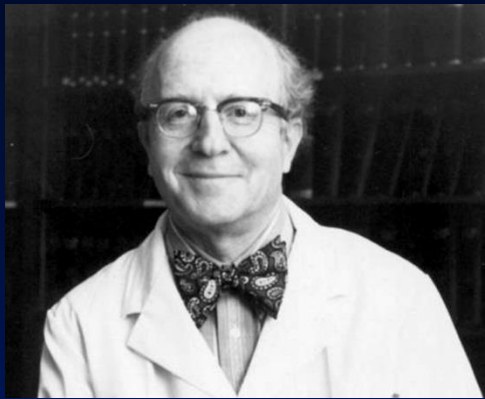


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The University of Arizona
Tucson, Arizona**

**Mechanisms of Change
in the Psychotherapeutic
Treatments of Bodily Distress**

Mechanisms of Change in the Psychotherapeutic Treatments of Bodily Distress

- Two fundamental problems arise from early adversity
 - dysregulated emotion processing
 - dysfunctional attachment processes
- Impaired mentalization / emotional awareness
 - can account for heightened focus on physical pain
 - treatment goal: promote transition from implicit to explicit emotion processing
- Dysfunctional attachment processes; treatment involves
 - Reconsolidation of emotional memories
 - Corrective emotional experiences



11th APS President 1953-54

Review

“Psychogenic” Pain and the Pain-Prone Patient*

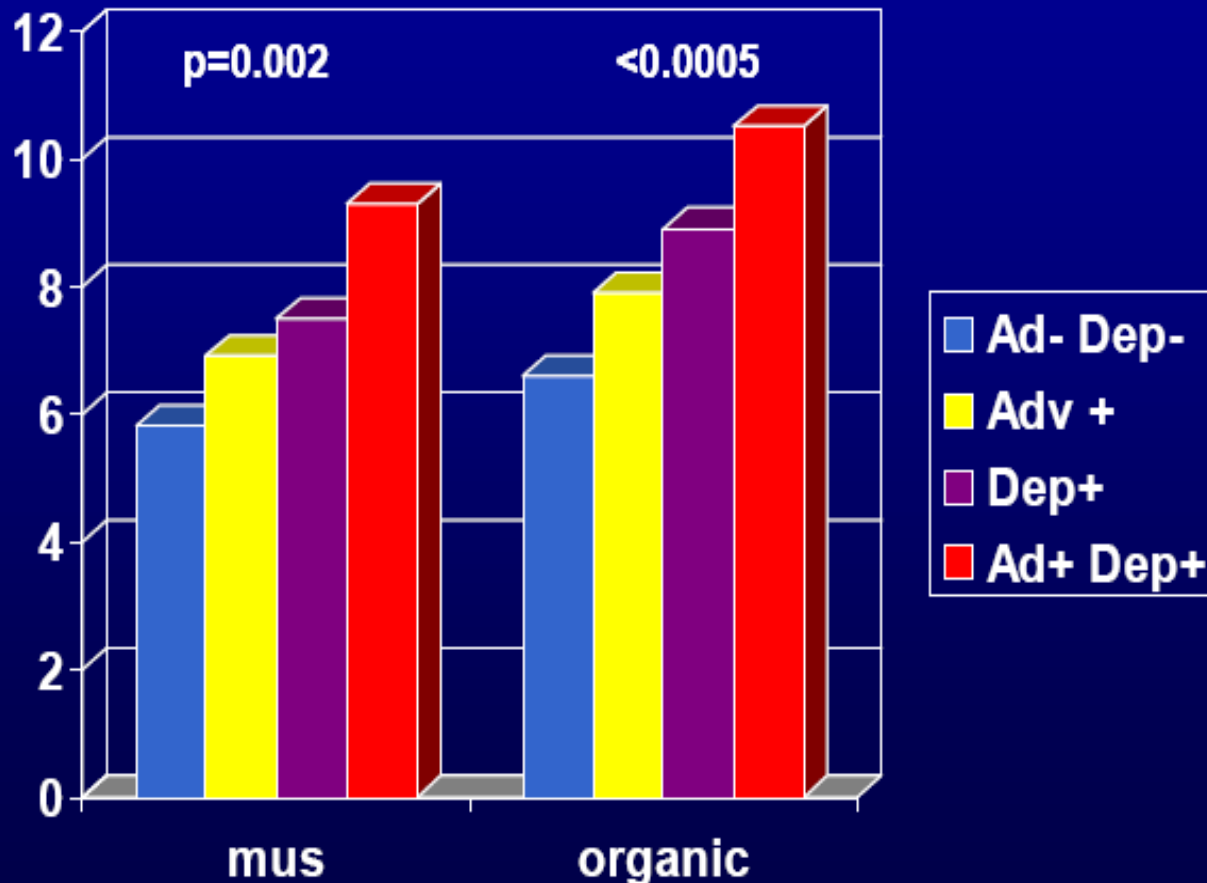
GEORGE L. ENGEL, M.D.
Rochester, New York

- Pain is a psychological, experiential phenomenon requiring participation of higher nervous centers
- Pain may occur without sensory input
- Pain often seems to serve as a kind of psychic regulator
 - when a strong aggressive drive is not fulfilled, pain may be experienced instead
 - when guilt is present, pain seems to serve as a kind of atonement
 - when a relationship is threatened or lost, pain serves as a replacement
- In certain pain prone patients, pain seems to substitute for the experience of other more painful emotions

Engel GL. *American Journal of Medicine* 1959; 26 (6): 899-918.

