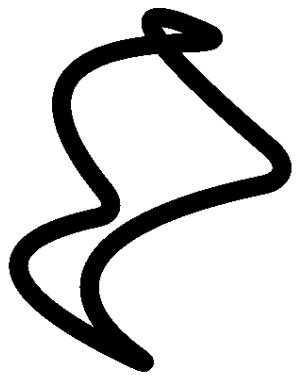

Psychiatrische
Universitätsklinik
Zürich

Psychiatrische Universitätsklinik Zürich

SAVE THE DATE :

MITTWOCH, 05. NOVEMBER 2025

GANZTAGS

2ND ANNUAL SYMPOSIUM + WORKSHOP:

PSYCHEDELIKA IN DER PSYCHIATRISCHEN THERAPIE

PSYCHIATRISCHE UNIVERSITÄTSKLINIK ZÜRICH

Programm

ab 08:30 Uhr	**Registrierung**
09:15 Uhr	**Prof. Dr. med. Erich Seifritz** **Klinikdirektor Erwachsenenpsychiatrie PUK Zürich** Begrüssung
09:30 Uhr	**Dr. sc. med. Friederike Holze** Klinische Pharmakologie verschiedener Psychedelika
10:00 Uhr	**Abigail Calder, Ph.D. cand.** Effekte von LSD auf motorisches Lernen Neuroplastizität
10:30 Uhr	**Kaffeepause**
11:00 Uhr	**Lea Mertens, Ph.D. cand.** Psilocybin bei therapieresistenter Depression – Erkenntnisse aus der EPIsoDE Studie
11:30 Uhr	**Prof. Dr. med. Sebastian Olbrich** Stratifizierung der Psychedelika-assistierten Therapie mittels EEG und EKG
12:00 Uhr	**Mittagspause - Stehlunch**
13:00 Uhr	**Workshop 1:** Begleitung und Kontextfaktoren **Stephanie Buschner, M.Sc.,** **Dr. med. Susanne Prinz, M.Sc.,** **Dr. med. univ. Johannes Jungwirth**
14:00 Uhr	**Kaffeepause**
14:30 Uhr	**Workshop 2:** Ethische und gesellschaftliche Aspekte der aktuellen Entwicklungen **Dr. phil. Helena Aicher,** **Dr. med. Alexander Wopfner** **Prof. Dr. med. Gerhard Gründer**
15:30 Uhr	**Abschluss**

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Health › Health news

Germany to allow some depressed patients to try psilocybin amid psychedelic medicine boom

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Ottawa

Could 'microdosing' psilocybin help people with anxiety? This study aims to find out

Clinical trial now underway in Kingston, Ont.

Trevor Pritchard · CBC News · Posted: Oct 20, 2025 4:00 AM EDT | Last Updated: October 20

Listen to this article
Estimated 4 minutes

Klinische Anforderungen

nature mental health

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nature > nature mental health > perspectives > article

Perspective | Published: 03 May 2024

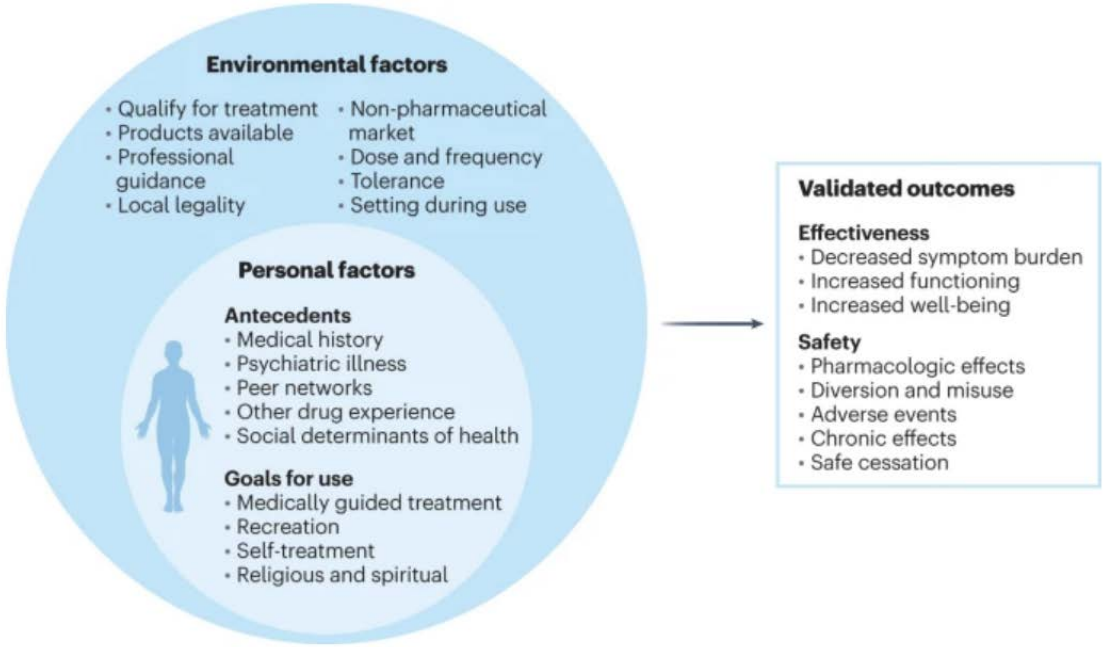
Optimizing real-world benefit and risk of new psychedelic medications: the need for innovative postmarket surveillance

Joshua C. Black, Andrew A. Monte, Nabarun Dasgupta, Jennifer S. Jewell, Karilynn M. Rockhill, Richard A. Olson & Richard C. Dart

