hypothalamic to PAG</td>
<td>Glutamate (+), DBI, CRF, CCK, alpha-MSH, NPY</td>
</tr>
<tr>
<td>LUST/ Sexuality</td>
<td>Central &amp; lateral amygdala to medial hypothalamus and dorsal PAG</td>
<td>Steroids (+), <strong>vasopressin</strong>, &amp; oxytocin, LH-RH, CCK</td>
</tr>
<tr>
<td>CARE/ Nurturance</td>
<td>Cortico-medial amygdala, Bed nucleus of stria terminalis (BNST) Preoptic hypothalamus, VMH, PAG</td>
<td>oxytocin (+), prolactin (+) dopamine (+), opioids (+/-)</td>
</tr>
<tr>
<td>PANIC/ Separation</td>
<td>Anterior Cingulate, BNST Preoptic Area, VTA, PAG</td>
<td>opioids (-), oxytocin (-) prolactin (-), CRF (+) glutamate (+)</td>
</tr>
<tr>
<td>PLAY/ Joy</td>
<td>Dorso-medial diencephalon Parafascicular Area, PAG</td>
<td>opioids (+/-), glutamate (+) Ach (+), <strong>cannabinoids</strong>, TRH?</td>
</tr>
</tbody>
</table>
Consciousness Without a Cortex

Figure 9. The reaction of a three-year-old girl with hydranencephaly in a social situation in which her baby brother has been placed in her arms by her parents, who face her attentively and help support the baby while photographing.

Merker, 2007
Increased connectivity in areas involving emotional reactivity such as amygdala, anterior cingulate cortex, insula, cerebellum (Adolphs et al., 1994; Bush et al., 2000; Stein et al., 2007; Turner et al., 2007)
“Imminent danger results in fast, likely ‘hard-wired’, defensive reactions mediated by the midbrain.” – Mobbs et al., 2009, J Neurosci
Implications for therapy...
How can we regulate emotions?
How can we regulate emotions?
I know that it was not my fault, but I can’t stop feeling it…
How can we regulate emotions?

Bottom Up

Top Down

Neocortex: Rational or Thinking Brain

Limbic Brain: Emotional or Feeling Brain

Reptilian Brain: Instinctual or Dinosaur Brain
Bottom Up Regulation
Personalized Approach to Treatment...
The four dimensions of consciousness and the sense of self...
Self, Emotion, Thought, Body, Time, Disintegrated Across
I am …
An organism must be able to experience its own existence as a sentient being before it can experience the existence and salience of anything else in the environment…

Craig, 2009
Without a Self there is no Other...
Isolation and Estrangement...
Mentalizing: Allowing Experiences of Time, Thought, Body, and Emotion to be Shared between Two Individuals
Interviewer: What would it be like to make eye contact?

Tim: It feels, really scary. I feel like they’re going to see a kind of stain on my soul. I feel a sense of shame about being in the situation in Vietnam, and I also feel shame about some of the things that I witnessed and I didn’t do anything about - case in point, watching idly while they threw a grenade in a hole with a guy and knowing full well what the outcome of that was going to be...
“Making eye contact meant that you wanted to be noticed. Any kind of eye contact was seen as defiance, or as aggression, and it was also stating that I existed, and Mom did not want me to exist. It was not a good thing for me to exist because she didn’t like me - she didn’t want me. I was definitely not anything she wanted. To make any kind of eye contact was to bring attention to myself, and it would be met 99% of the time with being slugged or hit in some way. This is why I hid most of the time. Before I was probably three years old, I learned not to make eye contact, not to move, not to speak, and not to do anything. I learned: ‘keep your eyes down all the time’.”
The Neurobiology of Eye Contact
Eye Contact and the Innate Alarm System

Lanius et al., *Current Opinion in Psychology*, 2017
Direct Gaze > Avert Gaze (Angry, Happy and Neutral)

Steuwe et al., SCAN, 2012
NO ACTIVATION OF HIGHER CORTIVAL REGIONS IN PTSD

Superior Colliculus/Periaqueductal Grey

Steuwe et al., SCAN, 2014
Implications for treatment, obtaining social support, and the intergenerational transmission of trauma…
Healing the Traumatized Self: The Rebirth of the Self
The goal of psychotherapy is to help the traumatized individual establish a sense of self that is integrated across time, thought, body, and emotion and thereby is capable of the agentic pursuit of joy, pleasure, and triumph both within oneself and within relationships.
4D-Model and Sense-of-Self: From Trauma to Recovery

Not integrated across time, thought, body, and emotion

SELF TRAUMATIZED

I am in the past...

My thoughts and voices take control...

I am outside my body, and my body does not belong to me...

I can’t feel / I don’t know what I’m feeling, feel too much / too little...
“I was running on terror, and the only way that I can describe it, in retrospect, was that it was a kind of animal survival psyche. My sense of self was pretty undefined and diffuse, as if the nerve endings had no stopping place, and so without a skin or without a boundary, and without the other which creates that boundary, there isn’t a self.”
4D-Model and Sense-of-Self: From Trauma to Recovery

**SELF TRAUMATIZED**

- I am in the past...
- My thoughts and voices take control...
- I am outside my body, and my body does not belong to me...
- I can’t feel / I don’t know what I’m feeling, feel too much / too little...

**SELF RECOVERED**

- I am in the present...
- I own and am in control of my thoughts...
- I am in my body and it belongs to me...
- I can feel, and know what I’m feeling...
“It just happened that, there I was, established in that universe as a separate human being, not particularly unique, sort of ordinary and with other human beings who were living their lives out too. This was all like, miraculous, and I could only know it was miraculous in the absence of all the fear.... I could make eye contact, it didn’t hurt anymore - because it had been physically painful to make eye contact with another human being - that just was not an issue anymore...
...I would look at myself in the mirror (laughs)...hadn’t done [that] before (laughs)... I don’t know that I can say too much more about it, except that in the absence of abiding terror, a self can occur. A self *does* occur, and self-in-relationship occurs, because the other comes into view: smelled and felt and known. And then the other is known as having their own inherent self". 
THANK YOU!