Number of bodily symptoms - childhood adversity and anx/dep as risk factors

Fiddler et al Gen Hosp Psych 2004



(medically unexplained symptoms)

Emotional and Cognitive Consequences of Trauma



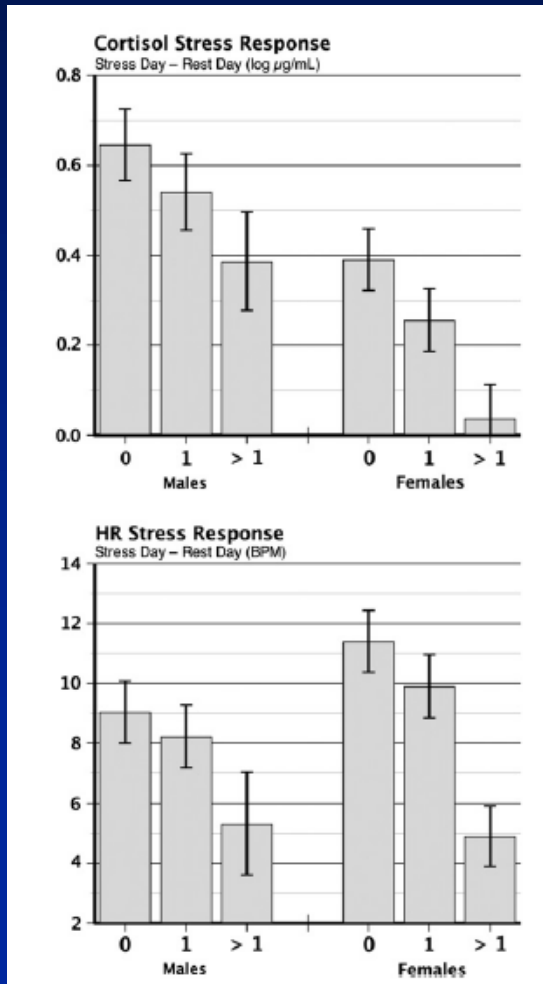
- Trauma - overwhelming, exceeding coping capacity
- Experiences often not shared with others
- “Double whammy” if parent is the perpetrator
(abuse + lack of support)
- Talking about or even attending to one’s own emotions was dangerous
- Adaptations were made to reduce emotional distress
(e.g. becoming perfectionistic, pessimistic)
- These adjustments were adaptive in the original context but are maladaptive later in life

Do Theory of Mind and Executive Function Deficits Underlie the Adverse Outcomes Associated with Profound Early Deprivation?: Findings from the English and Romanian Adoptees Study

Emma Colvert • Michael Rutter • Jana Kreppner •
Celia Beckett • Jenny Castle • Christine Groothues •
Amanda Hawkins • Suzanne Stevens •
Edmund J. S. Sonuga-Barke

- Children from Romanian orphanages who immigrated to the UK by age 43 months had impaired Theory of Mind and Executive Function relative to other Romanian or British adoptees tested at age 11
- The longer they were in the orphanages the more impaired they were: 2 yrs > 6-12 mos > 6 mos

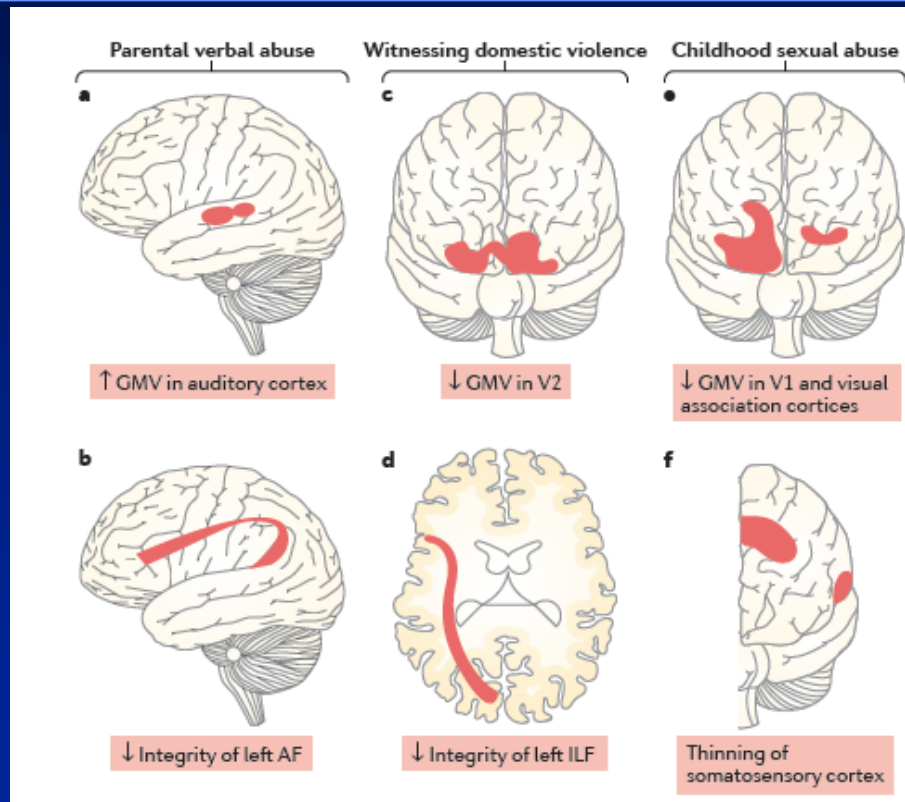
Early Adversity is Associated With *Attenuated* Stress Responses



Bill Lovallo
65th APS President
2007-2008

Lovallo, WR, Farag, NH, Sorocco, KH, Cohoon, AJ, & Vincent, AS (2012). Lifetime adversity leads to blunted stress axis reactivity: studies from the Oklahoma Family Health Patterns Project. *Biological Psychiatry*, 71(4), 344-349.

Early Adversity Associated with Abuse-Specific Changes in Brain Structure and Connectivity



Teicher MH, Samson JA, Anderson CM, Ohashi K. The effects of childhood maltreatment on brain structure, function and connectivity. *Nature Reviews Neuroscience* 2016; 17(10): 652-666.

Automatic Physiologic Adaptations to Early Adversity

Automatic adaptation to repeated, unavoidable emotional distress in childhood

- ↓ Stress Responses
- ↓ Emotional Awareness
- ↓ Volume Sensory Cortex

How Might Early Adversity *Amplify Pain?*

- In childhood emotions are interpersonally regulated
- In the context of abuse and neglect, this type of regulation does not occur or is limited when it is needed most
- A common solution is to tune out internal emotional distress and become vigilant for external threats
- Abused children also do not receive the empathic attunement and mirroring from others that would enable them to know what they are feeling
- This impairment in mental representation is associated with impaired MPFC activation and impaired top-down modulation of subcortical generators of affect