Nature Mental Health **2**, 469–477 (2024) | Cite this article

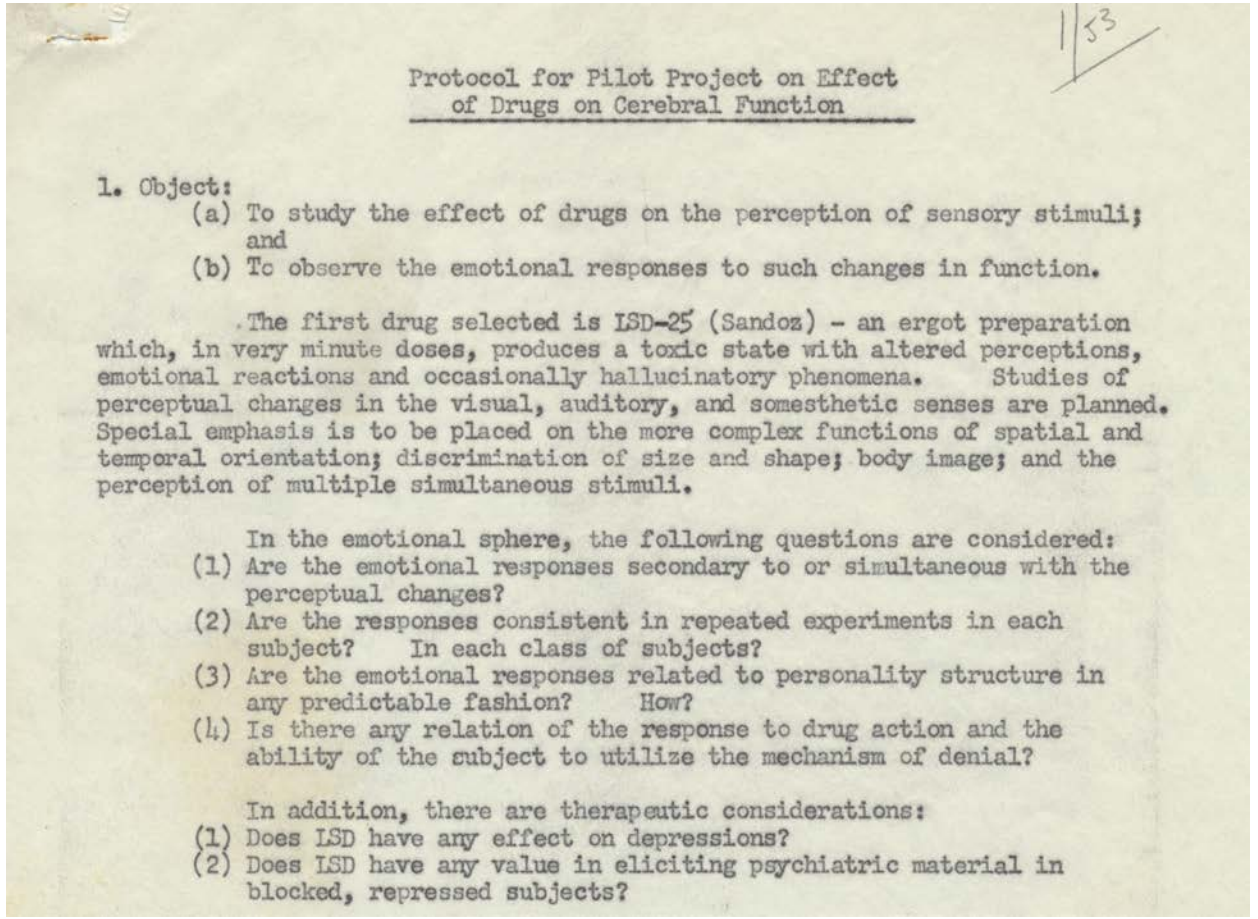
323 Accesses | **1** Citations | **19** Altmetric | Metrics

Fig. 1: The continuum of psychedelic drug use.



Surveillance must cover multiple domains, from environmental factors and personal factors to relevant validated outcomes.

Max Fink 1953



1/53

Protocol for Pilot Project on Effect
of Drugs on Cerebral Function

1. Object:

(a) To study the effect of drugs on the perception of sensory stimuli; and

(b) To observe the emotional responses to such changes in function.

The first drug selected is LSD-25 (Sandoz) - an ergot preparation which, in very minute doses, produces a toxic state with altered perceptions, emotional reactions and occasionally hallucinatory phenomena. Studies of perceptual changes in the visual, auditory, and somesthetic senses are planned. Special emphasis is to be placed on the more complex functions of spatial and temporal orientation; discrimination of size and shape; body image; and the perception of multiple simultaneous stimuli.

In the emotional sphere, the following questions are considered:

(1) Are the emotional responses secondary to or simultaneous with the perceptual changes?

(2) Are the responses consistent in repeated experiments in each subject? In each class of subjects?

(3) Are the emotional responses related to personality structure in any predictable fashion? How?

(4) Is there any relation of the response to drug action and the ability of the subject to utilize the mechanism of denial?

In addition, there are therapeutic considerations:

(1) Does LSD have any effect on depressions?

(2) Does LSD have any value in eliciting psychiatric material in blocked, repressed subjects?

