WHY NEUROSCIENCE?

NEUROSCIENCE AS A CROSS -DISCIPLINE BRIDGE
- INTEGRATES PSYCHIATRY, PSYCHOLOGY, AND ADDICTION MEDICINE INTO A UNIFIED, BRAIN -CENTRIC FRAMEWORK
- OFFERS "NORMATIVE" NEURAL PATHWAYS (E.G., STOP → START → GROW) THAT TRANSCEND SPECIFIC MODALITIES

GROUNDING THERAPY IN BIOLOGICAL REALITY
- PROVIDES OBJECTIVE REFERENCE POINTS—E.G., AMYGDALA DOWN-REGULATION, VMPFC REACTIVATION RATHER THAN SOLELY RELYING ON SYMPTOM CHECKLISTS OR 'GUT'
- ENSURES INTERVENTIONS ENGAGE ACTUAL NEURAL CIRCUITS RATHER THAN ABSTRACT CONSTRUCTS

FREUD'S UNFULFILLED NEUROSCIENTIFIC AGENDA
- SOUGHT CIRCUITRY EXPLANATIONS FOR NEUROSES, BUT LACKED TOOLS (PRE-FMRI ERA; NO SYNAPTIC PLASTICITY CONCEPT)
- TURNED FROM CORTICAL LOCALISATION TO DYNAMIC PSYCHOLOGICAL MODELS: ID, EGO, SUPEREGO

A SHARED VOCABULARY FOR CLINICIANS
- TERMS LIKE "PFC-LIMBIC CONNECTIVITY,""REWARD-CIRCUIT RE-SENSITISATION," AND "NEUROPLASTIC WINDOW" CREATE CLARITY ACROSS SPECIALTIES
- REDUCES SILOED APPROACHES (E.G., PURE CBT, PURE 12-STEP) BY ANCHORING DISCUSSION IN OBSERVABLE BRAIN PROCESSES

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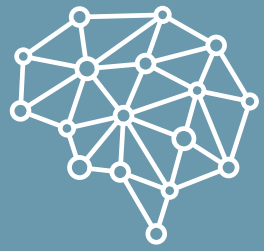
INTEGRATING NEUROSCIENCE INTO PSYCHOTHERAPY



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THE MISTAKE OF TRIBALISM - WHY "HAMMER-ONLY" APPROACHES FAIL

CLINGING TO A SINGLE MODALITY ("IF ALL YOU HAVE IS A HAMMER...")
- PHILOSOPHICAL DOGMAS TRAP CLINICIANS (E.G., "CBT SOLVES EVERYTHING," "MI IS BEST FOR EVERYONE")
- FOSTERS RIGIDITY - IGNORES EACH CLIENT'S CHANGING NEURAL NEEDS.

PROJECT MATCH & SIMILAR TRIALS: SINGLE DISCIPLINE, FIXED COURSE
- MATCHED CLIENTS TO CBT, MET, OR TSF BASED ON BASELINE CHARACTERISTICS –THEN DELIVERED THAT MODALITY FOR 12+ WEEKS
- RESULT: HIGH EARLY DROPOUT WHEN INTERVENTIONS MISALIGNED WITH CLIENTS' NEURAL PHASE (E.G., CBT BEFORE STRESS STABILIZATION)

THERAPEUTIC ALLIANCE AS AN INDICATOR OF RESPONSIVENESS
- ALLIANCE IS STRONG WHEN CLIENTS FEEL "HEARD" AND INTERVENTIONS FEEL "TIMELY"
- STATIC MODELS WEAKEN ALLIANCE WHEN CLIENTS FEEL MISUNDERSTOOD OR OVERWHELMED

SURVIVORSHIP BIAS IN LIVED -EXPERIENCE ADVOCACY
- MANY PEER MENTORS SUCCEEDED UNDER OLDER MODELS - THIS "SUCCESS STORY" COHORT OVERLOOKS CLIENTS WHO FAILED
- LEADS TO WHOLESALE ADOPTION OF ALUMNI-FAVORED PROTOCOLS, PERPETUATING MISMATCHES

KEY TAKEAWAY:
REJECT TRIBALISM. EMBRACE ADAPTIVE SEQUENCING - CHANGE TOOLS AS THE BRAIN'S NEEDS EVOLVE.