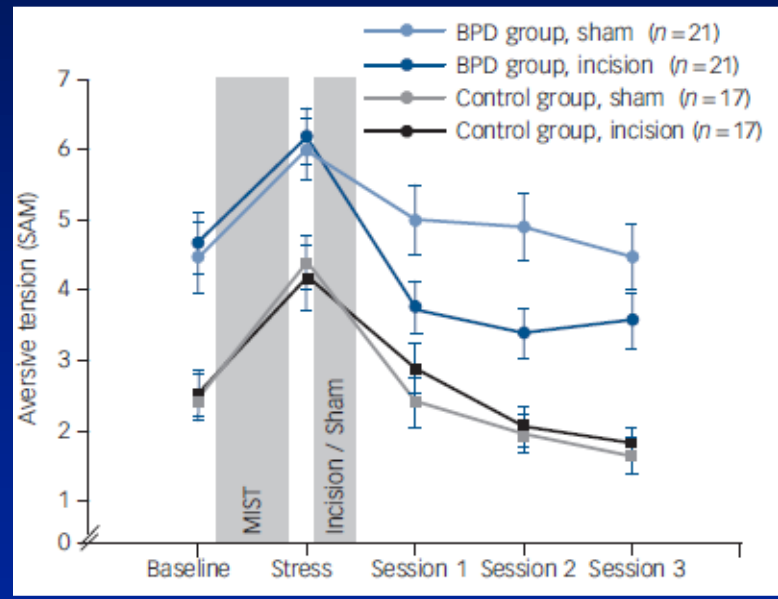
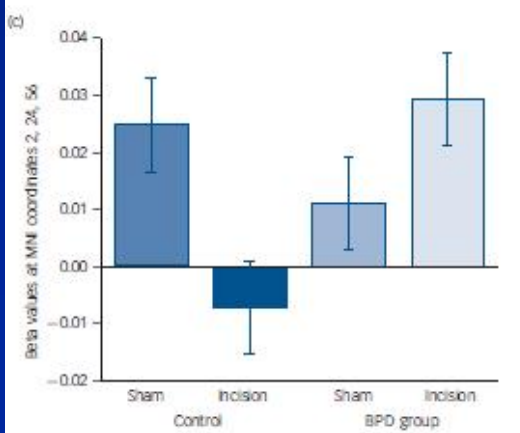
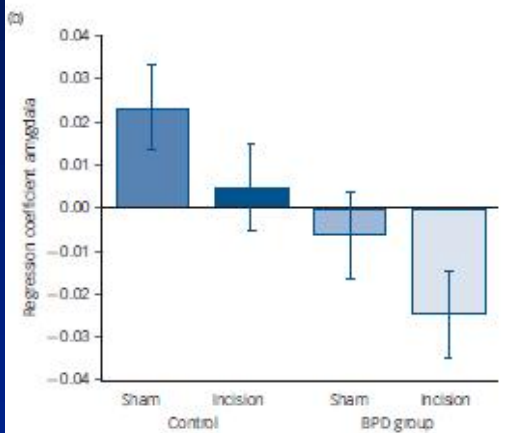
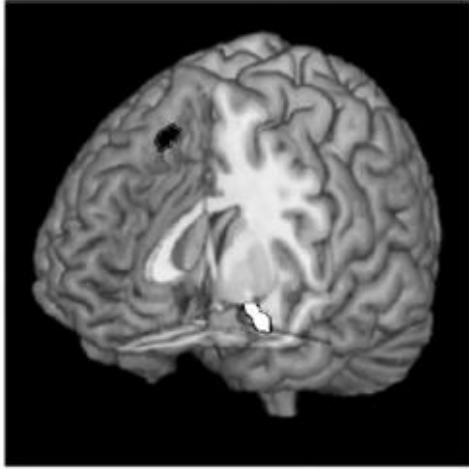
How Might Early Adversity *Amplify Pain?*

- Impaired mental representation of emotion is linked to
 - Decreased mentalization ability
 - Decreased capacity to identify stressors
 - Impaired capacity for attachment
- Unmodulated subcortically-generated implicit affect
 - Decreased vagal tone
 - Enhanced inflammation
- Inflammation promotes allodynia (benign stimuli painful)
- If early adversity involved physical pain, pain is a likely interpretation of ambiguous physical sensations arising from undifferentiated emotional distress

Role of Attention in Promoting Physical Pain Experience in the Context of Emotional Distress

- In the context of early adversity, unpleasant bodily sensations may be interpreted either as emotional distress or physical pain
- If physical pain is “selected” and attended to, that will **amplify** the experience of physical pain and **decrease** the experience of emotional distress
- The decrease in distress will be experienced as rewarding, reinforcing this cognitive bias
- As such, pain can serve as a “psychic regulator”

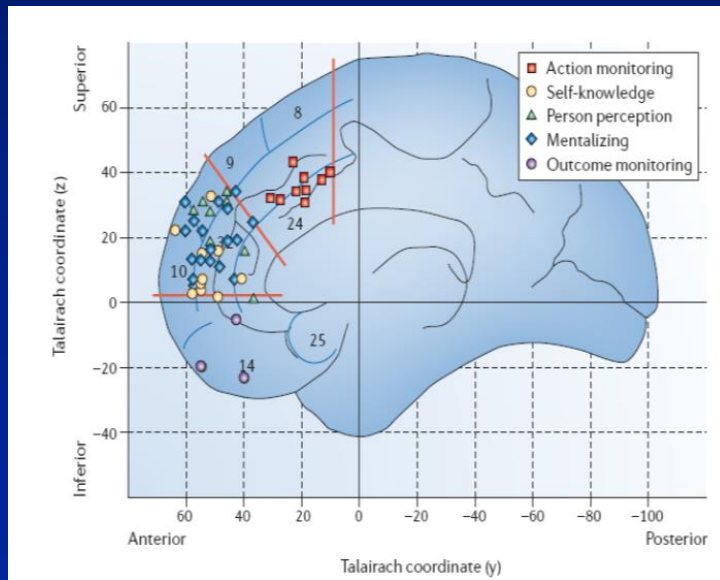
Reduction of Tension and Stress By Experimental Incisional Pain in Borderline PD