Max Fink 1958

Fig. 13, 14, 15

LSD - EEG

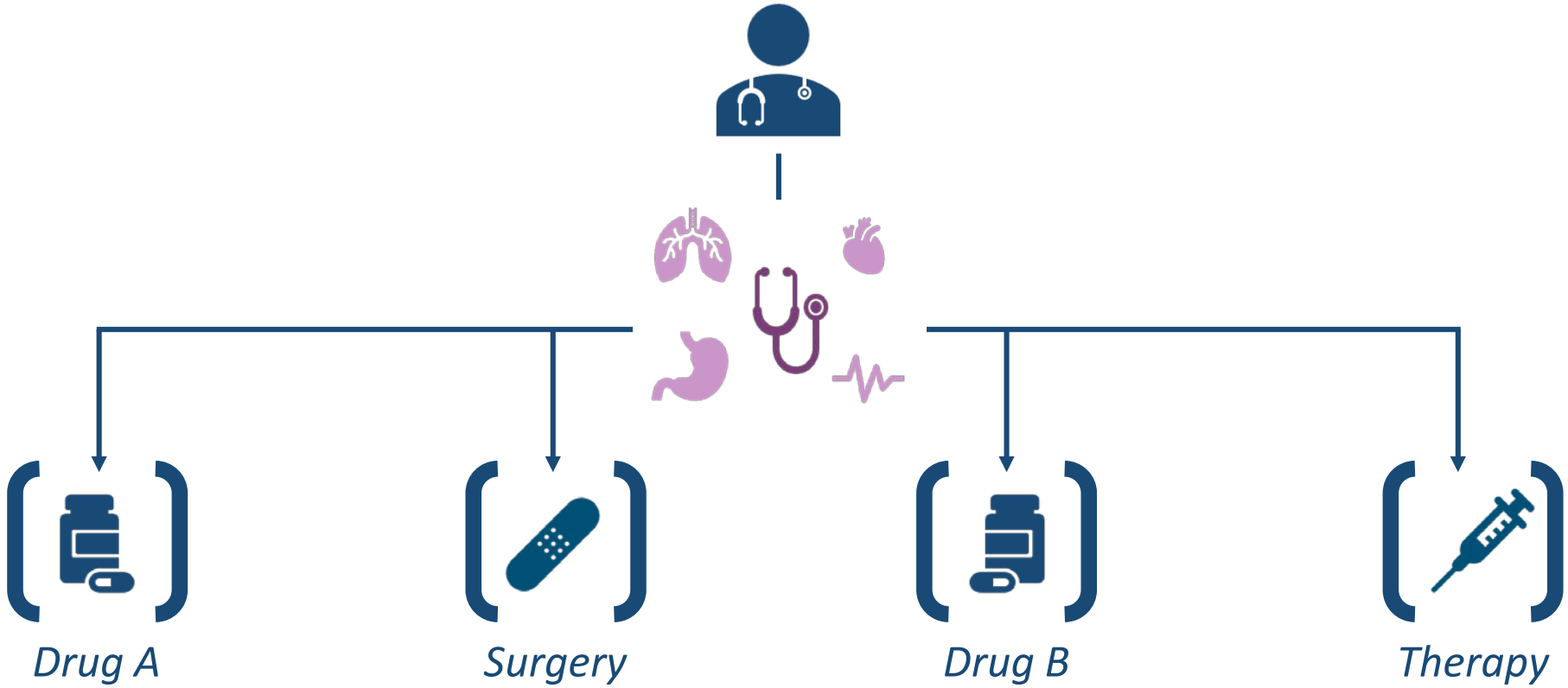
Recalling the ability of benactyzine to desynchronize records, we administered this compound intravenously, and again, we observed the same EEG pattern of desynchronization, associated with restlessness and excitement. While we did not observe the illusory and hallucinatory patterns, we did note the same kinds of language changes in these patients that we observed with diethazine.

Stratifizierung der Psychedelika-assistierten Therapie mittels EEG und EKG

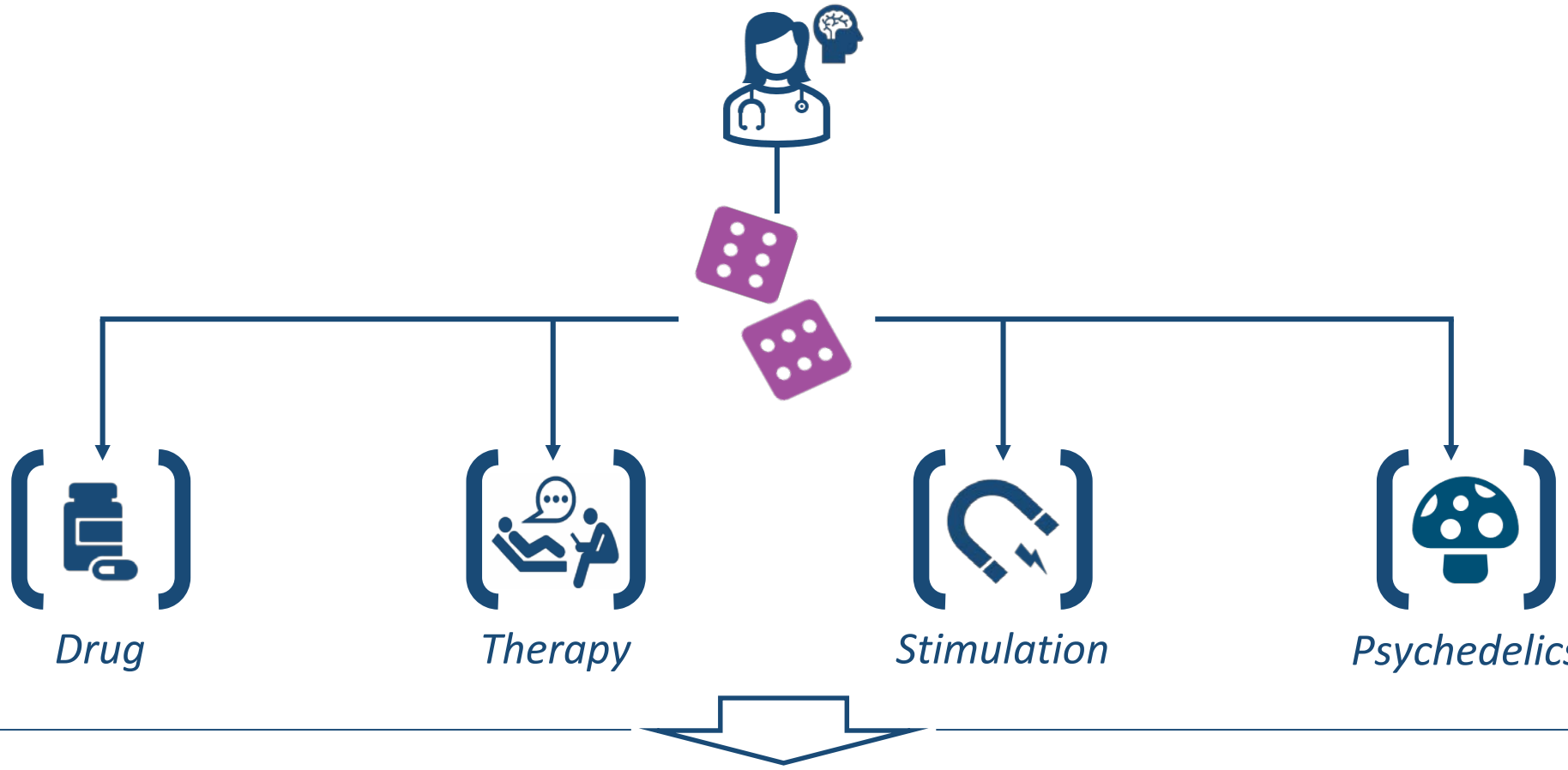
Sebastian Olbrich

05.11.2025, Zürich

Somatische Erkrankungen werden behandelt auf Basis objektiver Informationen



“Trial-and-error” in der psychiatrischen Praxis?