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FREUD'S VISION: A NEUROSCIENTIFIC AMBITION

FREUD'S EARLY TRAINING
- MD IN VIENNA; STUDIED NEUROANATOMY UNDER MEYNERT AND BRÜCKE
- INTENDED TO BUILD A "NEUROPATHOLOGICAL PSYCHOLOGY" GROUNDED IN BRAIN PHYSIOLOGY

FROM NEUROSCIENCE TO PSYCHOANALYTIC PRACTICE
- 1890S: HYPNOTHERAPY PHASE THE "DARK ARTS" OF SUGGESTION; LIMITED BY CONTEMPORARY NEUROPHYSIOLOGY
- DEVELOPED FREE -ASSOCIATION AND DREAM INTERPRETATION WHEN NEURAL SUBSTRATES COULDN'T YET BE MAPPED

FREUD'S UNFULFILLED NEUROSCIENTIFIC AGENDA
- SOUGHT CIRCUITRY EXPLANATIONS FOR NEUROSES, BUT LACKED TOOLS (PRE-FMRI ERA; NO SYNAPTIC PLASTICITY CONCEPT)
- TURNED FROM CORTICAL LOCALISATION TO DYNAMIC PSYCHOLOGICAL MODELS: ID, EGO, SUPEREGO

LEGACY FOR MODERN NEUROPSYCHOTHERAPY
- FREUD'S VISION ANTICIPATED NEUROPSYCHOANALYSIS: BRIDGING LIMBIC-CORTICAL DYNAMICS (PANKSEPP, 1998)
- OUR WORK ATTEMPTS TO CONTINUE THIS AMBITION; MAPPING TALK THERAPY TO THE UNDERSTANDING OF NEURAL CIRCUITS FREED BY CONTEMPORARY IMAGING

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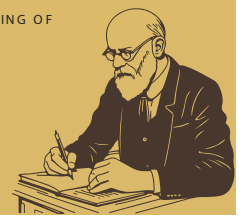
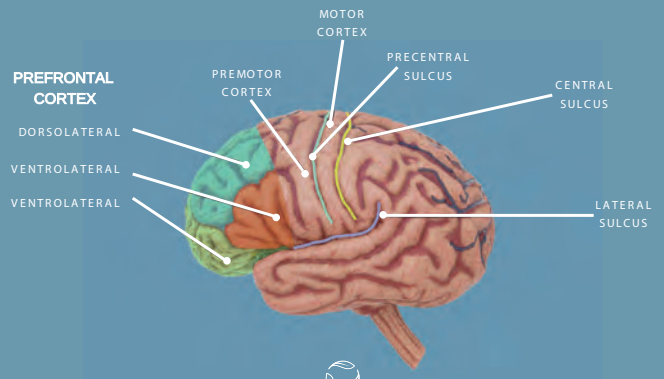


BRAIN REGIONS – A THERAPY-CENTRIC WHISTLESTOP TOUR

1.THE PREFRONTAL CORTEX: COMMAND AND CONTROL



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WHAT IS AN EMOTION?

WHAT IS ITS FUNCTION?

