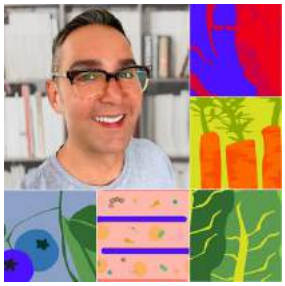
Microbiome, Gut and Systemic Health: New Frontiers in Personalised Nutrition



Dr. Miguel Toribio-Mateas

Lived Experience and the Gut-Brain Axis: a Trauma-Informed Approach to Mental Wellbeing from the Gut Up

4:15-5:00pm

An event by: Nutritional Medicine Institute

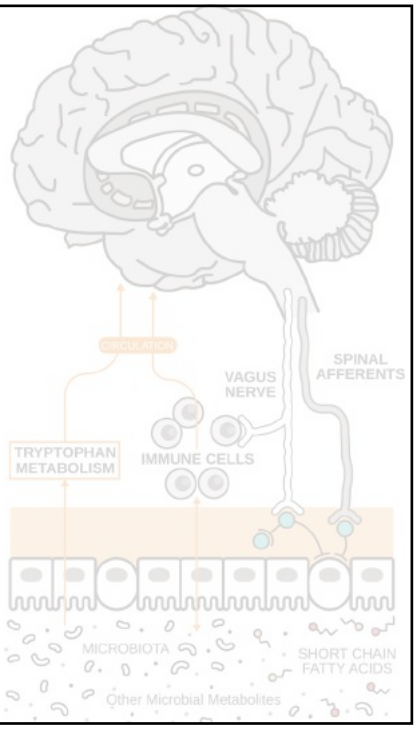
Platinum sponsors: regenerus labs VIRIDIAN Effective | Ethical | Pure pure encapsulations

1

Lived Experience and the Gut-Brain Axis:

a Trauma-Informed Approach to Mental Wellbeing from the Gut Up

By Dr Miguel Toribio-Mateas



2

Hello! I'm Miguel!

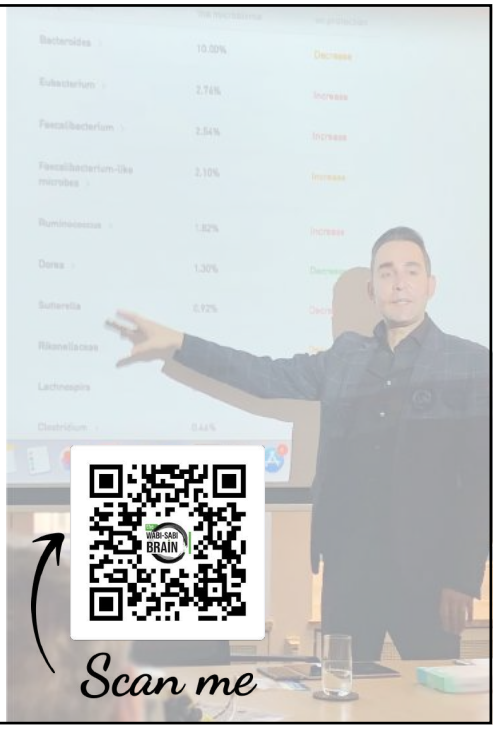
Clinical Neuroscientist

Applied Microbiologist

Longstanding background in Nutrition

Honorary Research Fellow, Cardiff University

Human with Lived Experience



3

4

What's "Lived Experience?

Lived Experience refers to the first-hand accounts and interpretations individuals give of their perceptions, actions, and experiences within a specific social and cultural context.

Toribio-Mateas, M (2023)

5

What's "Lived Experience?

In the context of the gut-brain axis, lived experience encompasses the unique, subjective experiences of health, wellbeing, and disease, deeply shaped by biological, psychological, and social factors. It serves as an indispensable dimension for holistic, patient-centred, and trauma-informed approaches in healthcare.

Toribio-Mateas, M (2023)

6

Phenomenology

At its core, the concept of "lived experience" is rooted in phenomenology, which focuses on the structure of various types of experience. From an ontological standpoint, phenomenology posits that understanding the essence of a "phenomenon" involves examining it from the perspective of those who have lived it.

Husserl, 1900-01

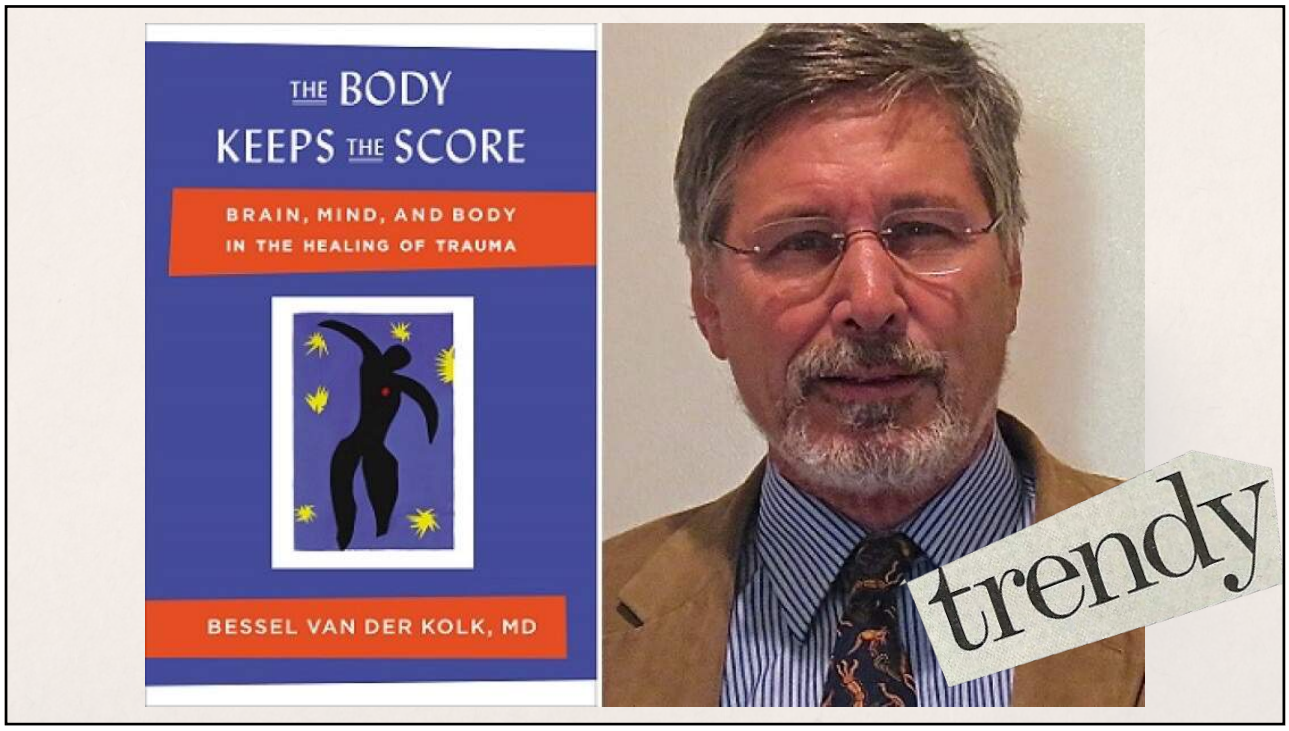
7

Embodiment

"Lived experience" also incorporates the notion of "embodiment," where the physical body isn't just an object that experiences reality, but rather a constitutive part of that reality.

Merleau-Ponty, 1945

8



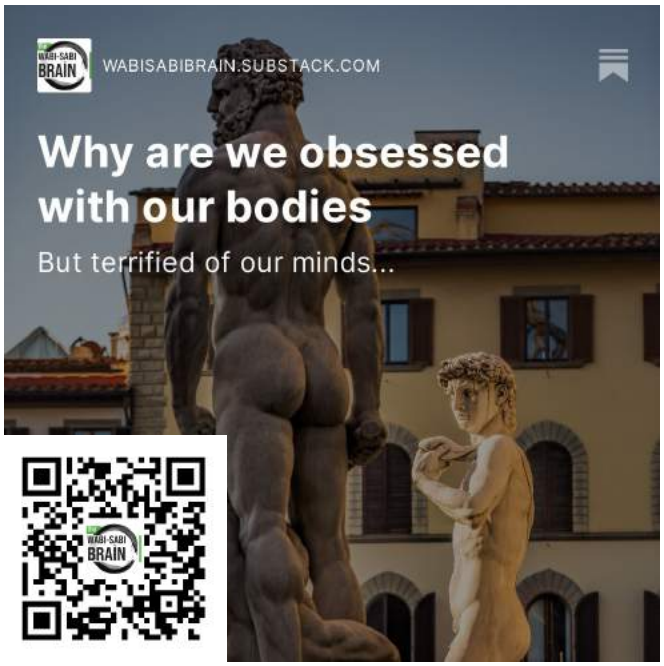
9

Subjectivity as a Source of Knowledge

Traditionally, objectivity has been highly valued in scientific research. However, in the study of "lived experience," subjectivity isn't seen as a limitation but rather as a source of unique and invaluable insights.

Heidegger, 1927

10



"a wabi-sabi approach to solving the mind-body body-mind dichotomy is to view it not as a problem to be solved but as a reflection of the beautiful complexity of human existence."

Dr Miguel Toribio-Mateas
Why are we obsessed with our bodies
WABISABIBRAIN.SUBSTACK.COM

11

Narrative Inquiry

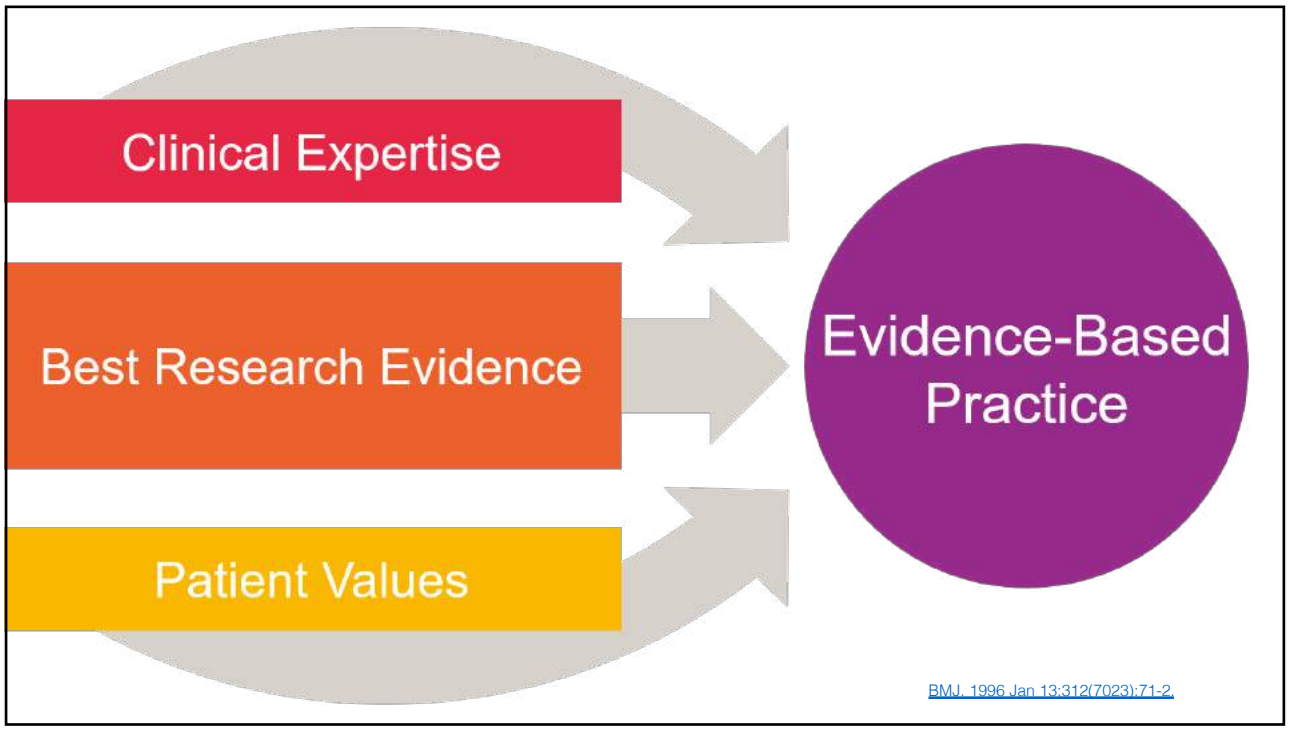
From an epistemological viewpoint, narrative inquiry serves as a means to explore and understand lived experience. Stories and personal accounts provide data that can be critically examined to uncover the underlying themes, emotions, and patterns that constitute lived experience.

Polkinghorne, 1988

12


Why is this important?

13


Clinical Expertise
Best Research Evidence
Patient Values
Evidence-Based Practice
BMJ. 1996 Jan 13;312(7023):71-2.

14

And then there's a curveball

Psychological trauma is an emotional response caused by severe distressing events such as accidents, violence, sexual assault, terror, or sensory overload.

Dialogues Clin Neurosci. 2011;13(3):263-78.

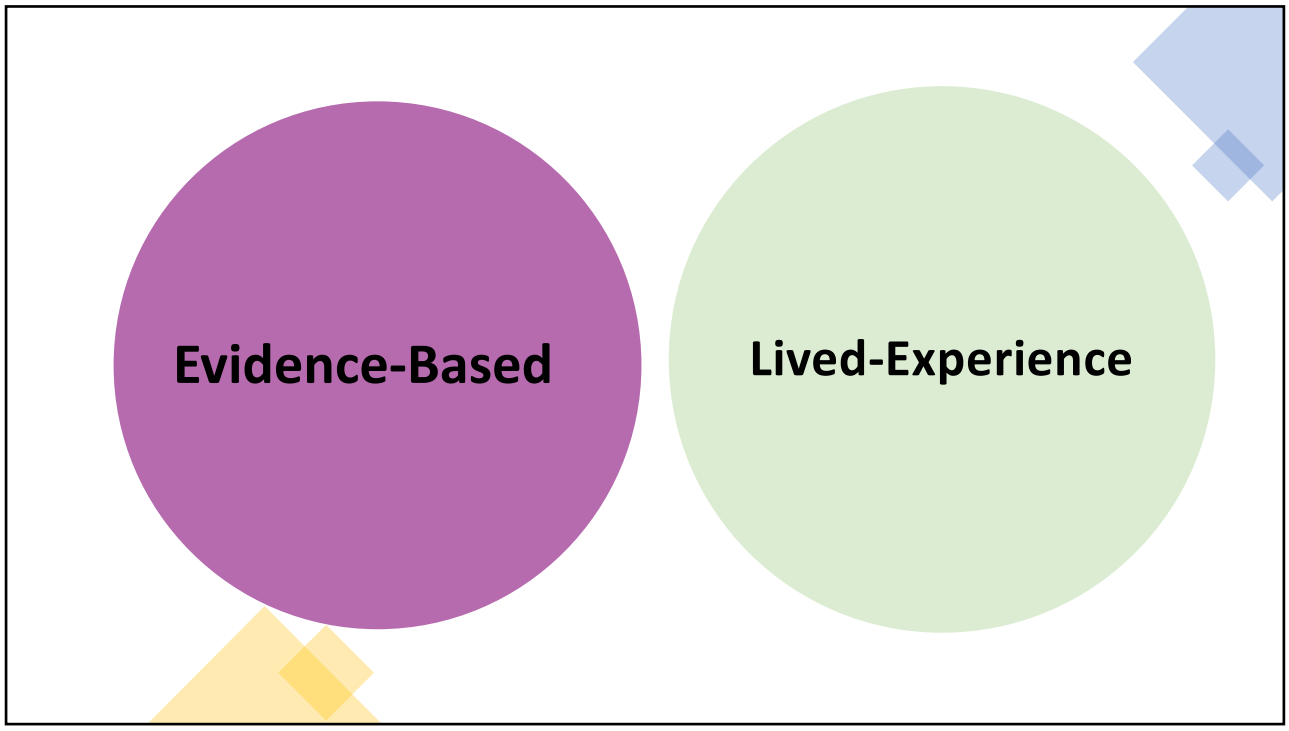
15

Psychological Trauma

As subjective experiences differ between individuals, people react to similar events differently. Not everyone who experiences a potentially traumatic event becomes psychologically traumatised, though they may be distressed and experience suffering.