Häufige Non-Response und Non-Remission: schwer zu behandelnde Depressionen

2025
Stratifizierte Psychiatrie

American College of Neuropsychopharmacology

www.nature.com/npp

PERSPECTIVE OPEN

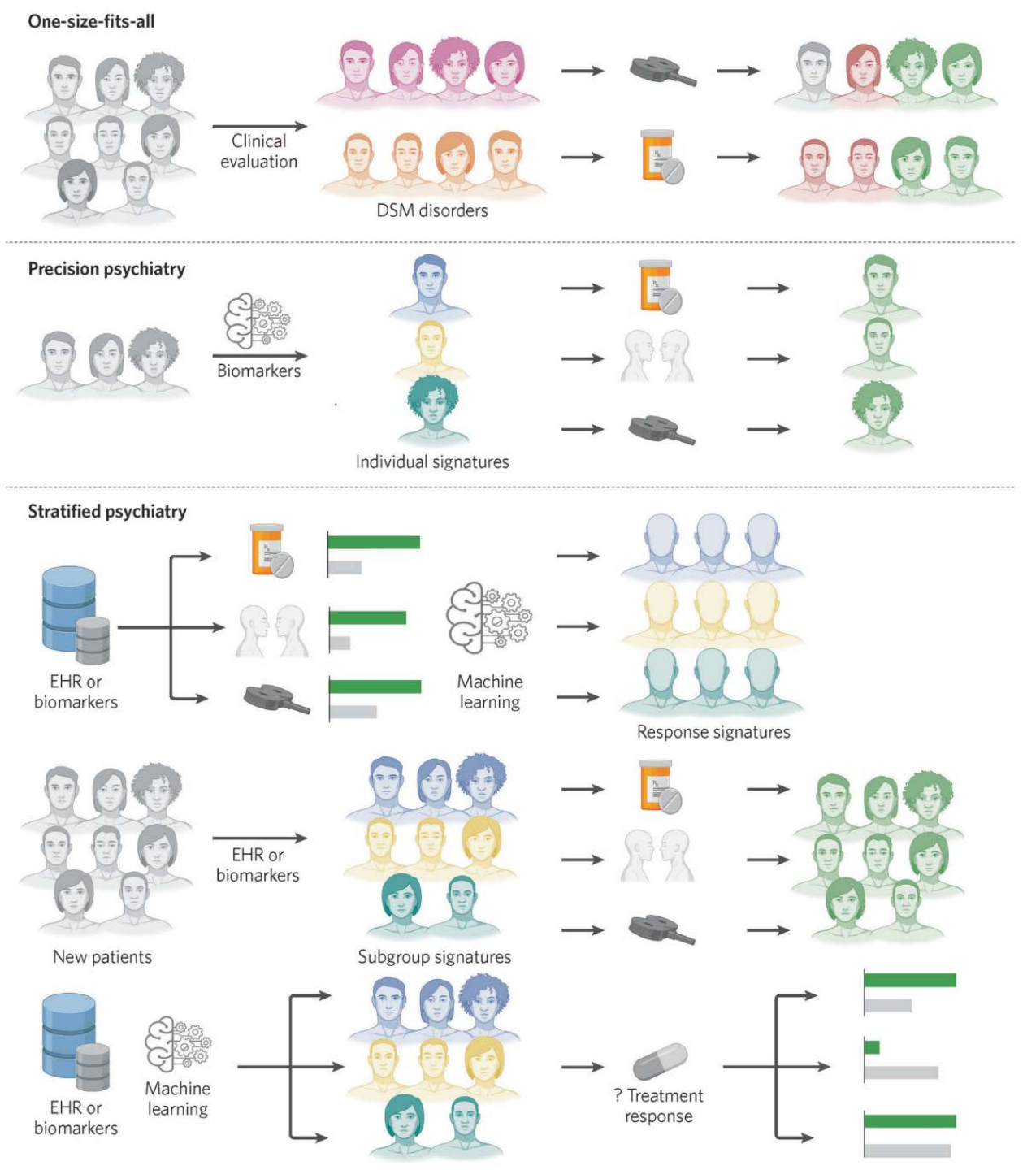
Check for updates

Electronic health records and stratified psychiatry: bridge to precision treatment?