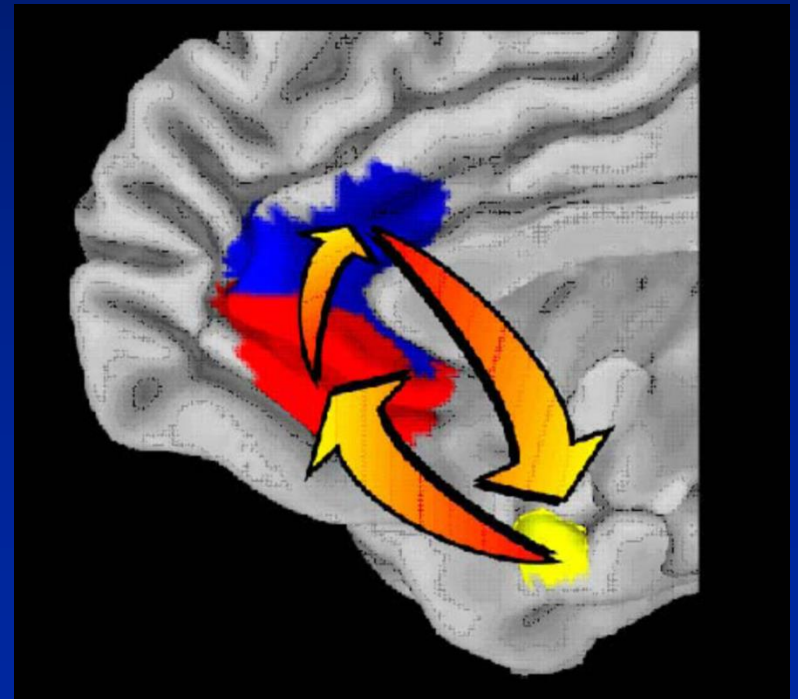
Reitz S et al. Incision and stress regulation in borderline personality disorder: neurobiological mechanisms of self-injurious behaviour. *British Journal of Psychiatry* 2015; 207: 165-172.

Affective Agnosia: An Impairment in the Ability to Explicitly Mentally Represent One's Own Emotions

- A new type of agnosia that is supramodal involving a deficit in the recognition of one's own emotional states
- A failure of subcortical transmission to the medial frontal lobe



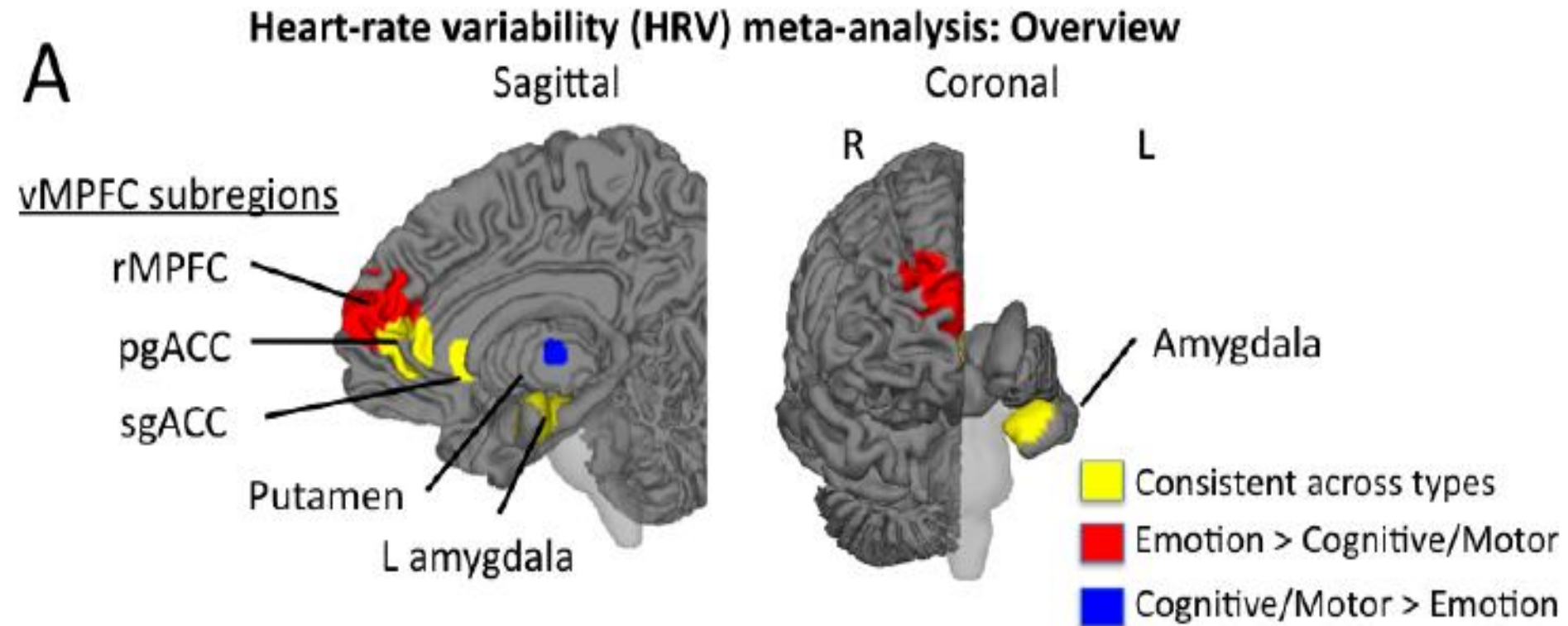
Lane et al. Affective Agnosia. *Neuroscience and Biobehavioral Reviews* 2015; 55:594-611.



Medial Prefrontal Cortex

Participates in Regulating Vagal Tone (HRV)

Meta-Analysis of 12 studies



Thayer JF, Åhs F, Fredrikson M, Sollers J, Wager TD.
Neuroscience & Biobehavioral Reviews 2012; 36(2): 747-756.