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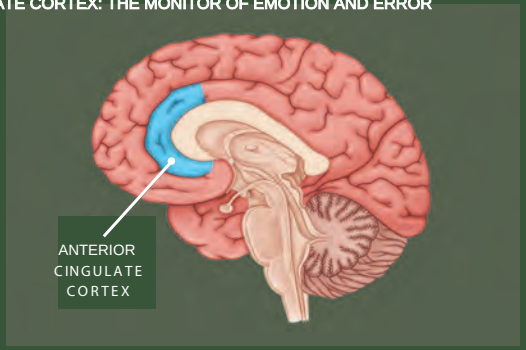
BRAIN REGIONS – A THERAPY-CENTRIC WHISTLESTOP TOUR

2. THE ANTERIOR CINGULATE CORTEX: THE MONITOR OF EMOTION AND ERROR



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PANKSEPPIAN AFFECT —EMOTION AS THE CATALYST FOR CHANGE
SEVEN PRIMARY AFFECTIVE SYSTEMS (PANKSEPP, 1998)

SEEKING: DOPAMINERGIC VTA →NAC PATHWAY DRIVING EXPLORATION AND MOTIVATION

FEAR: AMYGDALA-PAG NETWORK MEDIATING THREAT DETECTION AND DEFENSIVE BEHAVIOR

RAGE: DORSAL PAG-MEDIAL HYPOTHALAMUS-AMYGDALA CIRCUIT UNDERLYING ANGER/AGGRESSION

LUST: HYPOTHALAMIC CIRCUITS GOVERNING SEXUAL/MOTIVATIONAL DRIVES

CARE: OXYTOCIN-MODULATED VENTRAL PALLIDUM-MEDIAL PFC NETWORK SUPPORTING ATTACHMENT

PANIC/GRIEF: ACC-DORSAL PAG SYSTEM GENERATING SEPARATION DISTRESS

PLAY: DOPAMINERGIC-OPIOIDERGIC CIRCUITS IN NAC AND CEREBELLAR NETWORKS FACILITATING SOCIAL JOY

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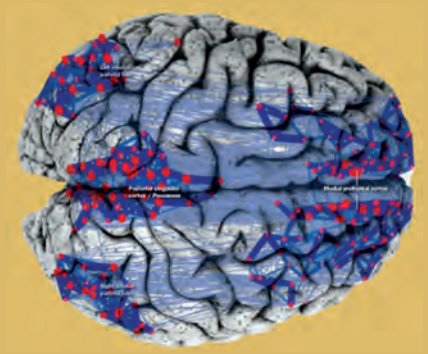
BRAIN REGIONS – A THERAPY-CENTRIC WHISTLESTOP TOUR

6. THE DEFAULT MODE NETWORK: THE SELF IN REFLECTION



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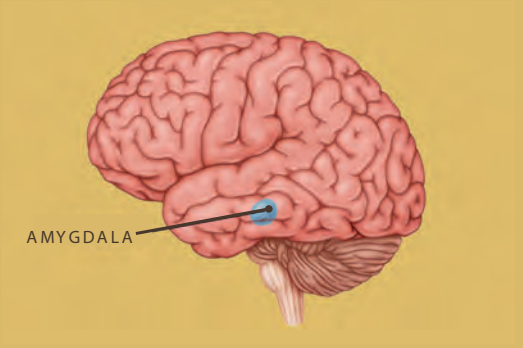
BRAIN REGIONS – A THERAPY-CENTRIC WHISTLESTOP TOUR

3. THE AMYGDALA: THE BRAIN'S ALARM BELL



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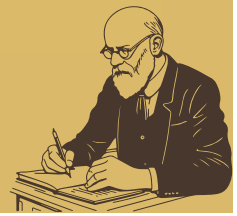
Where neuroscience is applicable…

TRIAGE/ASSESSMENT	TIMELINE AND INTERVENTION	OUTCOMES
HIGHER RESOLUTION TRIAGE WITH MORE CONCISE CATEGORIES	KNOWLEDGE OF NORMATIVE PROCESSES & BEST INTERVENTIONS ACCORDING TO NEUROBIOLOGICAL TIMELINES/FIRING SEQUENCES	ACCURATE ASSESSMENT OF NEUROLOGICAL SHIFTS