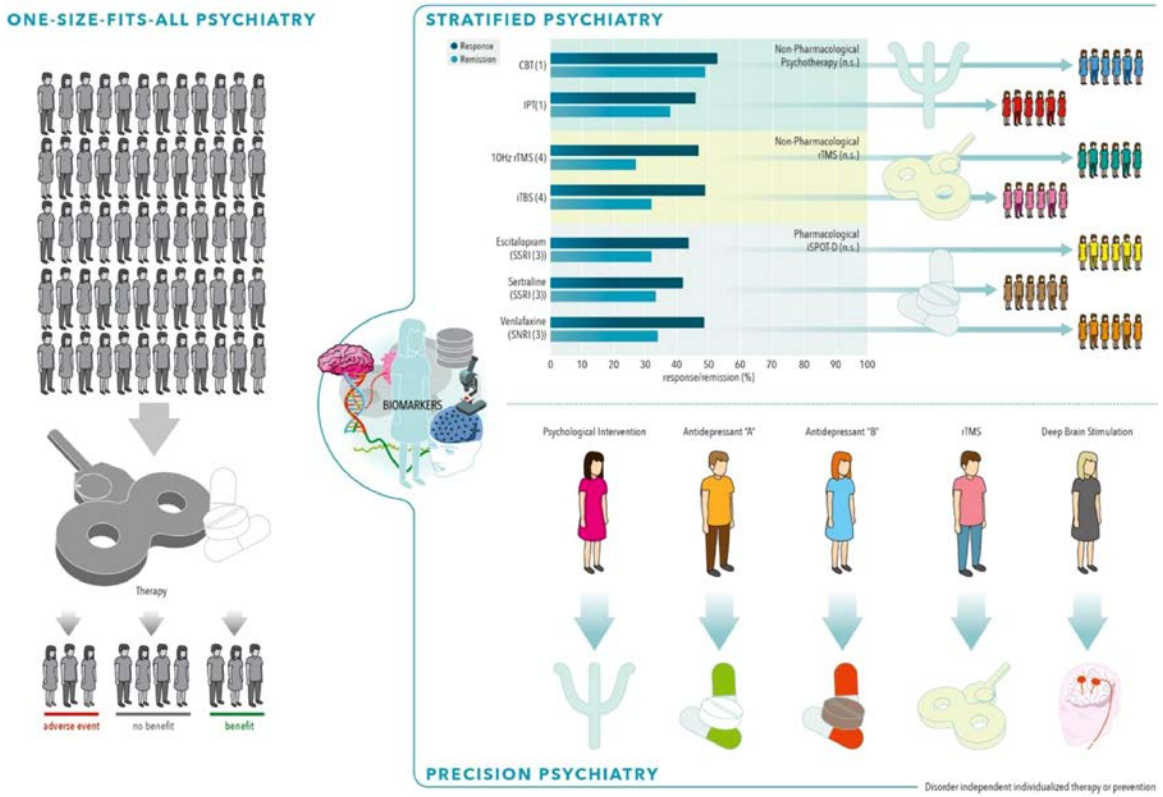
Adrienne Grzenda[1,2]✉ and Alik S. Widge[3]

The use of a stratified psychiatry approach that combines electronic health records (EHR) data with machine learning (ML) is one potentially fruitful path toward rapidly improving precision treatment in clinical practice. This strategy, however, requires confronting pervasive methodological flaws as well as deficiencies in transparency and reporting in the current conduct of ML-based studies for treatment prediction. EHR data shares many of the same data quality issues as other types of data used in ML prediction, plus some unique challenges. To fully leverage EHR data's power for patient stratification, increased attention to data quality and collection of patient-reported outcome data is needed.

Neuropsychopharmacology; https://doi.org/10.1038/s41386-023-01724-y



Behandlungsresistente Depression

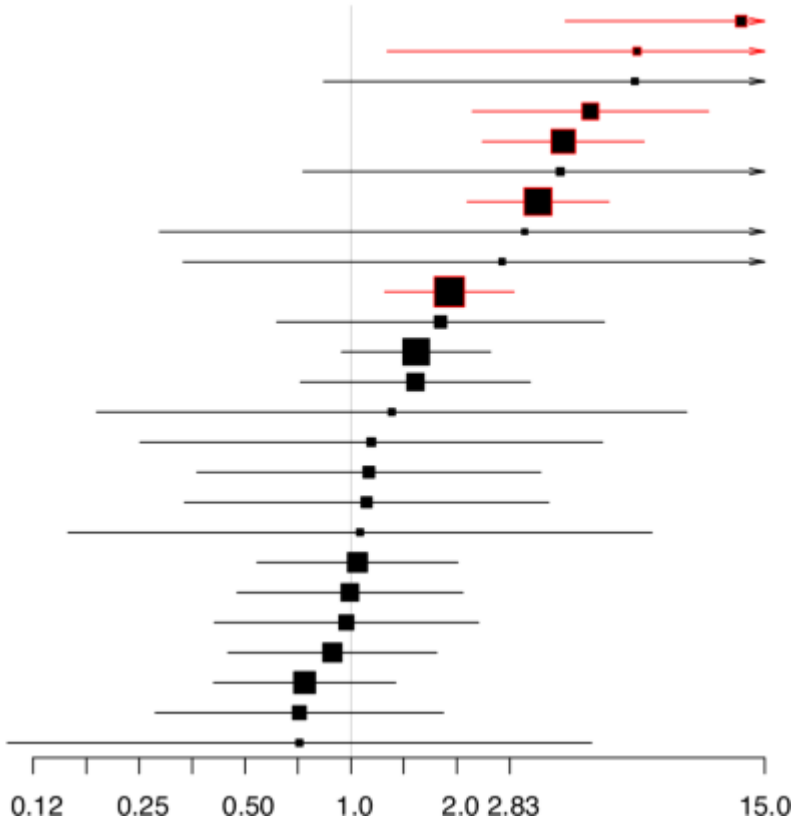


- Behandlungsresistenz („schwer zu behandelnde Depression“) ist definiert als mehr als zwei fehlgeschlagene Behandlungsversuche.
- Die meisten Therapieoptionen haben ähnlich niedrige Ansprechraten.
- Entscheidend ist die Verfügbarkeit verschiedener Behandlungsmethoden und die Möglichkeit zur Stratifizierung (also gezielte Auswahl der Therapie für den jeweiligen Patienten).