The Anti-Inflammatory Reflex

Activation of the Vagus Nerve Is Anti-Inflammatory

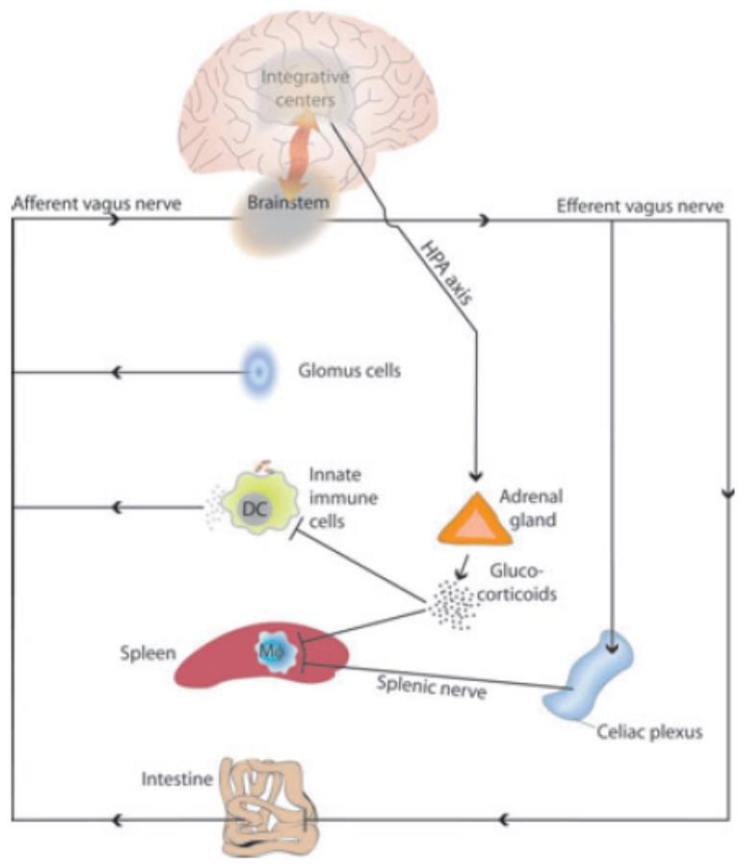
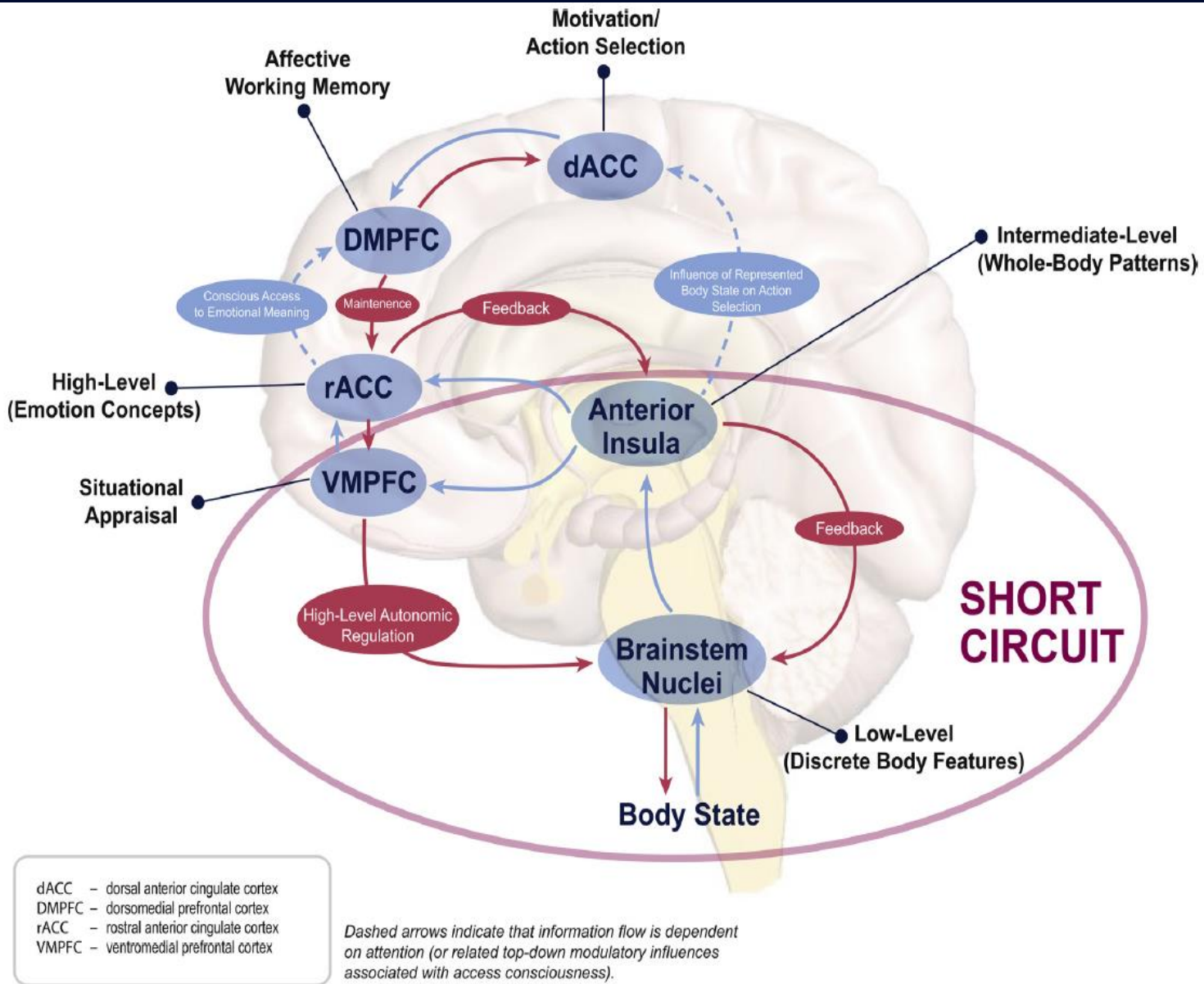


Fig. 1. The inflammatory reflex. Immune responses are regulated by neural reflex circuits that sense peripheral inflammation and provide regulatory feedback through specific nervous signals and humoral factors. Sensory vagus fibers innervate a multitude of organs, for example the intestine and glomus caroticum. They are activated by cytokines induced by tissue damage or PAMPs in the periphery and transmit signals to the nucleus tractus solitarius (NTS) in the brainstem. Polysynaptic relays connect to the vagal motor neurons in the dorsal vagal motor nucleus and nucleus ambiguus and sympathoexcitatory neurons in the rostral ventrolateral medulla. Efferent vagus nerve signals travel to the celiac plexus and also directly to target organs and suppress innate immune responses. Activation of afferent vagus signals also triggers a 'sickness response' and activates the hypothalamic-pituitary-adrenal (HPA) axis, which promotes glucocorticoid release from the adrenal glands.



Lane RD, Weihs KL, Herring A, Hishaw A, Smith R. Affective agnosia: Expansion of the alexithymia construct and a new opportunity to integrate and extend Freud's legacy. *Neuroscience and Biobehavioral Reviews* 2015; 55:594-611.