Mol Psychiatry. 2018 Sep;23(9):1892-1899.

16

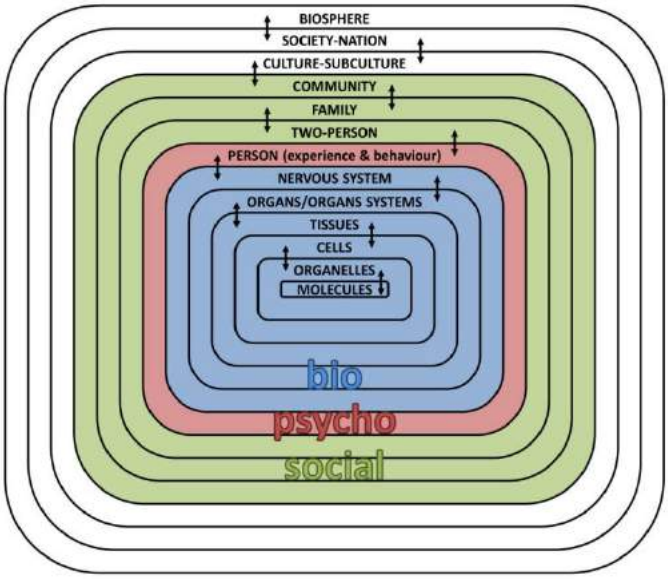


17

Engel's Biopsychosocial Model

'The existing biomedical model does not suffice. To provide a basis for understanding the determinants of disease and arriving at rational treatments and patterns of health care, a medical model must also take into account the patient, the social context in which he [sic] lives, and the complementary system devised by society to deal with the disruptive effects of illness, that is, the physician role and the health care system. This requires a biopsychosocial model'.

Healthcare (Basel). 2017 Nov 18;5(4):88.



18

Lived-Experience / Trauma-Informed Approach to Practice

19

Neurobiological Impact of Trauma

Feature	Change	Effect
A. Neuroendocrine		
Hypothalamic-pituitary-adrenal axis	Hypocortisolism	Disinhibits CRH/NE and upregulates response to stress
		Drives abnormal stress encoding and fear processing
	Sustained, increased level of CRH	Blunts ACTH response to CRH stimulation
		Promotes hippocampal atrophy
Hypothalamic-pituitary-thyroid axis	Abnormal T3: T4 ratio	Increases subjective anxiety
B. Neurochemical		
Catecholamines	Increased dopamine levels	Interferes with fear conditioning by mesolimbic system
	Increased norepinephrine levels/activity	Increases arousal, startle response, encoding of fear memories
		Increases pulse, blood pressure, and response to memories
Serotonin	Decreased concentrations of 5 HT in:	Disturbs dynamic between amygdala and hippocambus
	• Dorsal raphé • Median raphé • Dorsal/median raphé	Compromises anxiolytic effects
		Increases vigilance, startle, impulsivity, and memory intrusions

Dialogues Clin Neurosci. 2011;13(3):263-78.

20

Neurobiological Impact of Trauma

Feature	Change	Effect
A. Neuroendocrine		
Amino acids	Decreased GABA activity	Compromises anxiolytic effects
	Increased glutamate	Fosters derealization and dissociation
peptides	Decreased plasma NPY concentrations	Leaves CRH/NE unopposed and upregulates response to stress
	Increased CSF b-endorphin levels	Fosters numbing, stress-induced analgesia, and dissociation
C. Neuroanatomic		
Hippocampus	Reduced volume and activity	Alters stress responses and extinction
Amygdala	Increased activity	Promotes hypervigilance and impairs discrimination of threat
Cortex	Reduced prefrontal volume	Dysregulates executive functions
	Reduced anterior cingulate volume	Impairs the extinction of fear responses
	Decreased medial prefrontal activation	Unclear

Dialogues Clin Neurosci. 2011;13(3):263-78.

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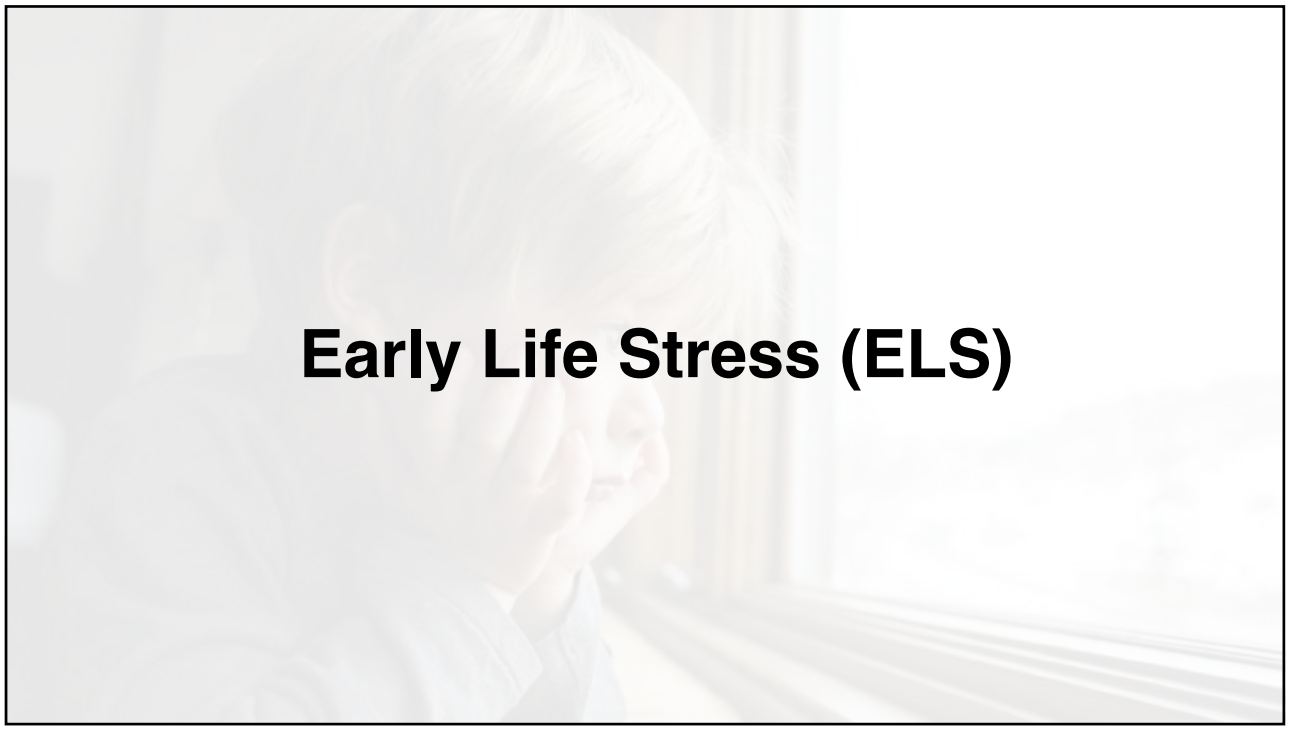
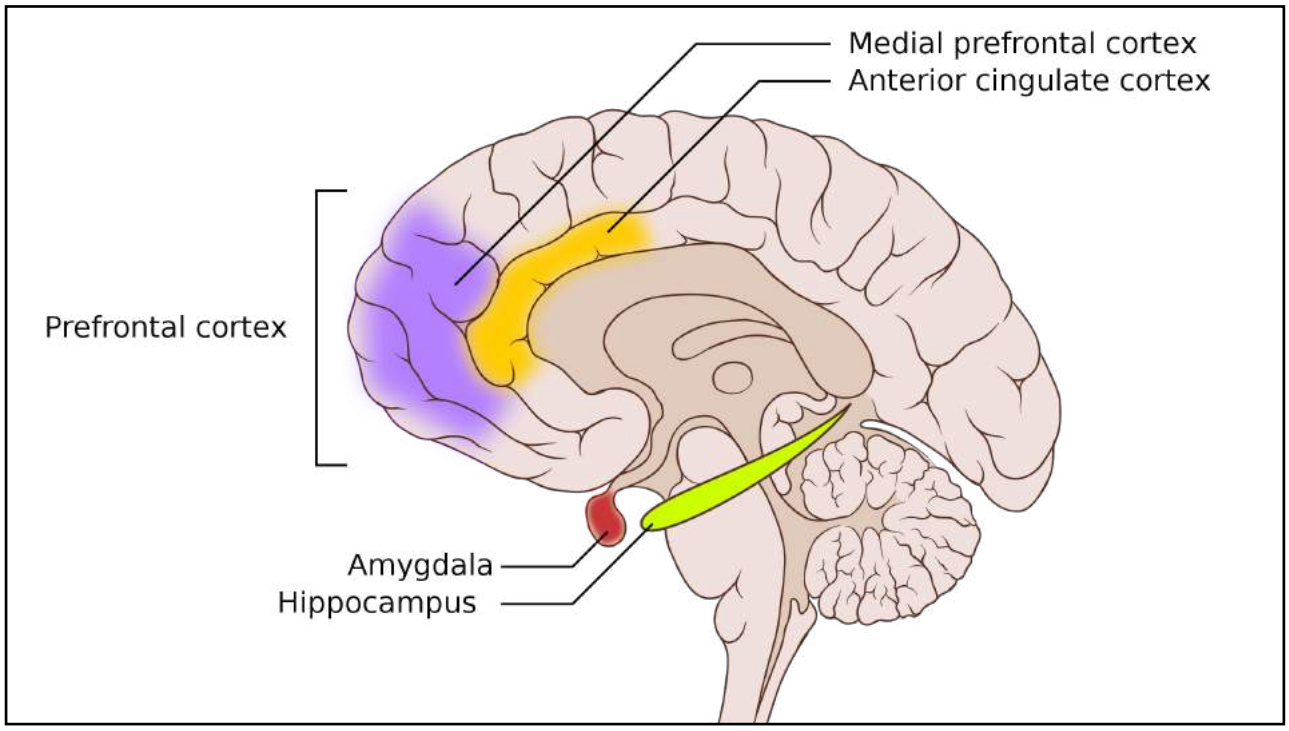


23

Overlapping Mechanisms with Trauma

Both early life stress and trauma can lead to **neurobiological alterations**, particularly in the amygdala, prefrontal cortex, and hippocampus. These changes can affect emotional regulation, stress response, and memory.

24

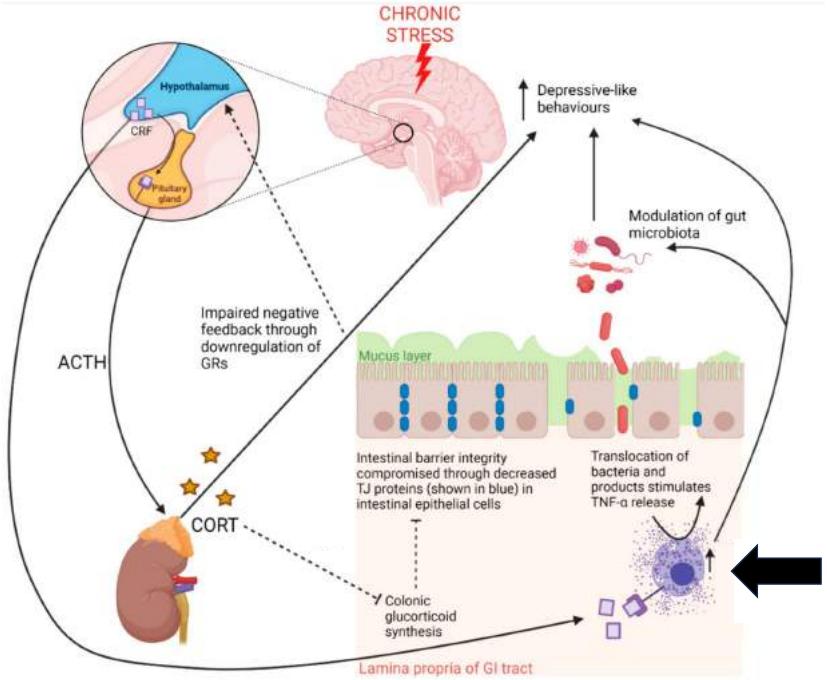


25

Overlapping Mechanisms with Trauma

Early life stress and trauma can **dysregulate the Hypothalamic-Pituitary-Adrenal (HPA) axis**, leading to chronic stress and increased susceptibility to mental health disorders like depression and anxiety.