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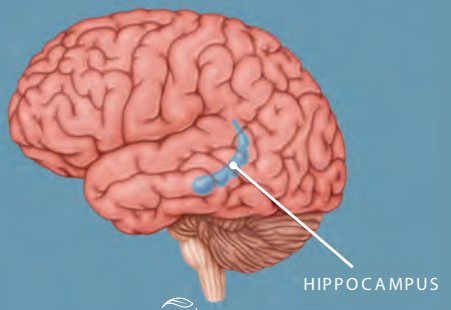
BRAIN REGIONS – A THERAPY-CENTRIC WHISTLESTOP TOUR

4. THE HIPPOCAMPUS: CONTEXT AND MEMORY INTEGRATION



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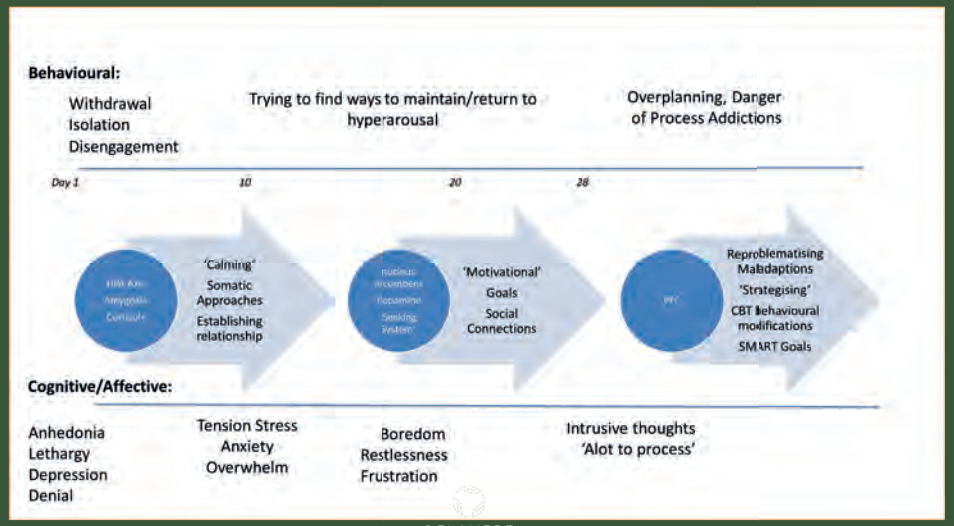
DELAMERE MODEL FROM A NEUROBIOLOGICAL PERSPECTIVE



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THE PROBLEM WITH TRIAGE—WHY DSM-5 HIDES NEURAL DIVERSITY

DSM-5'S FUNCTIONAL CATEGORIES VS. NEURAL REALITY

DSM-5 GROUPS DISORDERS BY SYMPTOM CLUSTERS (E.G., "ALCOHOL USE DISORDER")
HOWEVER, SIMILAR BEHAVIORS (E.G., HEAVY DRINKING) CAN ARISE FROM DISTINCT NEURAL DYSREGULATIONS

THREE DISTINCT NEURAL PATHWAYS UNDER A SINGLE LABEL

STRESS-DRIVEN PATHWAY: CHRONIC HPA-AXIS OVERACTIVATION → AMYGDALA HYPERREACTIVITY

REWARD-DEFICIT PATHWAY: MESOLIMBIC DOPAMINE HYPORESPONSIVITY → ANHEDONIA

EXECUTIVE-CONTROL PATHWAY: PREFRONTAL HYPOACTIVITY → POOR IMPULSE REGULATION

CONSEQUENCES OF DSM-5 TRIAGE

CLINICIANS ASSIGN ONE FIXED TREATMENT BASED ON DIAGNOSIS, IGNORING WHICH PATHWAY PREDOMINATES
RESULTS IN MISMATCHED INTERVENTIONS, REDUCED ENGAGEMENT, HIGHER RELAPSE
BETTER TO RECONCEPTUALIZE ALONG NEUROBIOLOGICAL LINES—TREAT THE PERTURBED CIRCUIT, NOT JUST THE LABEL

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Future Directions – Neuro-Biomarkers?