Working with Trauma in Psychotherapy



- Victims know what happened but not how it affected them emotionally
- Emotional experiences need to be formulated for the first time – titrated to what is tolerable
- Discussion of past experiences incorporates new information – safety, empathy, support
- New context permits the experience of **new** emotions, experiencing feelings (anger, guilt, longing) for the first time that had previously been intolerable and unformulated

Mentalization-Based Therapy Helps in the Treatment of Functional Pain

Psychoanalytic Psychotherapy,
Vol. 26, No. 2, June 2012, 121–140

 Routledge
Taylor & Francis Group

A mentalization-based approach to the understanding and treatment of functional somatic disorders

Patrick Luyten^{a,b*}, Boudewijn Van Houdenhove^a, Alessandra Lemma^c,
Mary Target^b and Peter Fonagy^b

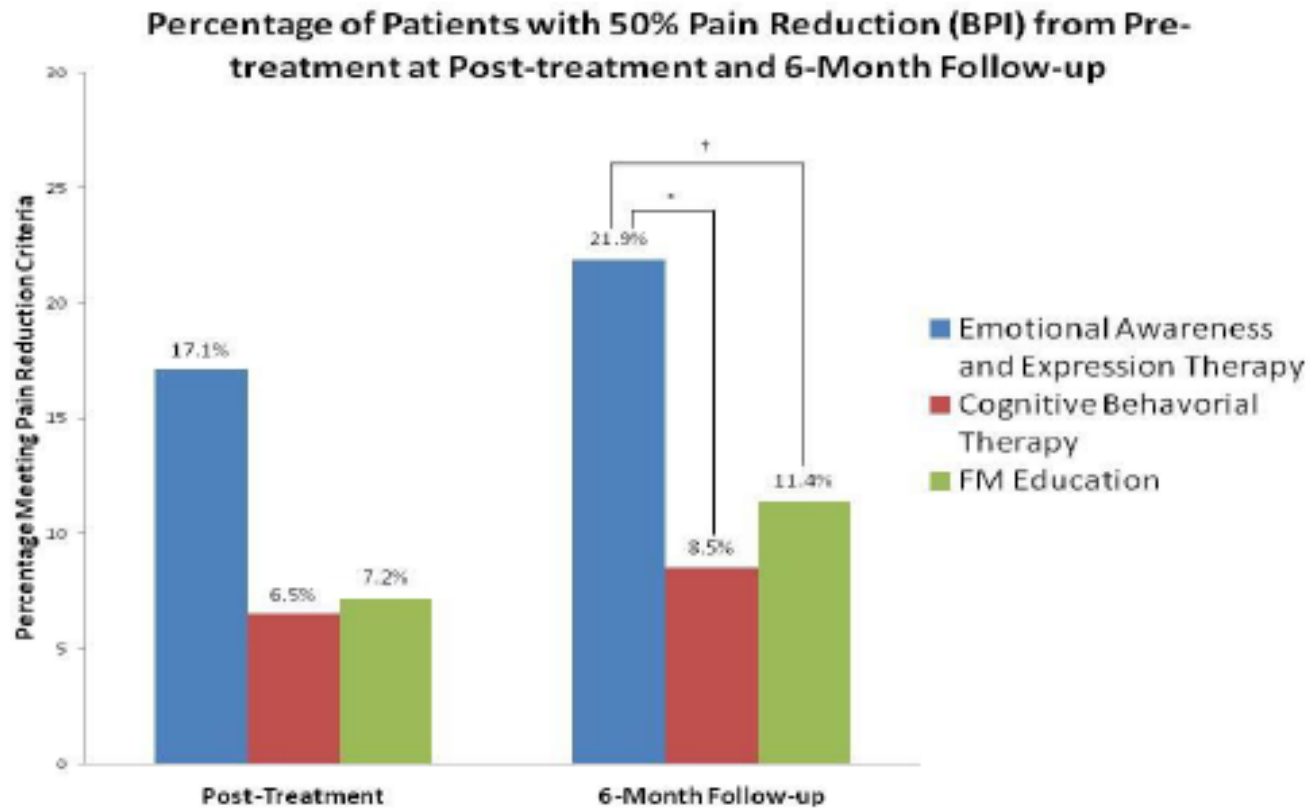
^a*University of Leuven, Leuven, Belgium;* ^b*University College London, London, UK;*
^c*Tavistock and Portman NHS Foundation Trust, London, UK*



The PAST-FM (Pain and Stress Treatment for Fibromyalgia) Trial: Effects of Emotional Awareness and Expression and Cognitive Behavioral Therapies



Mark A. Lumley¹, Howard Schubiner², Nancy Lockhart¹, Kelley M. Kidwell³, Steven Harte³, Daniel J. Clauw³, and David A. Williams³
¹Wayne State University, ²St. John Providence Health System, & ³University of Michigan Medical Center