26



International Journal of Molecular Sciences

Stress leads to a vicious circle of inflammation

TNF-α release *by mast cells upon binding of cortisol releasing factor (CRF) CRF receptors*

Int J Mol Sci. 2022 Feb 11;23(4):2013

27

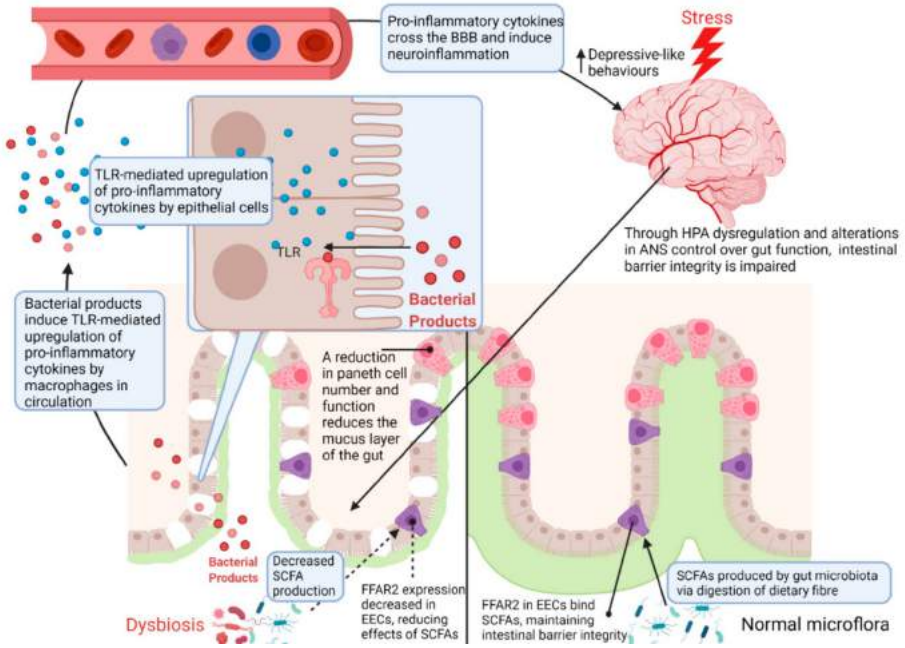
Overlapping Mechanisms with Trauma

"TNF-α may lead to psychiatric disorders via an activation of a neuroendocrine system such as the HPA axis, the activation of neurotransmitter transporters such as the serotonin transporter, the influence on the metabolism of neurotransmitters and the autoimmune destruction of neurones."

Int J Mol Sci. 2022 Feb 11;23(4):2013

28

HPA dysregulation leads to dysbiosis and impaired gut barrier integrity.



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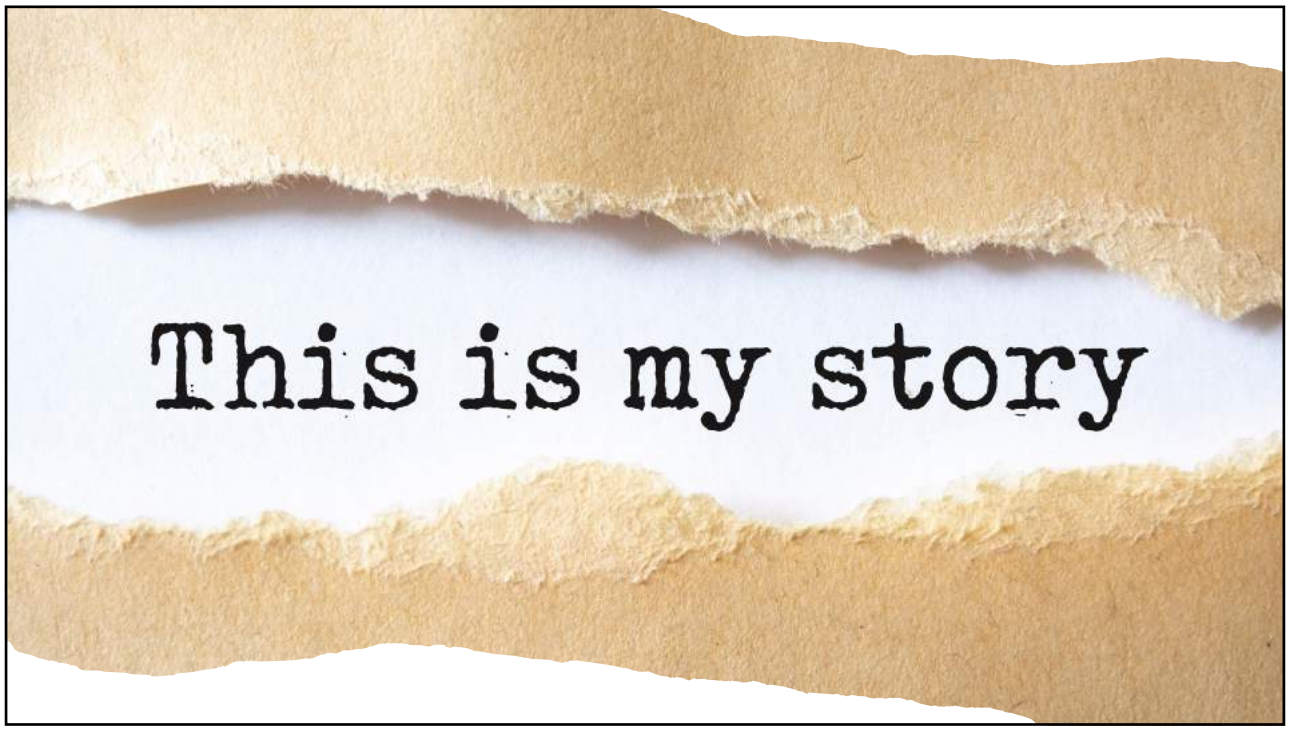

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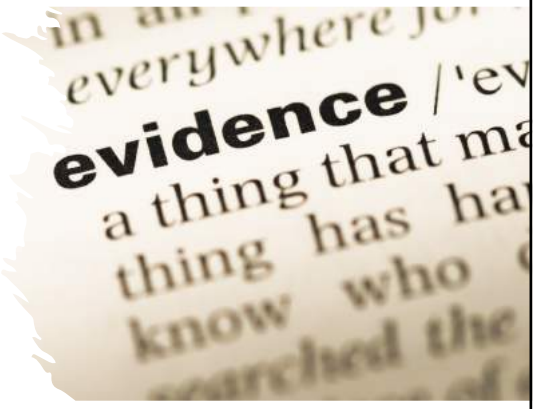
"Stories (i.e. narratives of patients, friends, family, and caregiver experiences) are a tremendously popular and effective medium to support the uptake of research evidence."



Implement Sci Commun 3, 35 (2022)

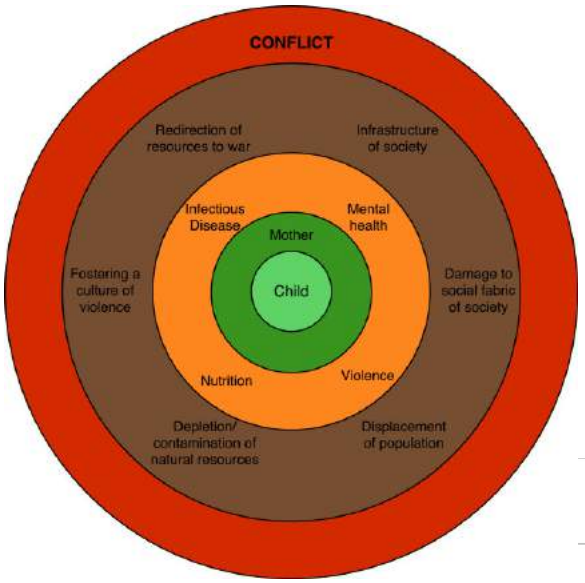
31

My Mum

- Survivor of the Spanish Civil War
- Lost her dad when she was three years old
- Lost a 6-month-old baby girl, her second
- Had to be astute with the pesetas to make ends meet every month on my dad's salary

Madrid, 1977

32



BMC Med. 2014; 12: 57.
Published online 2014 Apr 2. doi: 10.1186/1741-7015-12-57

The intergenerational effects of war on the health of children

Delan Devakumar,[1] Marion Birch,[2] David Osrin,[1] Egbert Sondorp,[3] and Jonathan CK Wells[4]

While evidence is currently limited, parental trauma and psychosocial stress during conflict have been associated with adverse health effects in offspring, through both biological pathways (such as neuroendocrine and immune system modulation) and propagation of stressful social environments [83-85].

BMC Med. 2014; 12: 57.

Review > Front Psychol. 2022 May 11;13:852467. doi: 10.3389/fpsyg.2022.852467. eCollection 2022.

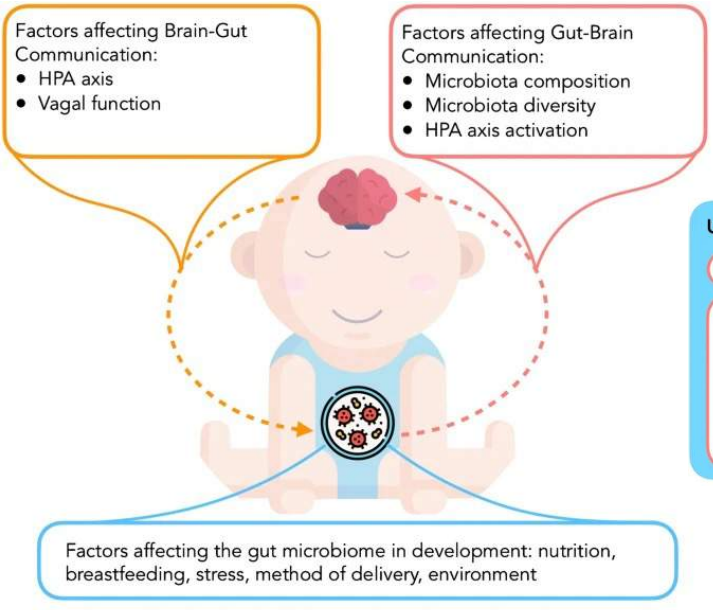
Intergenerational Transmission of Maternal Adverse Childhood Experiences on Next Generation's Development: A Mini-Review

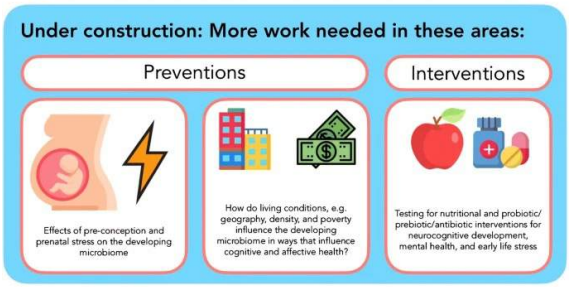
Keita Ishikawa [1], Natsuko Azuma [1], Mai Ohka [1]

Six studies were identified using three search engines. The results indicated that four out of six studies reported at least one significant direct association between maternal ACEs and child development. Additionally, maternal biological, psychological, and social factors were identified as mediators or moderators.

Front Psychol . 2022 May 11:13:852467

33





Curr Psychiatry Rep . 2020 Sep 12:22(11):61.

34

*"Studies suggest that abundance of both **Bifidobacterium** and **Lactobacillus** in the infant gut microbiota may promote healthy neurocognitive development and that depletion of these bacteria may increase the risk for neurodevelopmental disorders, e.g. autism, ADHD, etc."*

Curr Psychiatry Rep . 2020 Sep 12;22(11):61.

35

Brain, Behavior, and Immunity
Volume 107, January 2023, Pages 253-264

Maternal anxiety, depression and stress affects offspring gut microbiome diversity and bifidobacterial abundances

Jeffrey D. Galley, Lauren Mashburn-Warren, Lexie C. Blalock, Christian L. Lauber, Judith E. Carroll, Kharah M. Ross, Calvin Hobel, Mary Coussons-Read, Christine Dunkel Schetter, Tamar L. Gur

Highlights

- Maternal stress, anxiety, and depression are associated with shifts in infant microbiome alpha diversity.
- Beneficial microbes, including members of the bifidobacteria, were reduced in infants born to mothers with higher reported stress, anxiety, and depression.
- Infant beneficial bacterial abundances were also linked to maternal inflammatory levels in both pre- and post-natal timepoints.

Brain Behav Immun . 2023 Jan;107:253-264

Madrid, 1977

36

My brother

- Diagnosed with synovial sarcoma at 9
- My mum and dad were told he was "terminal" at 10
- Passed away aged 13 in 1981

37

"Sibling bereavement is one of the most distressing childhood adverse life events and may lead to negative lifelong physical and psychological outcomes such as substance abuse, impaired relationships, poor academic performance, suicide, and early mortality"

J Pediatr Nurs . 2022 Sep-Oct;66:e82-e99.

38

Mol Psychiatry. 2016 May; 21(5): 642–649.
Published online 2015 Jun 2. doi: 10.1038/mp.2015.67

MOLECULAR PSYCHIATRY

Childhood trauma and adulthood inflammation: a meta-analysis of peripheral C-reactive protein, interleukin-6 and tumour necrosis factor-α

D Baumeister,[1,2] R Akhtar,[3] S Ciufolini,[4,5] C M Pariante,[1] and V Mondelli[1,5,*]

"This meta-analysis demonstrates that childhood trauma contributes to a pro-inflammatory state in adulthood, with specific inflammatory profiles depending on the specific type of trauma. For example, ***physical and sexual abuse is strongly associated with increased TNF-α and IL-6****."*

Mol Psychiatry. 2016 May; 21(5): 642–649.

39

Can J Psychiatry. 2016 Apr; 61(4): 204–213.
Published online 2016 Feb 24. doi: 10.1177/0706743716635535

CJP RCP

Posttraumatic Stress Disorder: Does the Gut Microbiome Hold the Key?

Sophie Leclercq, PhD,[1,2] Paul Forsythe, PhD,[1,3] and John Bienenstock, MD[1,2]

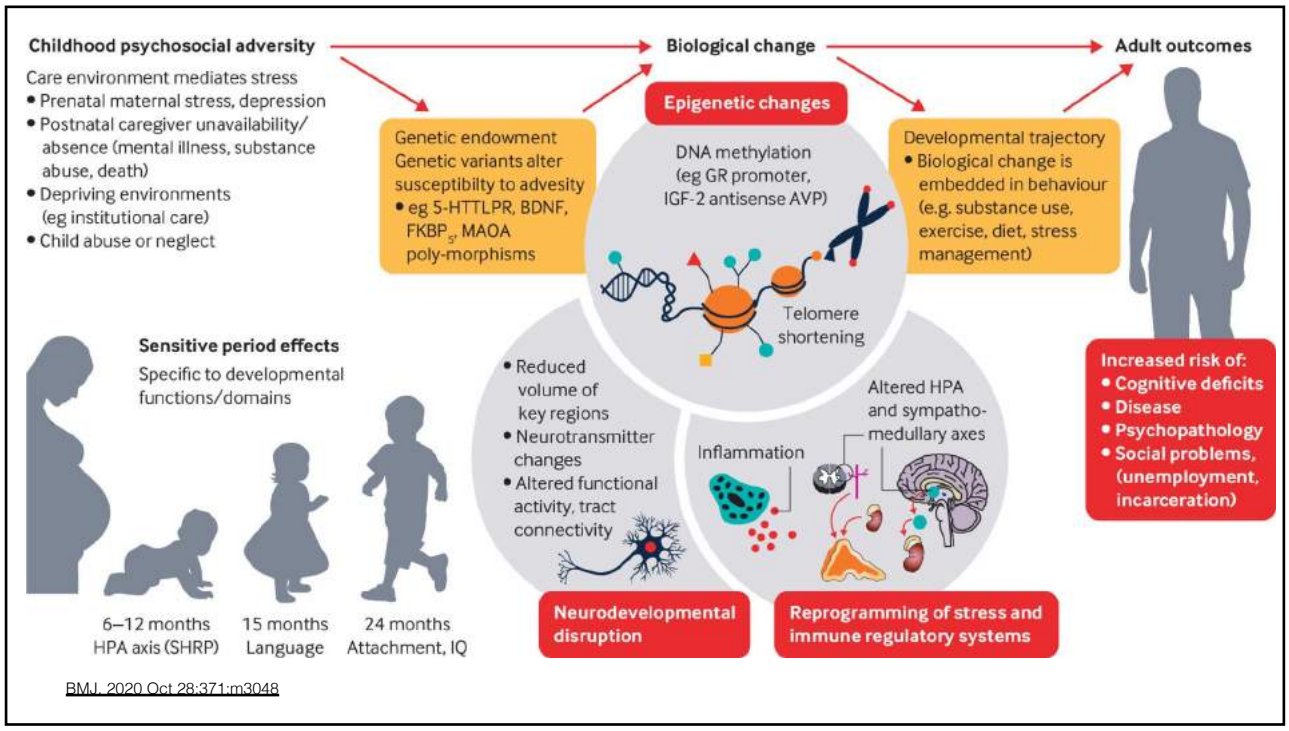
"Recent experimental and clinical data converge on the hypothesis that ***imbalanced gut microbiota in early life may have long-lasting immune and other physiologic effects that make individuals more susceptible to develop PTSD after a traumatic event*** *and contribute to the disorder."*

Can J Psychiatry. 2016 Apr; 61(4): 204–213.