Arns et al. 2022

Behandlungsresistente Depression

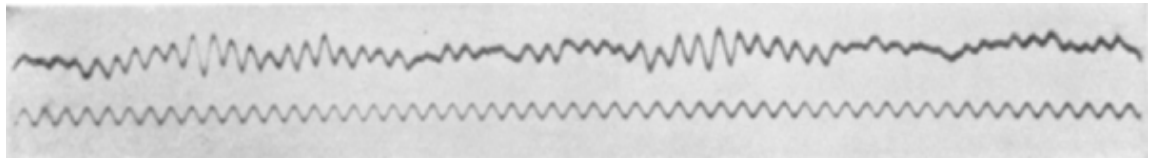
Treatment	OR	95%–CI
ECT	12.86	[4.07; 40.63]
Minocycline	6.5	[1.27; 33.29]
D–Cycloserine	6.42	[0.84; 49.22]
TBS	4.8	[2.21; 10.39]
rTMS	4.01	[2.36; 6.81]
Ayahuasca	3.94	[0.73; 21.20]
Ketamine	3.4	[2.14; 5.41]
tDCS	3.11	[0.29; 34.06]
Nitrous Oxide	2.69	[0.33; 21.65]
Aripiprazole	1.9	[1.25; 2.91]
Psilocybin	1.8	[0.62; 5.25]
Brexpiprazole	1.53	[0.94; 2.49]
Lanicemine	1.52	[0.72; 3.23]
Sodium Valproate	1.31	[0.19; 9.00]
Thyroid Hormone	1.14	[0.25; 5.19]
Quetiapine XR Mono	1.12	[0.37; 3.46]
DBS	1.11	[0.34; 3.65]
Buspirone	1.06	[0.16; 7.17]
Olanzapine/Fluoxetine	1.04	[0.54; 2.01]
Quetiapine XR	0.99	[0.48; 2.08]
Lamotrigine	0.97	[0.41; 2.31]
Fluoxetine	0.89	[0.45; 1.75]
Olanzapine	0.74	[0.41; 1.34]
Lithium	0.71	[0.28; 1.83]
Risperidone	0.71	[0.11; 4.83]



Saelens et al. 2025

EEG und Hans Berger

- Erste Ableitungen eine „EEG“ am Menschen 1924
- „Berger-Reaktion“ mit Alpha Wellen
- Erste vermutete Korrelation zwischen Alpha Wellen und affektiven Symptomen
- Bereits 1941 konkrete Hypothesen für Korrelationen EEG und Depressionen



6. EEG Findings in Depression

Lemere (1941) was the first to report that manic-depressive patients tend to have a large amplitude, strongly dominant alpha rhythm. Davis (1941, 1942) confirmed Lemere's finding showing that manic-depressed individuals have more alpha-type EEGs compared with schizophrenics, and that predominantly depressed patients have more alpha-type and mixed alpha and slow activity EEGs; whereas predominantly manic patients have more mixed alpha and fast activity EEGs. Greenblatt *et al.* (1944) further discriminated the manic patients, based on the large amount of fast activity found in his manic group. Hurst *et al.*, 1954, also found that manic patients have higher alpha frequencies than the depressed patients, but they did not show a shift in alpha frequency accompanying a phase change, whenever a manic-depressive patient shifted from mania to depression or from depression to mania. On the contrary, some others observed an increase in alpha frequency during manic episodes of two manic-depressive patients.

Through visual analysis of the EEGs of 73 schizophrenics and 100 endogenous depressed patients, it was shown that there is a significant relationship between alpha dominance and depression, and beta dominance and schizophrenia (Itil, 1964). Brezinova *et al.*, 1966, reported a greater abundance of alpha rhythm in patients with endogenous depression. Volavka *et al.*, 1967, compared the EEGs of five depressed patients during the episodes of depression and during remission. The patients showed significantly more alpha and beta activities during the depressive phase.

Itil 1983

Psychiatrische Universitätsklinik Zürich

Das Pharmako-EEG

- Bereits 1937 postulierte H. Berger, dass einen engen Zusamenhang zwischen Verhaltensänderung und EEG-Mustern
- 1957 berichtete Max Fink von engen Zusamenhängen zwischen Besserung nach EKT und EEG Veränderungen
- 1954 berichteten Itil und Bente von EEG Veränderungen unter Chlorpromazin

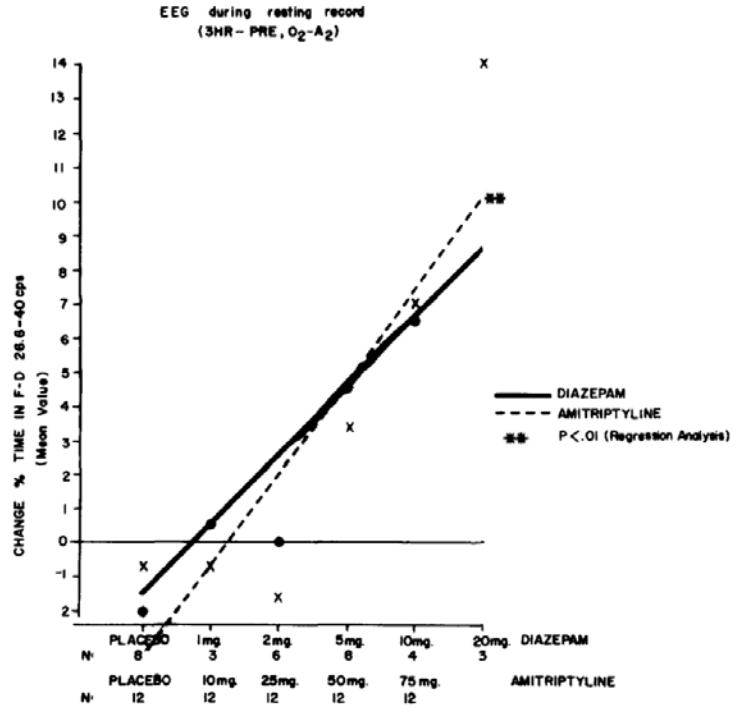


FIG. 3. EEG dose response curve.

Psychiatrische Universitätsklinik Zürich

Das „Key-Lock“ Prinzip

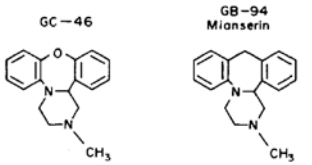


FIG. 17. Chemical structures of GB-94 (Mianserin) and GC-46.

- Entdeckung der antidepressiven Wirkung des Mianserin durch Itil aufgrund des EEG-Profils 1972

Progress in Neurobiology, Vol. 20, pp. 185 to 249 1983
Printed in Great Britain.