Lumley et al. Pain 2017

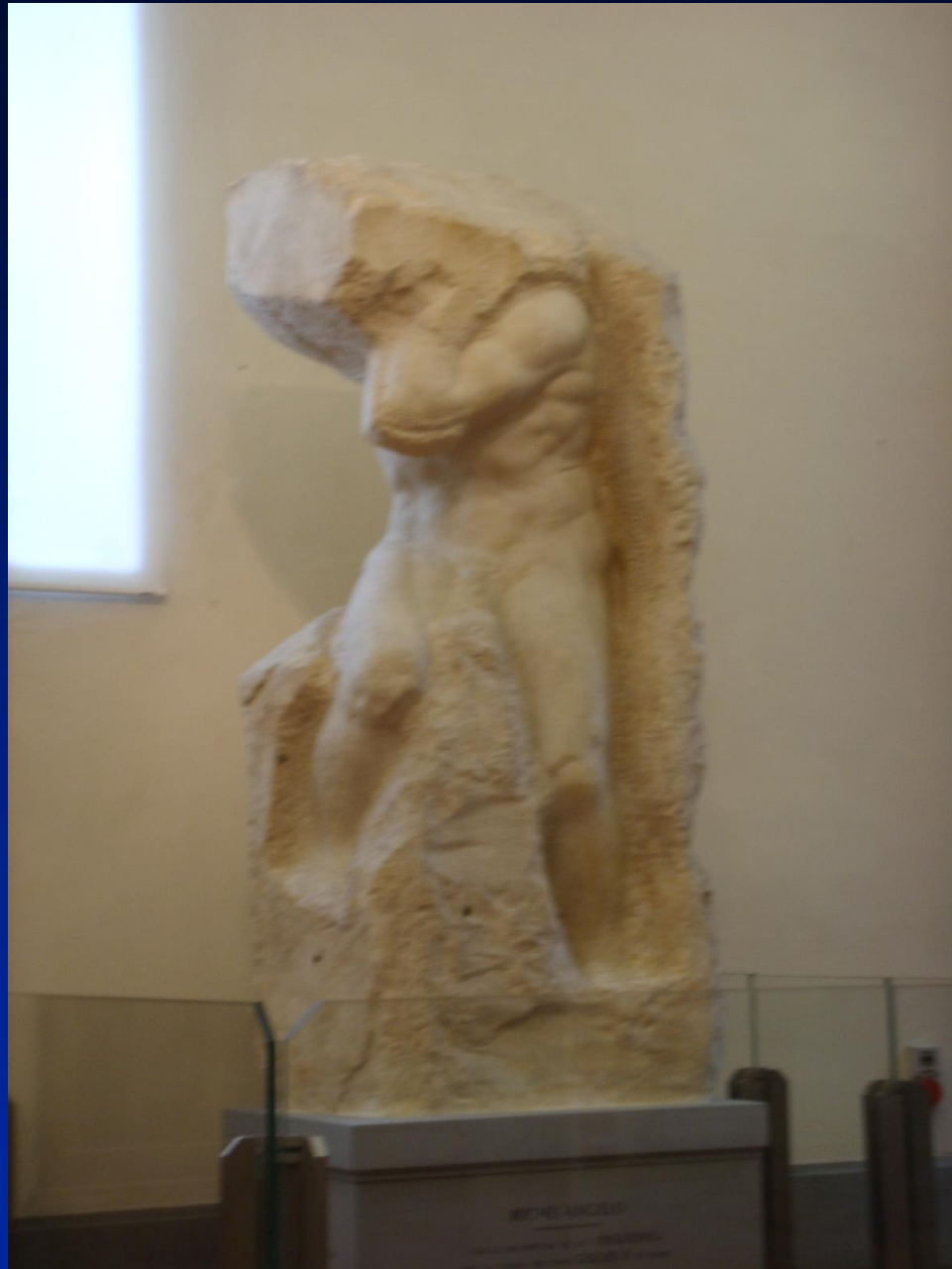
Transformation



From Implicit to Explicit

Implicit (Non-Mentalized) Emotion: Behavior and Physiology Without Feeling

Implicit aspects of emotion consist of the automatic motor expressions of emotion, including visceromotor {autonomic, neuroendocrine} and somatomotor {gestures, facial expressions, action tendencies, procedures} responses, i.e. peripheral physiology and behavior, and their sensory consequences {bodily sensations}.



MICHELANGELO

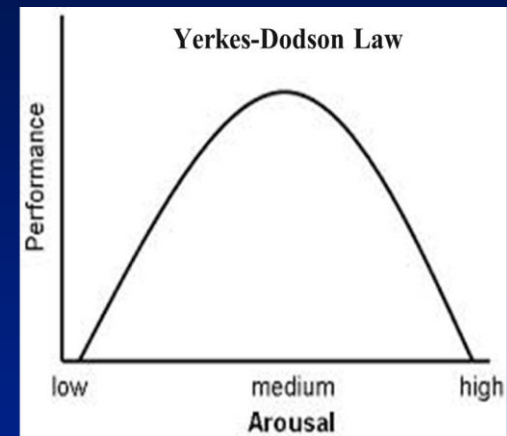
DAVID
1501-1504
MUSEO DELL'OPERA DEL DUOMO DI FIRENZE

Multi-Modal Treatment of Functional Pain

Somatic

- Exercise
- Meditation / Paced Breathing
- Massage / acupuncture
- Psychotropic medication

Mentalization
Ability



Psychological – (cognitive/affective)

- Non-verbal expressive therapies (art/dance)
- CBT
- Individual exploratory psychotherapy (if tolerated)
- Group therapy

Memory reconsolidation, emotional arousal, and the process of change in psychotherapy: New insights from brain science

Richard Lane, M.D., Ph.D., Prof of Psychiatry, U of Arizona

Lee Ryan, Ph.D. Professor of Psychology, U of Arizona

Lynn Nadel, Ph.D. Professor of Psychology, U of Arizona

Les Greenberg, Ph.D. Professor of Psychology, York U

BBS Editor (Barbara Finlay), 6 anonymous reviewers and
and 28 commentators

lane@email.arizona.edu



NEUROSCIENCE OF ENDURING CHANGE:

Applications to Psychotherapy

September 15-16, 2017 · Tucson, Arizona

The purposes of this two-day conference for researchers and clinicians are: (1) to define a research agenda for the neuroscience of enduring change, (2) acquaint researchers and clinicians with recent basic research findings and their clinical implications, and (3) discuss the mechanisms of enduring change in psychotherapy from the perspective of the major psychotherapy modalities.

FRIDAY, SEPTEMBER 15 : BASIC SCIENCE

- Lynn Nadel, PhD, University of Arizona: **Memory Systems and Dynamics**
- Ryan Smith, PhD, University of Arizona: **Implicit and Explicit Emotion**
- Ajay B. Satpute, PhD, Pomona College: **Construction of Emotional Experience**
- Merel Kindt, PhD, University of Amsterdam: **Emotion-Memory Interactions**
- Jessica Andrews-Hanna, PhD, University of Arizona: **Arousal and the Frontal Lobes**
- Jessica Payne, PhD, University of Notre Dame: **Sleep and Memory Dynamics**
- Lee Ryan, PhD, University of Arizona: **Memory and the Self**
- Jacek Debiec, MD, PhD, DPhil, MPH, University of Michigan: **Early Life Trauma**

SATURDAY, SEPTEMBER 16 : APPLICATIONS TO PSYCHOTHERAPY

- Les Greenberg, PhD, York University: **Emotion Focused Therapy**
- Edna B. Foa, PhD, University of Pennsylvania: **Behavioral Therapy**
- Michelle G. Craske, PhD, University of California, Los Angeles: **Cognitive Behavioral Therapy**
- Hanna Levenson, PhD, Wright Institute: **Psychodynamic Psychotherapy**
- Rhonda Goldman, PhD, Illinois School of Professional Psychology: **Integrative Therapies**
- Richard D. Lane, MD, PhD, University of Arizona: **Synthesis**

For more details and to register online visit: www.psychology.arizona.edu/NPC2017