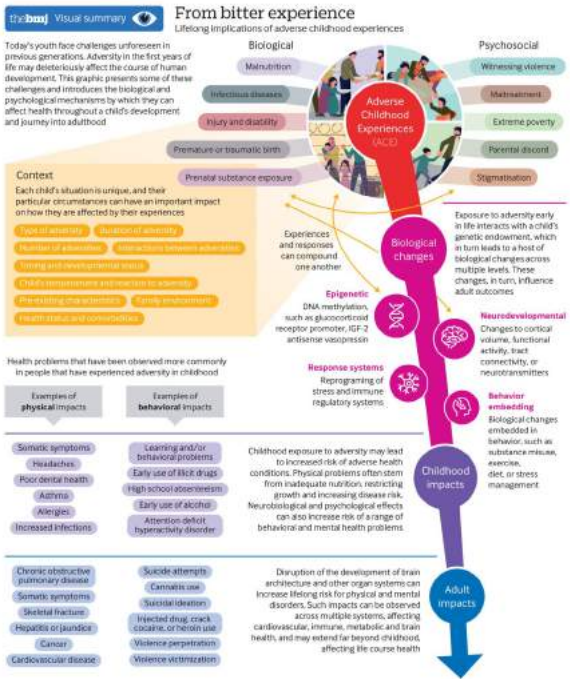
40


Madrid, 1983

41


Childhood psychosocial adversity
Care environment mediates stress
• Prenatal maternal stress, depression
• Postnatal caregiver unavailability/ absence (mental illness, substance abuse, death)
• Depriving environments (eg institutional care)
• Child abuse or neglect
Biological change
Adult outcomes
Epigenetic changes
Genetic endowment
Genetic variants alter susceptibilty to advesity
• eg 5-HTTLPR, BDNF, FKBP5, MAOA poly-morphisms
DNA methylation (eg GR promoter, IGF-2 antisense AVP)
Telomere shortening
Developmental trajectory
• Biological change is embedded in behaviour (e.g. substance use, exercise, diet, stress management)
Increased risk of:
• Cognitive deficits
• Disease
• Psychopathology
• Social problems, (unemployment, incarceration)
Sensitive period effects
Specific to developmental functions/domains
6–12 months HPA axis (SHRP)
15 months Language
24 months Attachment, IQ
• Reduced volume of key regions
• Neurotransmitter changes
• Altered functional activity, tract connectivity
Inflammation
Altered HPA and sympatho-medullary axes
Neurodevelopmental disruption
Reprogramming of stress and immune regulatory systems
BMJ. 2020 Oct 28;371:m3048

42



Analysis » Toxic Stress and PTSD in Children

Adversity in childhood is linked to mental and physical health throughout life

BMJ 2020 ; 371 doi: https://doi.org/10.1136/bmj.m3048 (Published 28 October 2020)

Key recommendations

- Researchers should consider both objective and subjective measures of childhood adversity
- Researchers should broaden assessment of interventions beyond mental health measures to more regularly include health outcomes such as asthma, infection, inflammation, and insulin resistance
- Adversity and trauma should be considered in context, and investigators in different cultures may need to develop different assessments
- Researchers should consider how much better (eg, as predictors) objective biomarker panels are than behavior, how early in life they can be used, and whether they are scalable
- Researchers should move towards longitudinal studies and ideally studies that involve interventions
- Researchers should pay more attention to individual differences
- Governments should implement evidence-informed policies for optimizing health, nutrition, and early child development
- Health and education systems should link and optimize preventive child health and education initiatives early in life at the appropriate level
- Use community, school, and after-school based interventions
- Consider public health strategies for primary, secondary, and tertiary prevention of childhood maltreatment and adversity

BMJ. 2020 Oct 28;371:m3048

43

International Journal of
EATING DISORDERS

Is bullying and teasing associated with eating disorders? A systematic review and meta-analysis

Selma Øverland Lie, Øyvind Rø, Lasse Bang

*"Being victimised through **bullying** and teasing is associated with the development of **eating disorders**."*

Int J Eat Disord . 2019 May;52(5):497-514.

44

Research Article | 21 January 2020

Gut Feelings Begin in Childhood: the Gut Metagenome Correlates with Early Environment, Caregiving, and Behavior

Authors: Jessica E. Flannery, Keaton Stagaman, Adam R. Burns, Roxana J. Hickey, Leslie E. Roos, Ryan J. Giuliano, Philip A. Fisher, Thomas J. Sharpton | AUTHORS INFO & AFFILIATIONS

*"Our analysis reveals that both socioeconomic risk exposure and child behaviours are associated with the relative abundances of specific taxa (e.g., **Bacteroides** and **Bifidobacterium** species) as well as functional modules encoded in their genomes (e.g., monoamine metabolism) that have been linked to cognition and health."*

mBio . 2020 Jan 21;11(1):e02780-19.

45

Front Psychol. 2021; 12: 687452.
Published online 2021 Aug 19. doi: 10.3389/fpsyg.2021.687452

PMCID: PMC8417524
PMID: 34489798

Prevalence of Various Traumatic Events Including Sexual Trauma in a Clinical Sample of Patients With an Eating Disorder

Gry Kjaersdam Telléus, [1,2,*] Marlene Briciet Lauritsen, [1,3] and Maria Rodrigo-Domingo [1]

*"The majority of patients with an eating disorder reported that they had experienced at least one traumatic life event, including **bullying**, and about one in five reported that they had been the subject of a negative sexual experience or **sexual abuse**."*

Front Psychol. 2021; 12: 687452.

46

Journal of Affective Disorders
Volume 225, 1 January 2018, Pages 306-312

"Based on analysis of medical and clinical files from 309 sexually abused children, findings revealed that cumulative childhood trauma affects both internalised and externalised behaviour problems through three mediation paths: emotion regulation alone, dissociation alone, and through a path combining emotion regulation and dissociation."

J Affect Disord . 2018 Jan 1;225:306-312.

47

BMC Pilot and Feasibility Studies

Trialling a microbiome-targeted dietary intervention in children with ADHD—the rationale and a non-randomised feasibility study

Kate Lawrence, Kyriaki Myrissa, Miguel Toribio-Mateas, Lori Minini & Alice M. Gregory

"Several studies describe low alpha diversity as a factor contributing to the pathogenesis of ADHD with recently published clinical evidence indicating that significantly ***lower Shannon index alpha diversity scores are seen in young ADHD patients compared to healthy controls****. […] Noteworthy observations [in children with ADHD] include changes in* ***Lachnospiraceae****,* ***Roseburia*** *and* ***Blautia****,* ***Bifidobacteriaceae****,* ***Sutterella****,* ***Ruminococcaceae*** *and* ***Bacteroides****."*

Pilot Feasibility Stud 8, 108 (2022).

48

49

nature communications

Elevated rates of autism, other neurodevelopmental and psychiatric diagnoses, and autistic traits in transgender and gender-diverse individuals

Varun Warrier, David M. Greenberg, Elizabeth Weir, Clara Buckingham, Paula Smith, Meng-Chuan Lai, Carrie Allison & Simon Baron-Cohen

"Compared to cisgender individuals, transgender and gender-diverse individuals have, on average, higher rates of autism, other neurodevelopmental and psychiatric diagnoses."

Nat Commun 11, 3959 (2020).

50

Current Addiction Reports (2018) 5:232–242
https://doi.org/10.1007/s40429-018-0208-9

FOOD ADDICTION (A MEULE, SECTION EDITOR)

Overeating, Overweight, and Substance Use: What Is the Connection?

Karen K. Saules[1] · Meagan M. Carr[1] · Kirstie M. Herb[1]

"Substance use disorder is often comorbid with depression, attention deficit hyperactivity disorder (ADHD), and most types of anxiety disorders, including social phobia, panic disorder, and post-traumatic stress disorder"

Curr Addict Rep 5, 232–242 (2018)

51

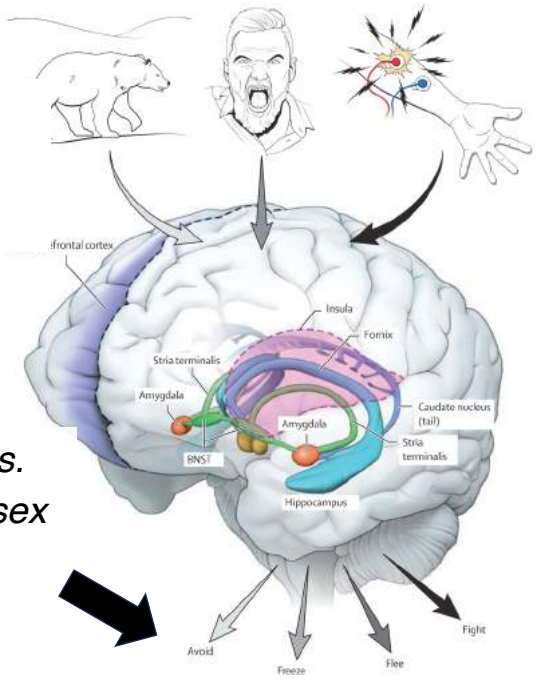
52

THE LANCET

Review > Lancet. 2021 Mar 6;397(10277):914-927.
doi: 10.1016/S0140-6736(21)00359-7. Epub 2021 Feb 11.

Anxiety disorders

Brenda Wjh Penninx [1], Daniel S Pine [2], Emily A Holmes [3], Andreas Reif [4]



Avoid *feeling feelings.*
Numb: *food, drugs, sex*
Dissociate

Lancet . 2021 Mar 6;397(10277):914-927.

53

PeerJ Life & Environment

‹ BRAIN, COGNITION AND MENTAL HEALTH

Eating for numbing: a community-based study of trauma exposure, emotion dysregulation, dissociation, body dissatisfaction and eating disorder symptoms

There is a complex relationship between dissociation, emotional numbing and emotional dysregulation in the context of trauma, eating disorder symptoms and body dissatisfaction.

PeerJ . 2021 Aug 5:9:e11899.

54

Autism in Adulthood

Interpersonal Trauma and Posttraumatic Stress in Autistic Adults

Katherine E. Reuben, BS,[1] Christopher M. Stanzione, PhD,[2] and Jenny L. Singleton, PhD[3]

*"**Many autistic adults report interpersonal traumas (IPTs) such as physical or sexual assault, which are often associated with posttraumatic stress and dissociation.** Factors such as gender might make autistic individuals particularly vulnerable to experiencing IPT and negative posttraumatic symptoms. Autistic women and **gender minorities** may be particularly vulnerable to sexual IPT and adverse outcomes."*

Autism Adulthood . 2021 Sep 1;3(3):247-256

55

56

Dialogues in Clinical Neuroscience
Taylor & Francis

Suicide bereavement and complicated grief

Ilanit Tal Young, PhD; Alana Iglewicz, MD; Danielle Glorioso, MSW; Nicole Lanouette, MD; Kathryn Seay, BS; Manjusha Ilapakurti, MBBS; Sidney Zisook, MD

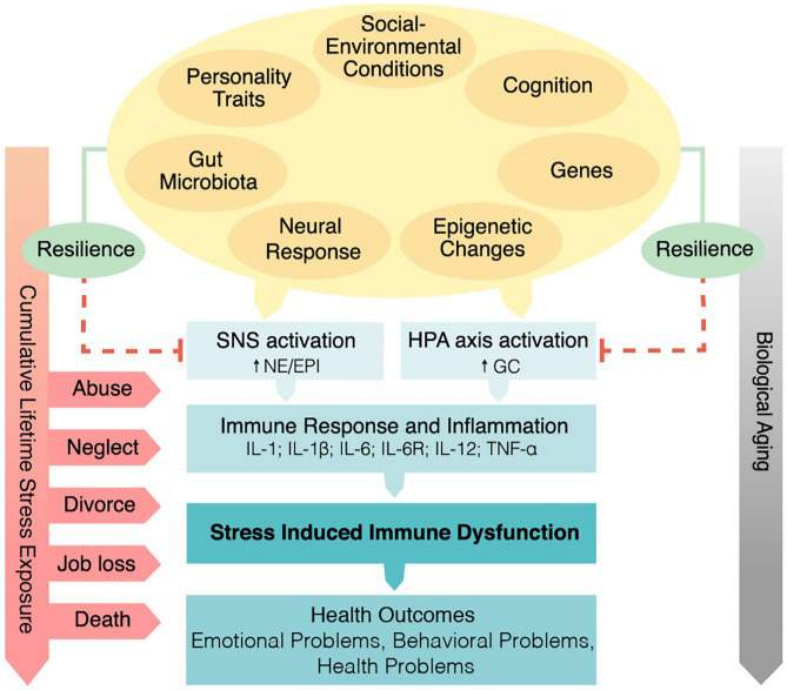
"Losing a loved to suicide is one is one of life's most painful experiences. The feelings of loss, sadness, and loneliness experienced after any death of a loved one are often magnified in suicide survivors by feelings of guilt, confusion, rejection, shame, anger, and the effects of stigma and trauma. Furthermore, survivors of suicide loss are at higher risk of developing major depression, post-traumatic stress disorder, and suicidal behaviours, as well as a prolonged form of grief called complicated grief."