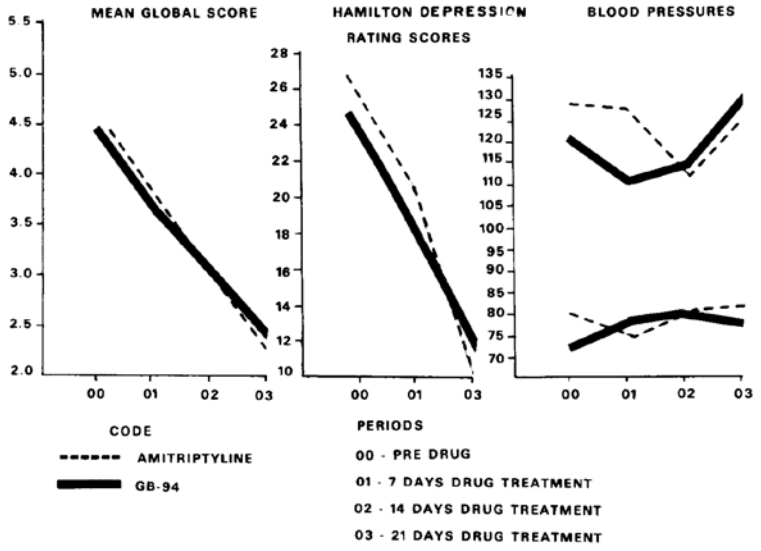
0301-0082/83/$0.00 + .50

THE DISCOVERY OF ANTIDEPRESSANT DRUGS BY COMPUTER-ANALYZED HUMAN CEREBRAL BIO-ELECTRICAL POTENTIALS (CEEG)

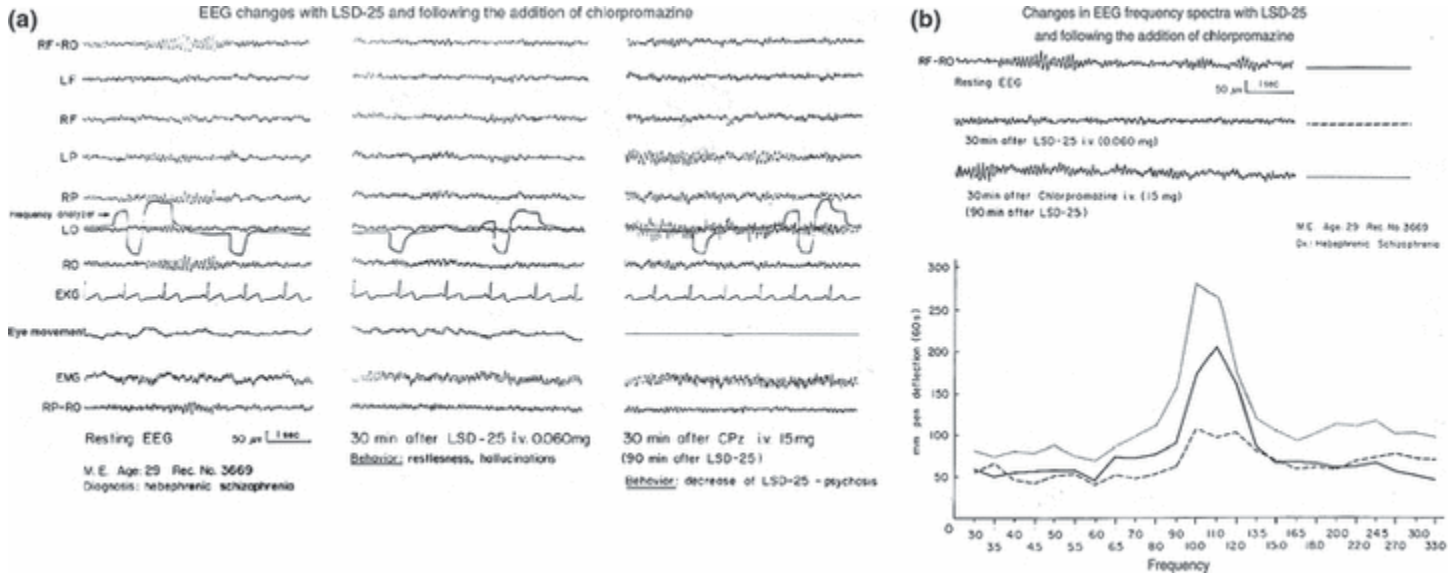
TURAN M. ITIL

Division of Biological Psychiatry, Department of Psychiatry, New York Medical College, Valhalla, NY 10595, U.S.A. and HZI Research Center, Tarrytown, NY, U.S.A.

(Received 14 September 1982)