Biomarker	Easy sample & cost	Key brain circuits indexed	When an *adaptive* shift matters to therapy	Practical negatives
HRV (RMSSD / HF-power)	5-min ECG or smartwatch (non-invasive; pennies per reading)	Central-autonomic network: ventromedial PFC → dACC / anterior insula top-down inhibition of the amygdala	Sustained ↑ HRV signals stronger prefrontal regulation; safe point to move from stabilisation into trauma-focused or high-demand CBT modules	Highly sensitive to caffeine, β-blockers, cardiorespiratory fitness
Serum BDNF	5 mL venous blood, ELISA (routine lab)	Synaptic plasticity in hippocampus and PFC - limbic loops; peripheral levels mirror CNS BDNF	Rising titres (typically weeks 2-4) mark a "plasticity window" → intensify cognitive restructuring or EMDR	Exercise, antidepressants and assay batch effects confound readings; blood draw required
Salivary cortisol (AM + PM)	Two cotton swabs; <£10	HPA axis output reflecting feedback through hippocampus, amygdala and medial PFC	Return of a steep AM-to-PM decline suggests stress circuitry has stabilised - green light for relapse-prevention skills work	Large diurnal and situational swings → need baselines and duplicate days
Serum IL-6	Standard cytokine panel (5 mL blood)	Cue-linked elevations correlate with vmPFC cue-reactivity and ventral-striatal drive in binge drinkers	Falling IL-6 after mindfulness / anti-inflammatory adjuncts indicates reduced neuro-immune stress; may pre-empt craving spikes	Non-specific (infection, obesity); moderate lab cost

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ALCOHOL DEPENDENCY: THREE DISTINCT NEURAL PATHWAYS & TREATMENT PRIORITIES

PATHWAY A: STRESS-DRIVEN ALCOHOL USE

NEURAL FEATURES: CHRONIC HPA-AXIS OVERACTIVATION; ELEVATED CORTISOL; AMYGDALA HYPERREACTIVITY
BEHAVIOURAL/EMOTIONAL PROFILE: FREQUENT PANIC, HYPERVIGILANCE, SLEEP DISRUPTION; "I DRINK TO CALM DOWN, OTHERWISE I CAN'T STOP SHAKING"
THERAPIST OBSERVATIONS: RESTLESSNESS IN SESSION; SCANNING ENVIRONMENT; RAPID BREATHING; IRRITABILITY WHEN FEELING UNSAFE
SURVEY INDICATORS: HIGH DASS-STRESS (>30); PCL-5 >50; CRAVING SPIKES IN RESPONSE TO STRESS TRIGGERS
TREATMENT PRIORITY: SOMATIC STABILISATION; BREATHWORK, INTEROCEPTIVE MINDFULNESS, TRAUMA-INFORMED YOGA—UNTIL DISTRESS SUBSIDES; EMDR TARGETING SALIENT STRESS MEMORIES ONCE SUDS <40 (JOHNSON, 2021; MCEWEN, 2007)