Dialogues Clin Neurosci. 2012 Jun; 14(2): 177–186.

57

"Cumulative lifetime stress exposure may alter vulnerability to mental and physical health problems following bereavement/loss."

Front Psychiatry. 2020; 11: 565239.



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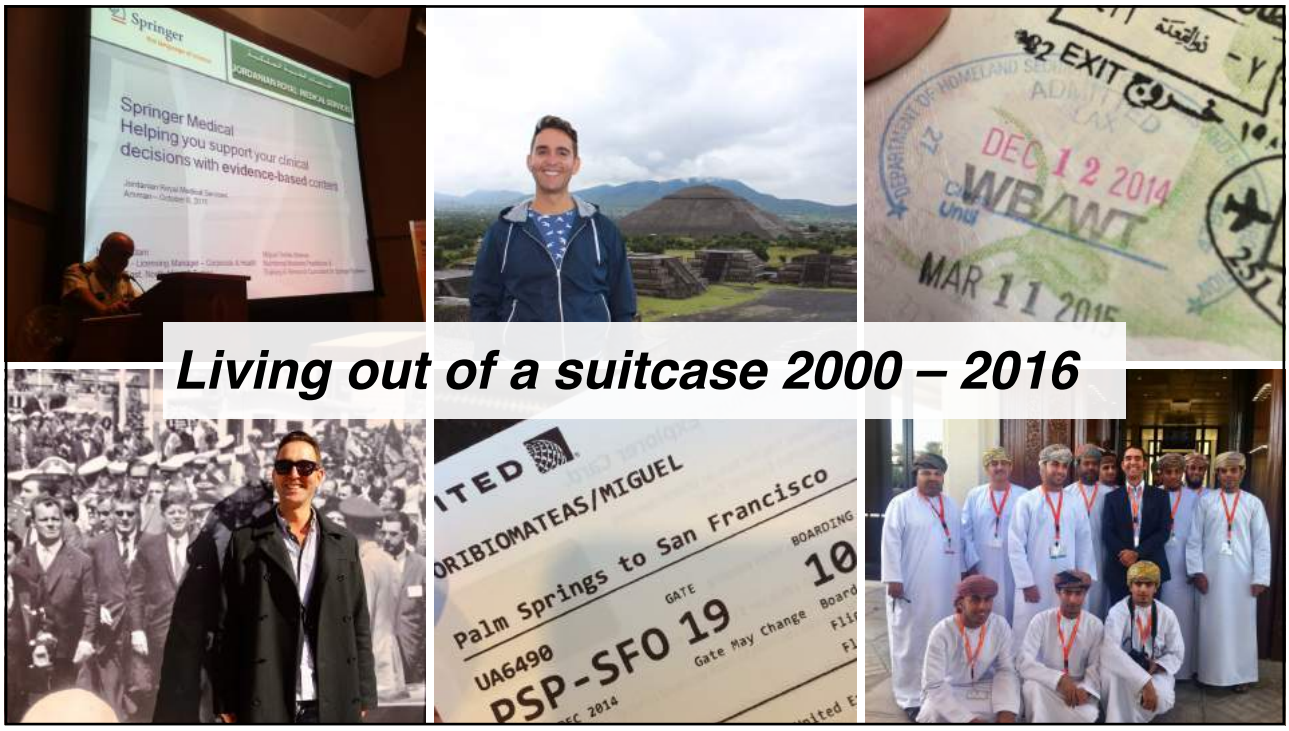

Springer
Springer Medical
Helping you support your clinical decisions with evidence-based content
EXIT
DEC 12 2014
MAR 11 2015
Palm Springs to San Francisco
UA6490
PSP-SFO 19
Gate May Change
BOARDING
Living out of a suitcase 2000 – 2016

59


Fast-forward to 2020

60

What is Meerkat Mode?

Hypervigilance

Seeking a monotropic flow-state (but difficulty accessing)

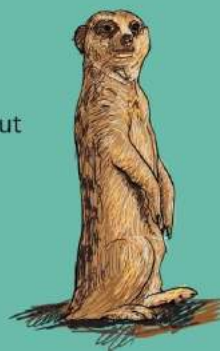
Increased sensory dysregulation (Usually interoceptive, proprioceptive, and vestibular)

Indicative of Atypical Burnout

AuDHD, may not feel tired or be able to rest

Tanya Adkin, 2023

emergentdivergence.com



I had spent my life "meerkating"

61

Our Ref:
NHS No:
Clinic Date: 24 September 2020
Typed: 5 October 2020

Private and Confidential
Dr D Kearns
Central Surgery
Bell Street
Sawbridgeworth
Herts CM21 9AQ

Dear Dr Kearns

Re: **Miguel TORIBIO-MATEAS**
Date of Birth: **1973**
Address: **Sawbridgeworth, Herts,**

Diagnosis	DSM CRITERIA
	1. ADHD (F90.0) 2. Predominantly inattentive symptoms 3. Generalised anxiety disorder 4. Fibromyalgia/chronic pain syndrome

Clinic Date: 04 May 2023
Typed: 22 May 2023

Private and Confidential
Dr D M Kearns
Central Surgery
Bell Street
Sawbridgeworth
Hertfordshire CM21 9AQ

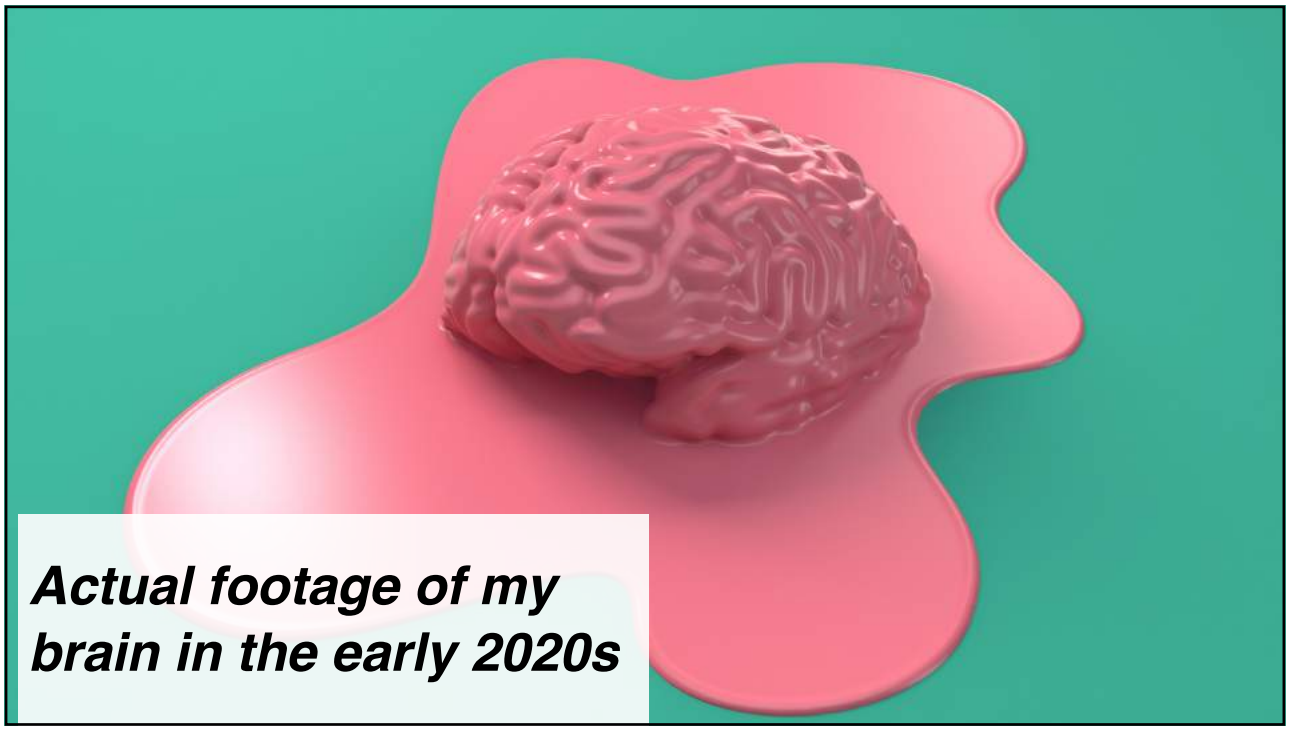
Dear Dr Kearns

Patient: **Miguel Toribio-Mateas**
Date of Birth: **1973**
Address: **Sawbridgeworth, Hertfordshire,**

Diagnoses	
	1. Autism Spectrum Disorder (ASD) 2. ADHD 3. General Anxiety disorder in context of Autism 4. Social Anxiety 5. Fibromyalgia

62

63



64

"Storytelling has the potential to provide patients with a more active role in their health care by identifying their specific needs as well as gaps in knowledge and skills, while allowing them to form strong bonds with peers who share similar disease-related experiences."

BMC Health Serv Res 16, 249 (2016)

65

66

Interface Between "Lived Experience" and Trauma

67

Interconnectedness

"Lived experience" provides a window into the psychological and emotional facets of trauma, making it central to understanding trauma from a holistic perspective.

68

Personal Narratives

A person's lived experience serves as a narrative that recounts the multi-layered impact of trauma on their daily life, beliefs, and wellbeing.

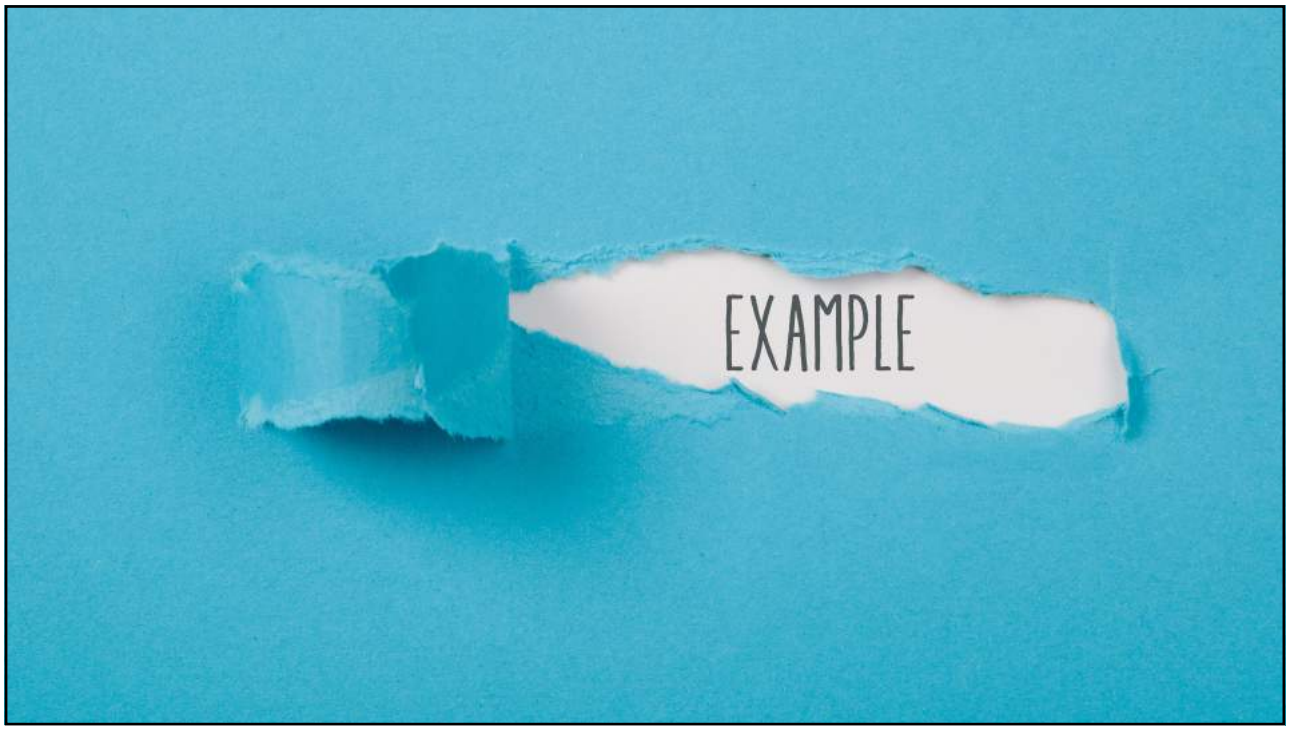
All lived experiences are valid. No matter what.

69

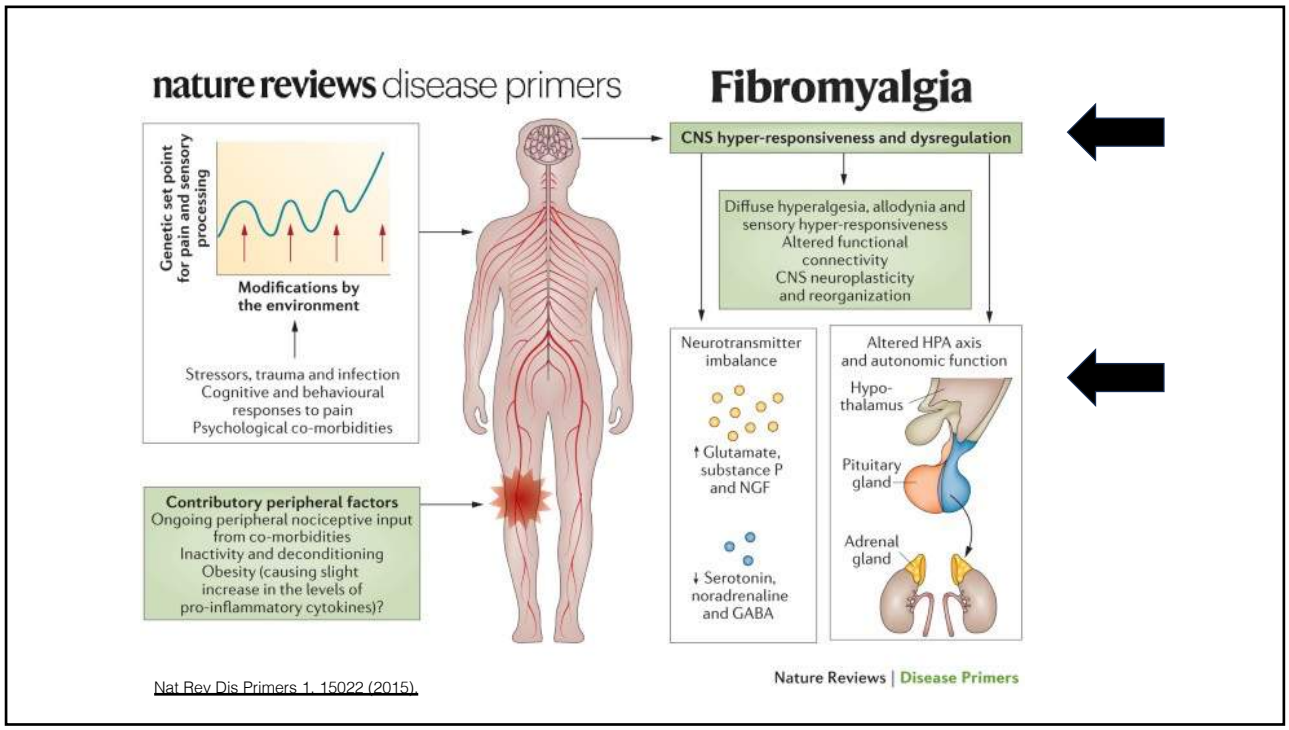
Stigma and Disclosure

Understanding lived experiences can help identify how societal stigma and personal shame affect the disclosure and handling of trauma.