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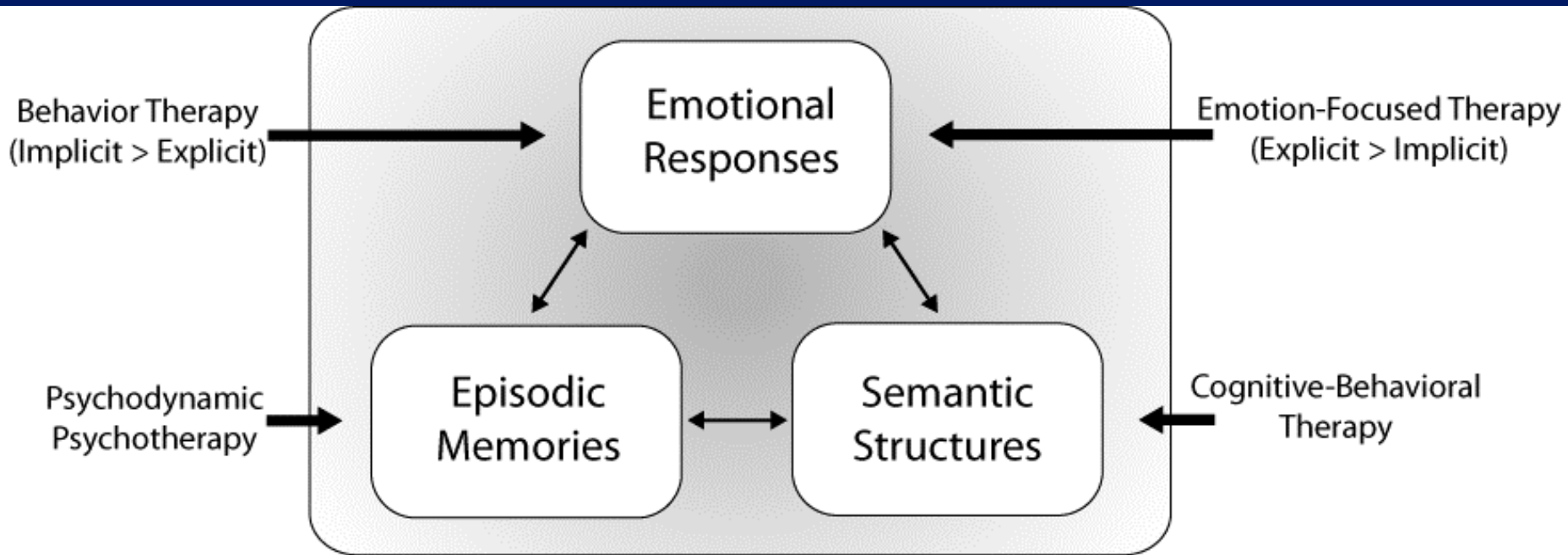


THE UNIVERSITY OF ARIZONA
COLLEGE OF MEDICINE TUCSON
Psychiatry

Proposed Essential Ingredients For Change in Psychotherapy

- Activate old memories and old feelings (with or without awareness of their connection to the past)
- Concurrently engage new emotional experiences that change old memories through reconsolidation
- Reinforce the strength of new memories and their semantic structures by practicing new ways of behaving and experiencing the world in a variety of contexts

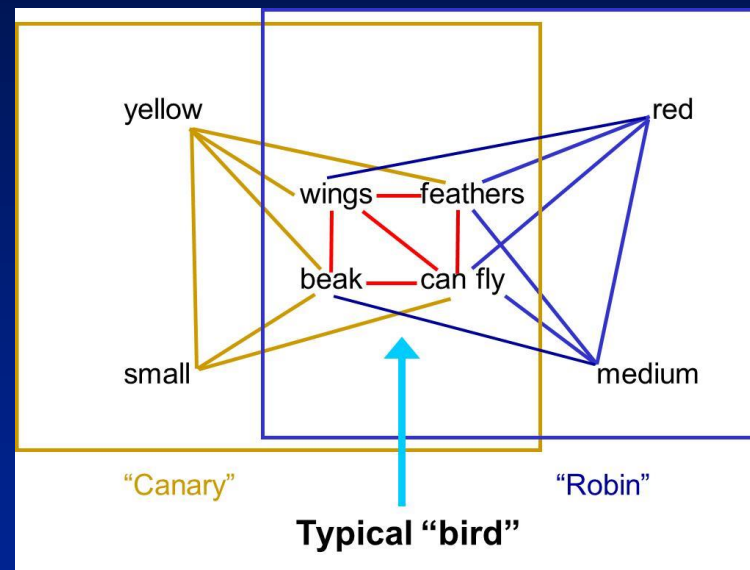
Major Psychotherapy Modalities Differ in Their Points of Entry



Proposal For How Automatic, Implicit Emotional Processes Can Be Altered: Reconsolidation of Emotional Memories

- Previously unformulated adaptive emotional responses (e.g. anger) can be experienced for the first time and put into words.
- These emotions are experienced in relation to problematic situations from the past and become added to an expanded narrative of the problematic situation.
- Memories of these old problematic contexts that incorporate these new adaptive emotional responses can be reconsolidated.
- Putting new emotions into words and new scripts into action enables them to be understood and rehearsed until they become automatic (i.e. implicit → explicit → implicit).

Working Through: Making the Transition from Episodic Memories to Semantic Structures



Relevant features of **recurring situations** are extracted including who is involved, what transpires, how it feels, how to respond and how others respond to you.

Updating Memories: Time Course of Change

- Episodic -- easiest to update
- Semantic – harder to update
- Procedural / Habit – hardest to update

Implications for Psychodynamic Psychotherapy

- Active recall of past experiences, promotion of intense emotional experiences including new experiences in the transference, and the emphasis on working through in a variety of contexts is highly consistent with this model
- Perhaps the process of creating trust, establishing the working alliance and enabling transference constitutes critical implicit learning that paves the way for new explicit corrective experiences

Conclusions

- Early adversity predisposes to unexplainable pain by compromising emotional awareness and attachment processes
- In this context a focus on pain may serve as a psychic regulator, preventing the experience of even more intolerable undifferentiated emotional distress
- Emotional awareness may be promoted by transforming implicit to explicit emotional processes
- Attachment schemas may be revised by having corrective emotional experiences and reconsolidating associated emotional memories
- The end result is a decrease in preoccupation with bodily distress and a better ability to deal with current stressors