PATHWAY B: REWARD-DEFICIT ALCOHOL USE

NEURAL FEATURES: MESOLIMBIC DOPAMINE HYPO-RESPONSIVITY; LOW D_2 RECEPTOR AVAILABILITY IN NUCLEUS ACCUMBENS; ANHEDONIA
BEHAVIOURAL/EMOTIONAL PROFILE: "NOTHING FEELS GOOD EXCEPT ALCOHOL; I CAN'T ENJOY LIFE WITHOUT A DRINK"
THERAPIST OBSERVATIONS: FLAT AFFECT, MINIMAL EYE CONTACT, RELUCTANT PARTICIPATION IN RECREATIONAL ACTIVITIES; "I DON'T SEE THE POINT IN THESE EXERCISES."
SURVEY INDICATORS: BADS REWARD SUBSCALE Z < –1; SHAPS ANHEDONIA SCALE > 20
TREATMENT PRIORITY: BEHAVIOURAL ACTIVATION & CONTINGENCY MANAGEMENT-MICRO-PLEASURE TASKS, TOKEN ECONOMIES TO EVOKE DOPAMINE SURGES; OPTIONAL PHARMACOLOGICAL ADJUNCT (BUPROPION) IF BADS Z REMAINS < –0.5 BY WEEK 3 (PETRY ET AL., 2005; KANTER ET AL., 2007)

PATHWAY C: EXECUTIVE-CONTROL ALCOHOL USE

NEURAL FEATURES: PREFRONTAL CORTEX HYPOFUNCTION; ANTERIOR CINGULATE CORTEX (ACC) CONFLICT-MONITORING DEFICITS; POOR WORKING MEMORY
BEHAVIORAL/EMOTIONAL PROFILE: IMPULSIVITY, DIFFICULTY PLANNING AHEAD, "I KNOW I SHOULDN'T, BUT I CAN'T STOP MYSELF."
THERAPIST OBSERVATIONS: INABILITY TO COMPLETE MULTI-STEP TASKS; FREQUENT ATTENTION LAPSES; "I KEEP FORGETTING MY STRATEGIES WHEN I'M STRESSED."
SURVEY INDICATORS: BIS-11 IMPULSIVITY SCALE > 70; < 60 PERCENT ACCURACY ON A BRIEF 2-BACK WORKING MEMORY TASK
TREATMENT PRIORITY: EXECUTIVE-FUNCTION SCAFFOLDING: SCAFFOLDED N-BACK & STOP-SIGNAL DRILLS; SIMPLIFIED CBT TEMPLATES (TWO-COLUMN THOUGHT RECORDS) TRANSITIONING TO FULL FIVE-COLUMN; "FUTURE-PROOF" RELAPSE PREVENTION WORKSHEETS (MILLER ET AL., 2017; ARON ET AL., 2007)

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MEASURING OUTCOMES - CONCEPTUAL PITFALLS OF RECOVERY CAPITAL AND COMPLETION

RECOVERY CAPITAL: CORRELATION ≠ CAUSATION

VIEWING INCREASED RECOVERY CAPITAL (SOCIAL SUPPORTS, RESOURCES) AS INHERENTLY "DRIVING" RECOVERY MAY OVERLOOK THAT IT OFTEN REFLECTS UNDERLYING MOTIVATION (AN ALREADY REACTIVATED SEEKING SYSTEM).

RISK: ELEVATING RECOVERY CAPITAL BECOMES AN END IN ITSELF, RATHER THAN A MARKER OF BRAIN -BASED READINESS FOR DEEPER CHANGE.

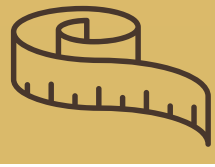
COMPLETION AS A FLAWED PROXY

COUNTING PROGRAM COMPLETION PRESUMES THAT MERE ATTENDANCE EQUATES TO NEURAL REMEDIATION.

FAILURE TO DISTINGUISH BETWEEN "TICKING THE BOX" OF A 28 -DAY STAY AND GENUINE PFC –LIMBIC INTEGRATION.

SYMPTOMS VS. MECHANISMS

EMPHASISING OUTCOME METRICS LIKE ABSTINENCE DAYS OR SELF -EFFICACY SCORES CAN MASK WHETHER STRESS CIRCUITS REMAIN PRIMED OR EXECUTIVE NETWORKS UNDERPERFORM. NEED TO AVOID CONFLATING SHORT -TERM "SUCCESS" MEASURES WITH DURABLE, MECHANISTIC CHANGE.



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