70



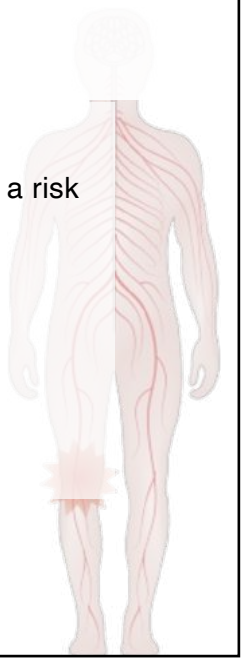
71



Nat Rev Dis Primers 1, 15022 (2015).

72

Trauma and Fibromyalgia

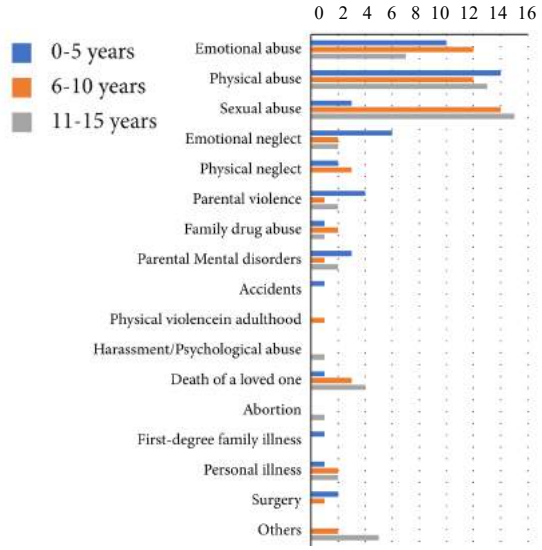


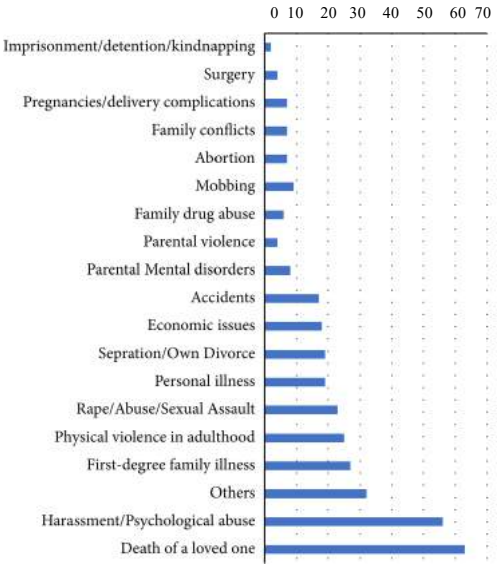
- **Background:** Psychological trauma, particularly from childhood, is a risk factor for fibromyalgia (FM)
- **Objective:** Evaluate the prevalence, characteristics, and impact of psychological trauma in people living with FM.
- **Method:** Interviews with 88 females covering various clinical and sociodemographic factors.

Pain Res Manag. 2022 Nov 30;2022:2114451.

73

Trauma and Fibromyalgia





Pain Res Manag. 2022 Nov 30;2022:2114451.

74

Journal of Gastroenterology

New insights into irritable bowel syndrome pathophysiological mechanisms: contribution of epigenetics

Giovanni Dothel, Maria Raffaella Barbaro, Aldo Di Vito, Gloria Ravegnini, Francesca Gorini, Sarah Monesmith, Emma Coschina, Eva Benuzzi, Daniele Fuschi, Marta Palombo, Francesca Bonomini, Fabiana Morroni, Patrizia Hrelia ✉, Giovanni Barbara & Sabrina Angelini

"Early life adverse events (EAEs), comprising psychological and physical stress as well as traumatic experiences during childhood have been identified as a predisposing factor for IBS development. Several factors are involved in the pathophysiology of IBS including unbalanced gut microbiota, low-grade immune activation, overactive serotonergic system, and intestinal barrier dysfunction."

J Gastroenterol (2023). https://doi.org/10.1007/s00535-023-01997-6

75

ORIGINAL ARTICLES

A Microbial Signature of Psychological Distress in Irritable Bowel Syndrome

The Official Journal of the American Psychosomatic Society
PSYCHOSOMATIC MEDICINE
Journal of Biobehavioral Medicine

Letter in Figure 5	Name	Taxonomic Level	LDA	*p*	*q*
Presence of psychological distress					
l	*Proteobacteria*	Phylum	2.51	.008**	.021*
n	*Burkholderiales*	Order	2.27	.007**	.020*
m	*Betaproteobacteria*	Class	2.27	.007**	.020*
o	*Alcaligenaceae*	Family	2.14	.005**	.020*
f	*Barnesiella*	Genus	2.02	.022*	.036*
Elevated stress perception					
d	*Alistipes*	Genus	2.78	.023*	.036*
c	*Rikenellaceae*	Family	2.78	.024*	.036*
l	*Proteobacteria*	Phylum	2.50	.007**	.020*
n	*Burkholderiales*	Order	2.20	.007**	.020*
m	*Betaproteobacteria*	Class	2.20	.007**	.020*
o	*Alcaligenaceae*	Genus	2.13	.009**	.021*
Anxiety					
h	*Bacteroidaceae*	Family	3.01	.022*	.036*
g	*Bacteriodes*	Genus	3.01	.022*	.036*
d	*Alistipes*	Genus	2.77	.043*	.043*
c	*Rikenellaceae*	Family	2.77	.043*	.043*
l	*Proteobacteria*	Phylum	2.47	.025*	.036*
f	*Barnesiella*	Genus	2.15	.030*	.040*
Depression					
e	*Prevotellaceae*	Family	2.92	.028*	.038*
l	*Proteobacteria*	Phylum	2.16	.020*	.036*

Bacteria with significantly elevated abundance in the respective category/subgroup as identified in LEfSe analyses.
p and *q* values and LDA effect sizes from LEfSe analyses.
* $p < .05$.
** $p < .01$.

"A microbial signature correlating IBS with psychological distress was identified."

Psychosom Med. 2018 Oct;80(8):698-709.

76

Overlapping Microbial Changes in IBS / FM

	Role	FM	IBS	References
Bifidobacterium	GABA synthesis	Reduction	Reduction	[53,60,80,81,82,83]
Ruminococcoceae	Production of butyrate	Reduction	Reduction	[53,60,61,80,81,82,83]
Lachnospiraceae	Synthesis of butyric acid	Reduction	Increase/reduction	[60,61,89,90,91,92,93,94,95,96]
Eubacterium	Production of butyrate	Reduction	Increase	[60,89,99]
Rikenellaceae	Digestion of crude fibre	Increase	Reduction	[60,90,91]
C. scindens	Production of bile acids	Increase	Increase	[77,78]

Biomedicines. 2023 Jun 13;11(6):1701.

77

Phylum and Functions	Genera	HS	IBS-D Subjects	Symptoms
Firmicutes Degrade mucin glycoproteins of the gut mucosal layer [22] Produces butyrate that contribute to maintainthe mucosal integrity and reduces the adhesion and colonization of pathogens in the intestinal tract (*Faecalibacterium*) [47,67]	*Ruminococcus* [22] *Lactobacillus* [27] *Clostridia* [33] *Dorea* spp. *Coprococcus* [29], *Anaerovorax, Subdoligranum, Faecalibacterium, Anaerostipes* [52]	✓	↑ *Clostridia, Dorea* spp., *Coprococcus* [29,50,51] ↓ *Lactobacillus, Anaerovorax, Subdoligranum, Faecalibacterium (F. prausnitzii)* [27,33,49]	Diarrhea, abdominal distension, abdominal pain and excessive gas production (*Clostridia*) [64,73] Increases gas production and intestinal permeability and contributes to IBS pathophysiology (*Dorea* spp.) [29,51,72]
Bacteroidetes Derives energy primarily from carbohydrates using principally glycolysis and pentose phosphate pathways [22]	*Prevotella* [22] *Bacteroides Tennerella Alistipes Parabacteroides*	✓	↑ *Bacteroides thetaiotaomicron, B.vulgatus, B. fragilis, Parabacteroides (P. distesonis)* [52]. ↓ *Prevotella, Alistipes, Tennerella* [29,46,48,49]	Increased symptoms severity associated to a reduction of *Prevotella* [46] and are associated with excess organic acid production (*Bacteroides)* [75]
Actinobacteria Beneficial effect producing SCFAs [54] and broad-spectrum antibacterial substances [58]	*Bifidobacterium* [36]	✓	↓ [29,46]	Reduced antinflammatory effects for reduced SCFAs production [54]
Proteobacteria Pathogens [36]	*E. coli* [36] *Salmonella enterica* [36] *Vibrio cholerae* [36]	✗	↑ *Enterobacteriaceae (E. Coli)* [27,50]	Abdominal pain and diarrhea [47]

✓ the phylum is normally present in a healthy subject microbiota composition; ✗ the phylum should not be present in a healthy microbiota composition; ↑ species increased ↓ species decreased.

Nutrients. 2021 Apr 29;13(5):1506

78

• Chronic widespread pain (CWP) is characterised by decreased alpha diversity of the gut microbiome.

• 113 CWP cases and 1623 controls (Twins UK)

• 16S rRNA amplicon sequencing and amplicon sequence variants, and associations with CWP were examined using linear mixed-effects models adjusting for BMI, age, diet, family relatedness and technical factors.

• The majority (38/44) of the ASVs nominally decreased in the CWP cases compared with the controls were assigned to Firmicutes of the order Clostridiales, with half assigned to the Lachnospiraceae family (19/38), and the rest mainly to the family Ruminococcaceae (16/38) (Table 2). Of the 60 ASVs with nominal *P*-values <0.05, the majority (48) were assigned at the genus level, but only 11 were assigned at the species level.

•*Coprococcus comes* is the most significantly reduced in CWP.

Rheumatology (Oxford). 2021 Aug 2;60(8):3727-3737. Nat Rev Dis Primers 1, 15022 (2015).

79

Microstressors: stress with a small ”s”

“The term macrostressor refers to potentially traumatising events, such as natural or human-made disasters, whereas the term microstressor, or daily hassle, refers to the “irritating, frustrating, distressing demands that to some degree characterise everyday transactions with the environment”

JMIR Ment Health. 2020 Feb 24;7(2):e14566.

80

Mainz Inventory of Microstressors

1.	Losing or displacing objects	0	1	2	3	4
2.	Negative event in the media	0	1	2	3	4
3.	Negative political event	0	1	2	3	4
4.	Social obligation	0	1	2	3	4
5.	Interruption during an activity (e.g., at work or during leisure	0	1	2	3	4
6.	Waiting time or delay (e.g., waiting for a person; bus or train	0	1	2	3	4
7.	Careless mistakes or slips due to	0	1	2	3	4
8.	Gossip (including social media)	0	1	2	3	4
9.	Discrimination or mobbing by another person (including social	0	1	2	3	4
10.	Nightmares	0	1	2	3	4
11.	Journey/commute to work/	0	1	2	3	4
12.	Minor offence (e.g., fine)	0	1	2	3	4
13.	Trouble with authorities, state office or other institutions (e.g.,	0	1	2	3	4
13.	Trouble with authorities, state office or other institutions (e.g., tax office,	0	1	2	3	4
14.	Conflict or disagreement at work (e.g., with colleagues or	0	1	2	3	4
15.	Conflict or disagreement **with** close persons (e.g., parents, siblings, partner)	0	1	2	3	4
16.	Conflict or disagreement **between** close persons (between parents, siblings,	0	1	2	3	4
17.	Conflict or disagreement with other non-related persons (e.g., bus driver, neighbor)	0	1	2	3	4
18.	Conflict or disagreement with own child/children	0	1	2	3	4
19.	Child care problems	0	1	2	3	4
20.	Running errands or transport service for other people (e.g., getting medication for a family member)	0	1	2	3	4
21.	Problem/inconvenience due to long distance relationships with friends/relatives	0	1	2	3	4

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22.	Problem/inconvenience due to a lack of help/support	0	1	2	3	4
23.	Problem with a pet (e.g., diseases, bad behavior)	0	1	2	3	4
24.	Problem/inconvenience due to an unsafe environment (e.g., unsafe neighborhood)	0	1	2	3	4
25.	Problem/inconvenience due to dirt, pollution or smell (e.g., in the neighborhood/	0	1	2	3	4
26.	Financial problems (not having enough money for basic services, emergencies	0	1	2	3	4
27.	Others owe you money	0	1	2	3	4
28.	You owe others money	0	1	2	3	4
29.	High or unexpected financial burden (e.g., purchase of expensive products, costs for a car repair)	0	1	2	3	4
30.	Financial issue (e.g., paying bills, planning retirement	0	1	2	3	4
31.	Unexpected or unwanted	0	1	2	3	4
32.	Side effects of medications	0	1	2	3	4
33.	Own physical discomfort	0	1	2	3	4
34.	Physical discomfort of a close person (e.g., minor illness,	0	1	2	3	4
35.	Lack of sleep or sleeping problems	0	1	2	3	4
36.	Seeing a doctor	0	1	2	3	4
37.	Paperwork at home (e.g., filling out a form)	0	1	2	3	4
38.	Housekeeping (e.g., cooking, cleaning, running errands)	0	1	2	3	4
39.	Minor repairs (e.g., at home)	0	1	2	3	4
40.	Problems with a technical device (e.g., computer, household appliance,	0	1	2	3	4
41.	Maintenance (e.g., of the car)	0	1	2	3	4
42.	Bad weather (e.g., rain, heat, cold)	0	1	2	3	4
43.	Annoying behavior of misconduct of others (e.g., inconsiderate smokers,	0	1	2	3	4
44.	Bad food (e.g., in the canteen/cafeteria)	0	1	2	3	4

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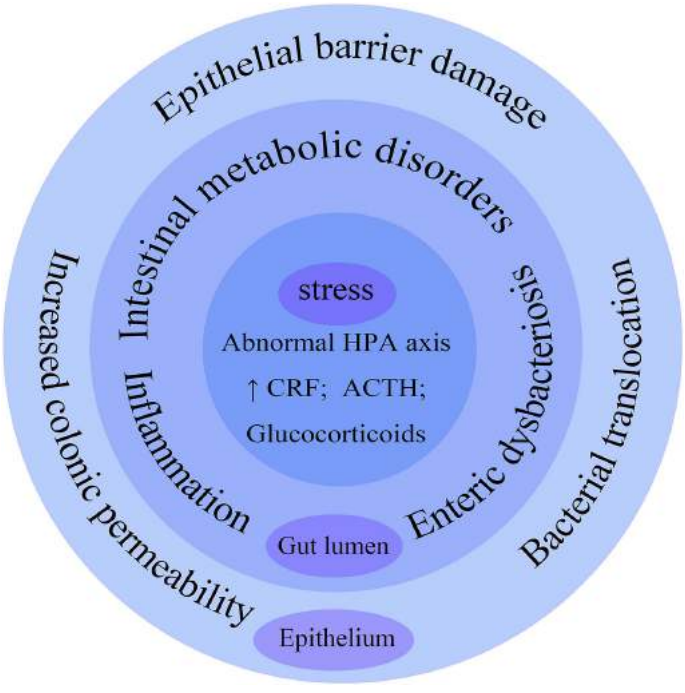
The Journal of Nutrition
Volume 153, Issue 4, April 2023, Pages 924-939

Critical Review

Understanding the Connection between Gut Homeostasis and Psychological Stress

Hongyun Zhang [1], Ziying Wang [2], Guangqiang Wang [1], Xin Song [1], Yangyang Qian [2], Zhuan Liao [3], Li Sui [3], Lianzhong Ai [1], Yongjun Xia [1]

"The Mediterranean diet enhances the stress resistance to some extent by regulating the intestinal flora."

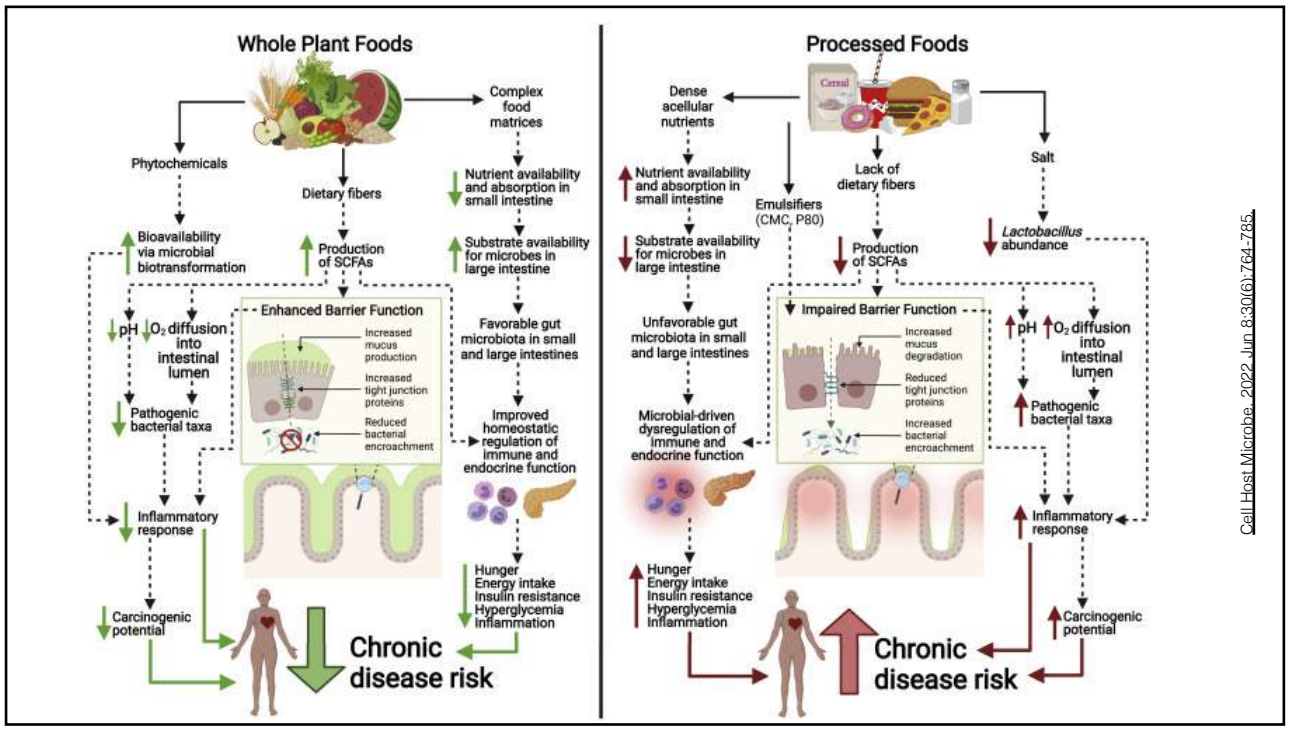


J Nutr. 2023 Apr;153(4):924-939.

84

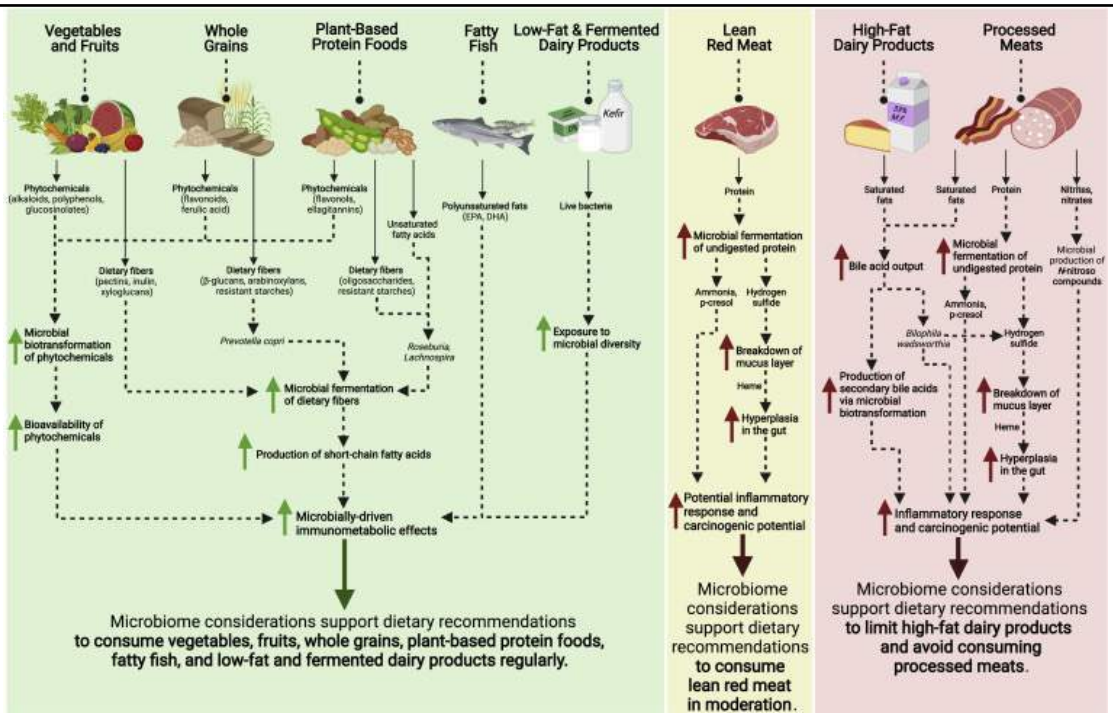
Rethinking Healthy Eating in Light of the Gut Microbiome

85



Cell Host Microbe. 2022 Jun 8;30(6):764-785.

86



Cell Host Microbe. 2022 Jun 8;30(6):764-785.

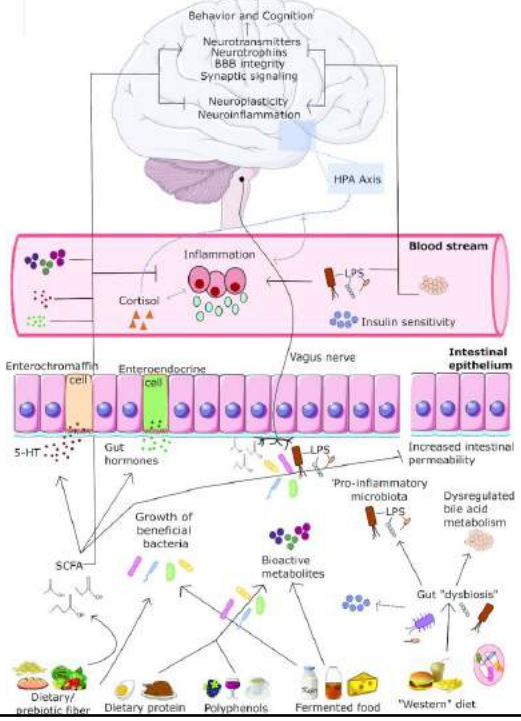
87

Diet and the Microbiota–Gut–Brain Axis: Sowing the Seeds of Good Mental Health

Kirsten Berding [1], Klara Vlckova [1], Wolfgang Marx [2], Harriet Schellekens [1 3], Catherine Stanton [1 4], Gerard Clarke [1 5], Felice Jacka [2 6 7 8], Timothy G Dinan [1 5], John F Cryan [1 3]

"The fact that many different dietary patterns have been linked to improved mental well-being reinforces the fact that individual components of the diet may be less important to mental health than overall dietary patterns high in plant foods and low in ultraprocessed foods."

Adv Nutr. 2021 Jul 30;12(4):1239-1285.



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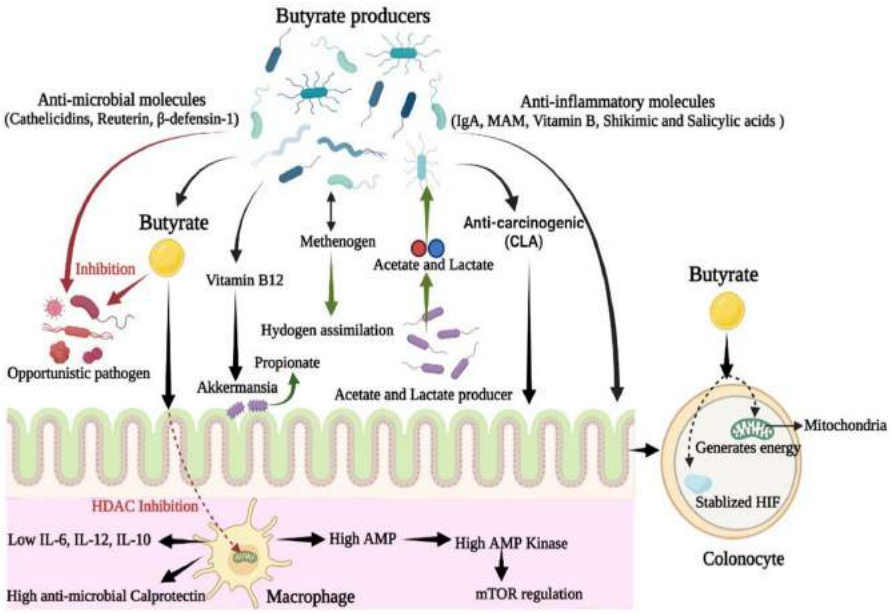
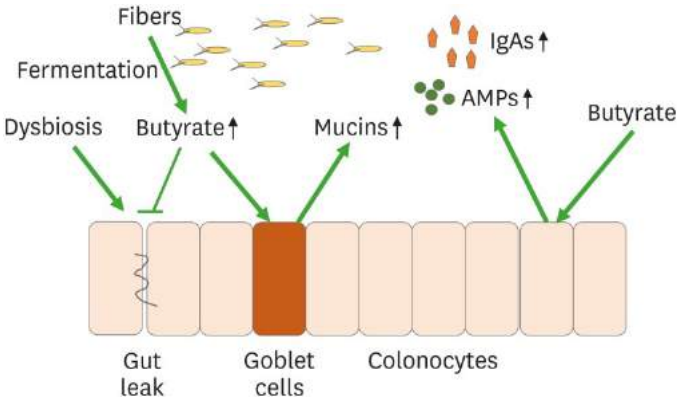
Agathobacter
Anaerostipes
Butyricicoccus
Butyricimonas
Butyrivibrio
Coprococcus
Eubacterium
Faecalibacterium
Flavonifractor
Lachnospira
Pseudoflavonifractor
Roseburia



Front Microbiol. 2023 Jan 12:13:1103836.

89

All About Butyrate…

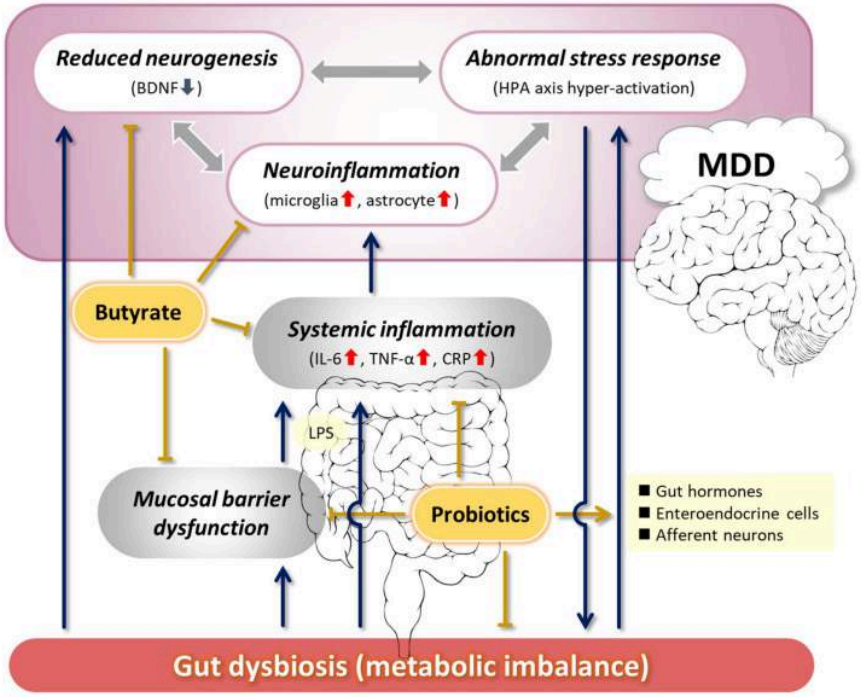


"Butyrate can down-regulate inflammation by inhibiting the growth of pathobionts, increasing mucosal barrier integrity, encouraging obligate anaerobic bacterial dominance and decreasing oxygen availability in the gut."

Immune Netw. 2020 Feb 4;20(2):e15.

90

"Butyrate has been reported to maintain BDNF levels and neurogenesis in the hippocampus, and improve depressive behaviour."



Int J Mol Sci. 2022 Jan 21;23(3):1172

91

Hyperresponsive HPA Microbial Signature

"Recent studies indicated that patients with generalised anxiety or eating disorders (anorexia nervosa, bulimia nervosa, and binge-eating disorders) show a specific profile of gut microbiota, and this imbalance can be partially restored after a single or multi-strain probiotic supplementation."

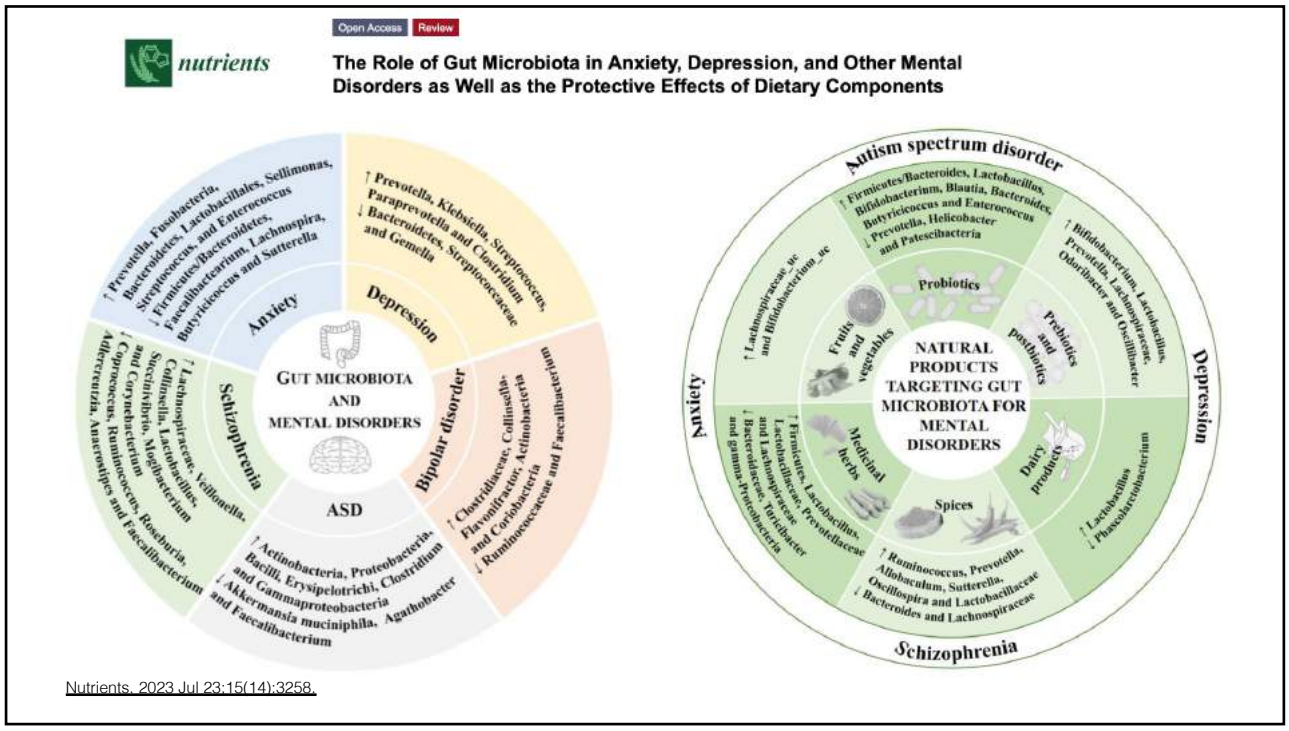
Low butyrate producers

High Proteobacteria (LPS producers)

Activated kyneurine pathway

Int J Mol Sci. 2021 Feb 26;22(5):2351.

92



Nutrients. 2023 Jul 23;15(14):3258.

93

Int J Environ Res Public Health. 2022 Dec 3;19(23):16180.

94

The conclusion for this interventional study based on nature-based physical activity validated that walking in nature improves post-traumatic growth and reduced traumatic stress. Significant pre and post-interventional variations in the psychological (TSC & PTGI) and physiological (SBP, DBP, PR, HRV, BDNF, CRP, Cortisol & IL-6) measures were observed prominently in the experimental group. Therefore, it can be concluded that nature-based physical activity can be an effective, low-cost, and high-maintained remedy for managing the public health burden of mental ailment elicited by trauma.

Int J Environ Res Public Health. 2022 Dec 3;19(23):16180.

95

A Trauma-Informed Approach

96

Patient / Client-Centred

By focusing on lived experience, a trauma-informed approach shifts from asking "What's wrong with you?" to "What happened to you?"

97

Safety and Trust

A trauma-informed approach aims to create an environment where people feel safe to share their lived experiences, fostering a sense of trust and openness that is never pushy. People who've experienced trauma are typically hypervigilant and will freeze if pushed.

Be gentle. Be kind.

98

Empowerment

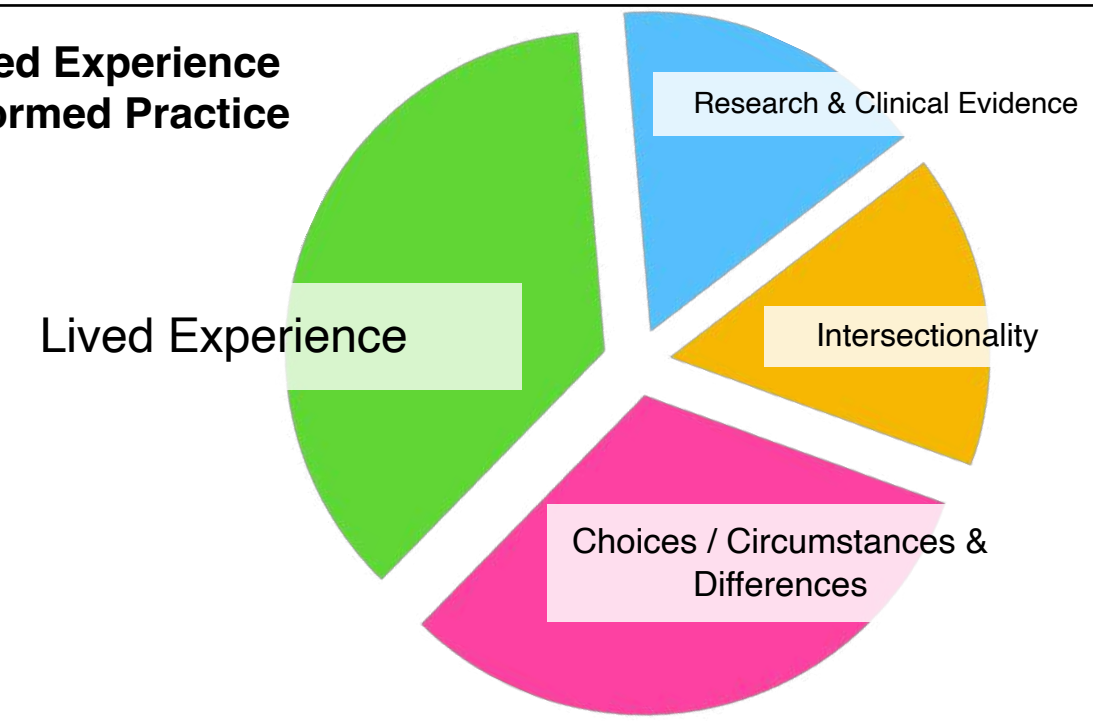
A trauma-informed approach equips individuals with coping skills and resources, rooted in the acknowledgement and validation of their lived experiences. Learning about your client's background empowers you and them to create a meaningful therapeutic relationship.

99

All Lived Experiences Are Valid

100

Lived Experience Informed Practice



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PLOS ONE

Disparities in Adverse Childhood Experiences among Sexual Minority and Heterosexual Adults: Results from a Multi-State Probability-Based Sample

RESEARCH PAPER

Altered microbiome composition in individuals with fibromyalgia

Cureus. 2022 Jul 18;14(7):e26966. doi: 10.7759/cureus.26966. eCollection 2022 Jul.

Maladaptive Eating Behaviors and Childhood Trauma: A Focus on Food Addiction

Maxime Legendre [1], Stéphane Sabourin [1], Catherine Bégin [1]

Affiliations + expand

PMID: 35989855 PMCID: PMC9382990 DOI: 10.7759/cureus.26966

Free PMC article

Intersectionality matters

American Public Health Association — Promoting Public Health Research, Policy, Practice and Education — About Us | Subscriptions | Submissions — American Journal of Public Health

Am J Public Health. 2016 February; 106(2): 314–320.
Published online 2016 February. doi: 10.2105/AJPH.2015.302904

PMCID: PMC4815563
PMID: 26691127

Adverse Childhood Experiences Related to Poor Adult Health Among Lesbian, Gay, and Bisexual Individuals

Anna Austin, MPH, Harry Herrick, MSHP, MSW, MEd, and Scott Proescholdbell, MPH

Author information ▸ Article notes ▸ Copyright and License information Disclaimer

J Clin Psychiatry. Author manuscript; available in PMC 2021 Jun 1.
Published in final edited form as:
J Clin Psychiatry. 2020 Dec 1; 81(6): 20m13291.
Published online 2020 Dec 1. doi: 10.4088/JCP.20m13291

PMCID: PMC7795652
NIHMSID: NIHMS1645459
PMID: 33264482

Sexual Orientation, Adverse Childhood Experiences, and Comorbid DSM-5 Substance Use and Mental Health Disorders

Author information ▸ Copyright and License information Disclaimer

Am J Public Health. 2007 November; 97(11): 2048–2055.
doi: 10.2105/AJPH.2006.087254

PMCID: PMC2040376
PMID: 17463371

Physical Health Complaints Among Lesbians, Gay Men, and Bisexual and Homosexually Experienced Heterosexual Individuals: Results From the California Quality of Life Survey

Susan D. Cochran, PhD, MS and Vickie M. Mays, PhD, MSPH

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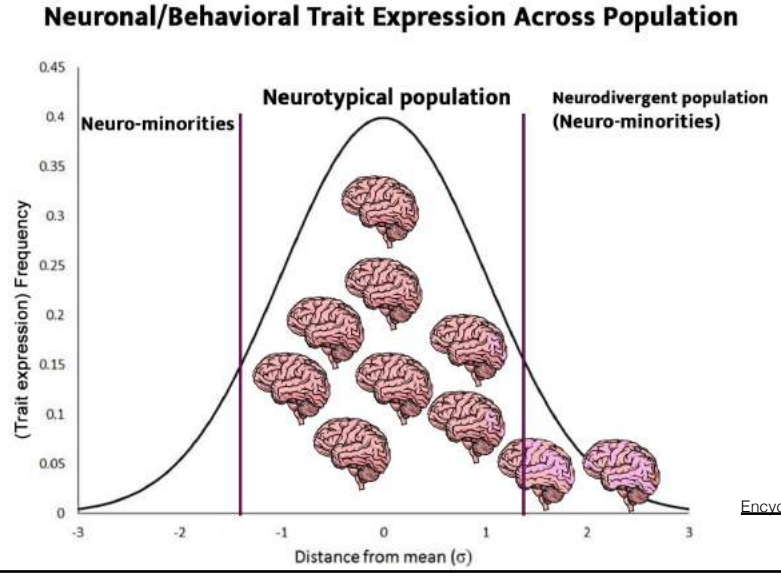
Open Access Entry

Unraveling Neurodiversity: Insights from Neuroscientific Perspectives

by Hagar Goldberg



Encyclopedia 2023, 3(3), 972-980

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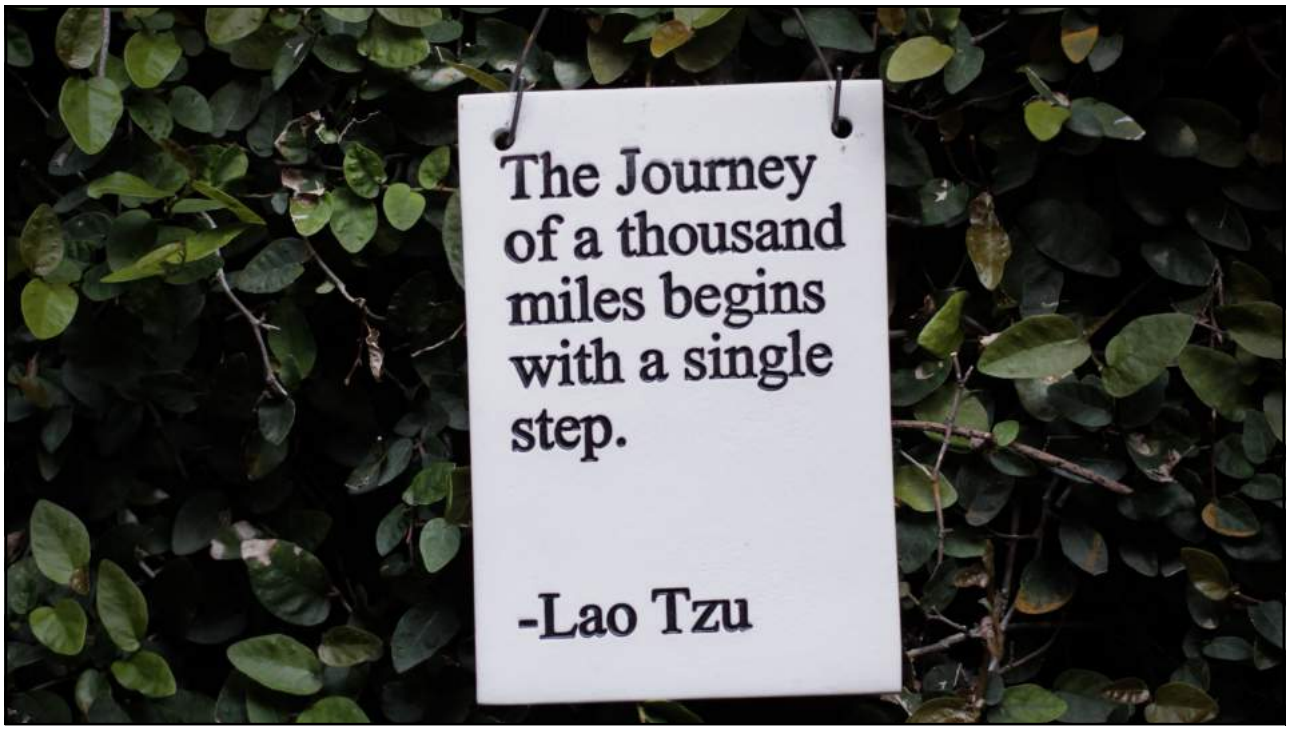

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Where to find me

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Microbiome, Gut and Systemic Health: New Frontiers in Personalised Nutrition

Thank you

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