History Itil et al. 1950s Effects of LSD on EEG



Max Fink. 2010

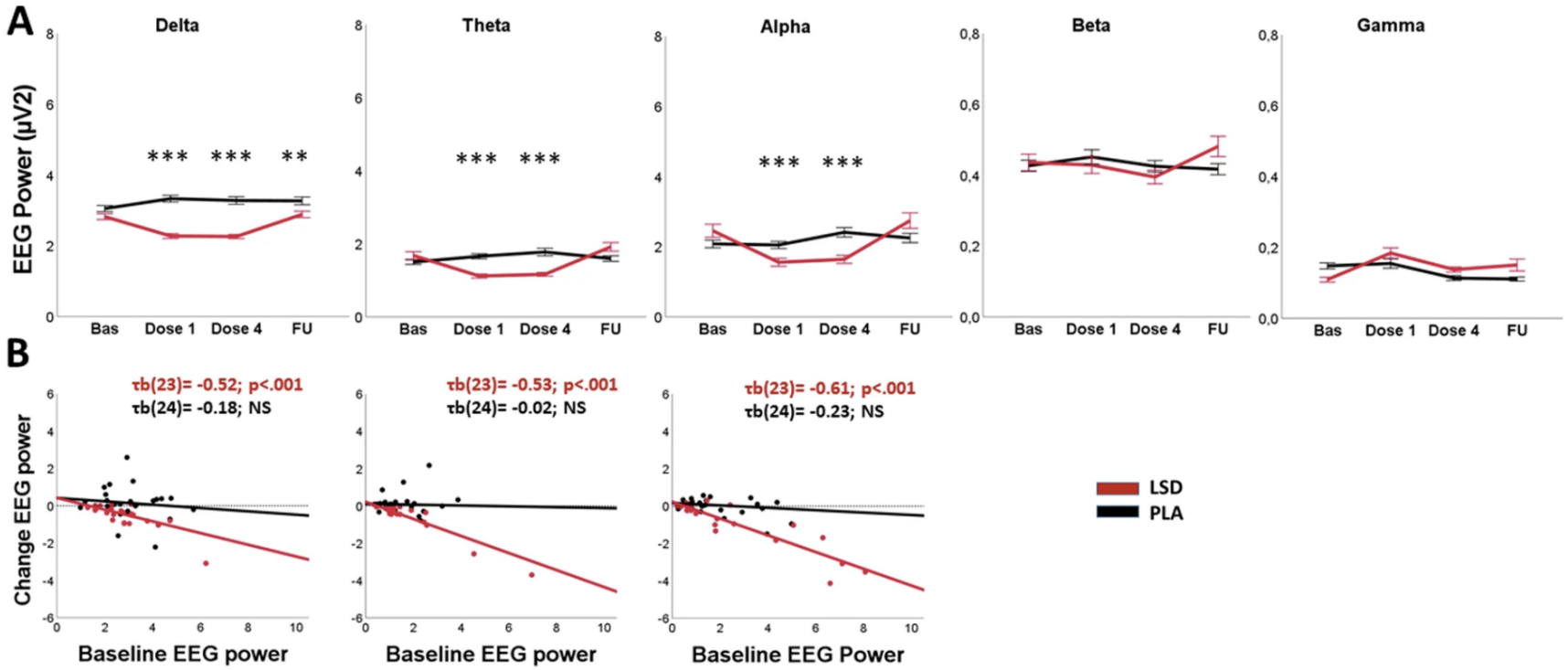
Max Fink

- By 1953 LSD had become a popular research tool, as microgram quantities affected mood and imagery in normal subjects. Such potency must have significance as others and we administered 50µg to 100µg lysegic acid diethylamide (LSD) intravenously. The mood of depressed patients heightened and some illusory experiences were elicited. In experiments in our patients with LSD administered late in the ECT course, when the recorded EEG was filled with slow waves, these were blocked in a dose related fashion. Although the patient's mood and expressed thoughts changed, these observations did not extend our understanding of ECT as the chemistry of LSD was poorly defined(Fink and Itil 1968a).

Max Fink

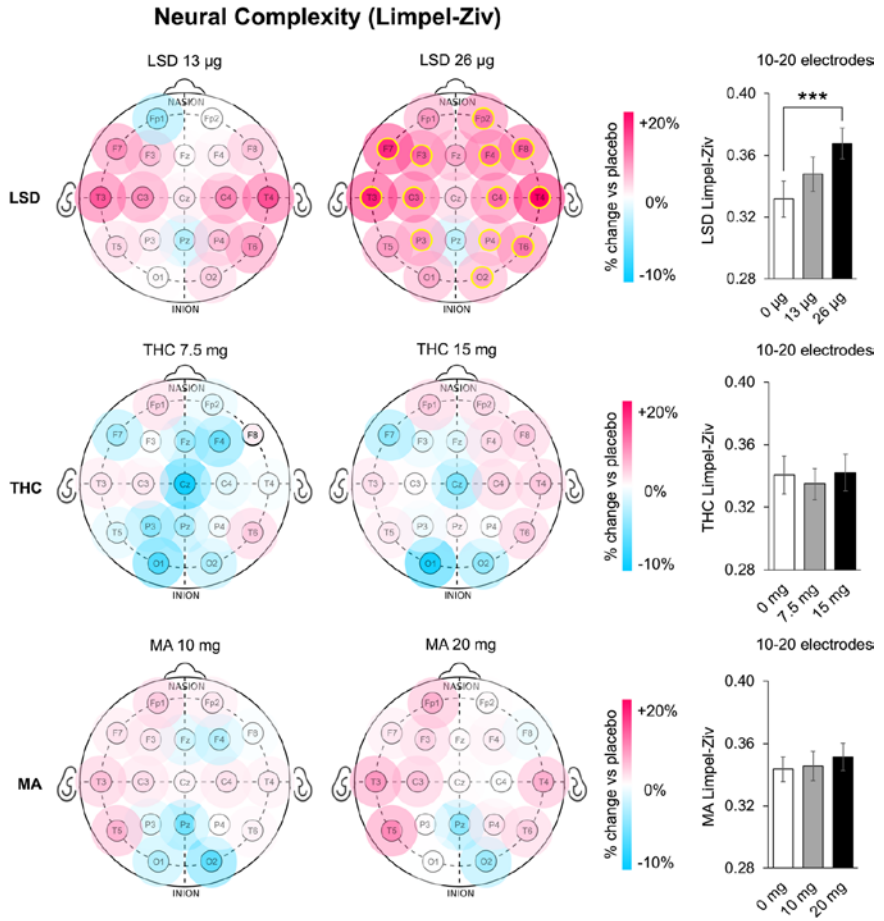
- We offered our psychiatry residents LSD experiences under conditions of EEG recording. Almost all volunteered and except for one paranoid response in which the subject refused his lunch as “poisoned,” all “enjoyed” their experience and encouraged others to volunteer. My personal LSD experience was trivial, for other than decreases in EEG alpha frequencies and increased heart rate, I failed the nirvana of imagery and insight promised by hippie enthusiasts. I cannot say that the illusions would have appeared spontaneously as we strongly encouraged the subjects to report any effects. Our experience with LSD did not anticipate the hyper-enthusiasm that developed in the hippie culture of the 1960s.

Today: Hutten et al. 2024 „EEG-Power“

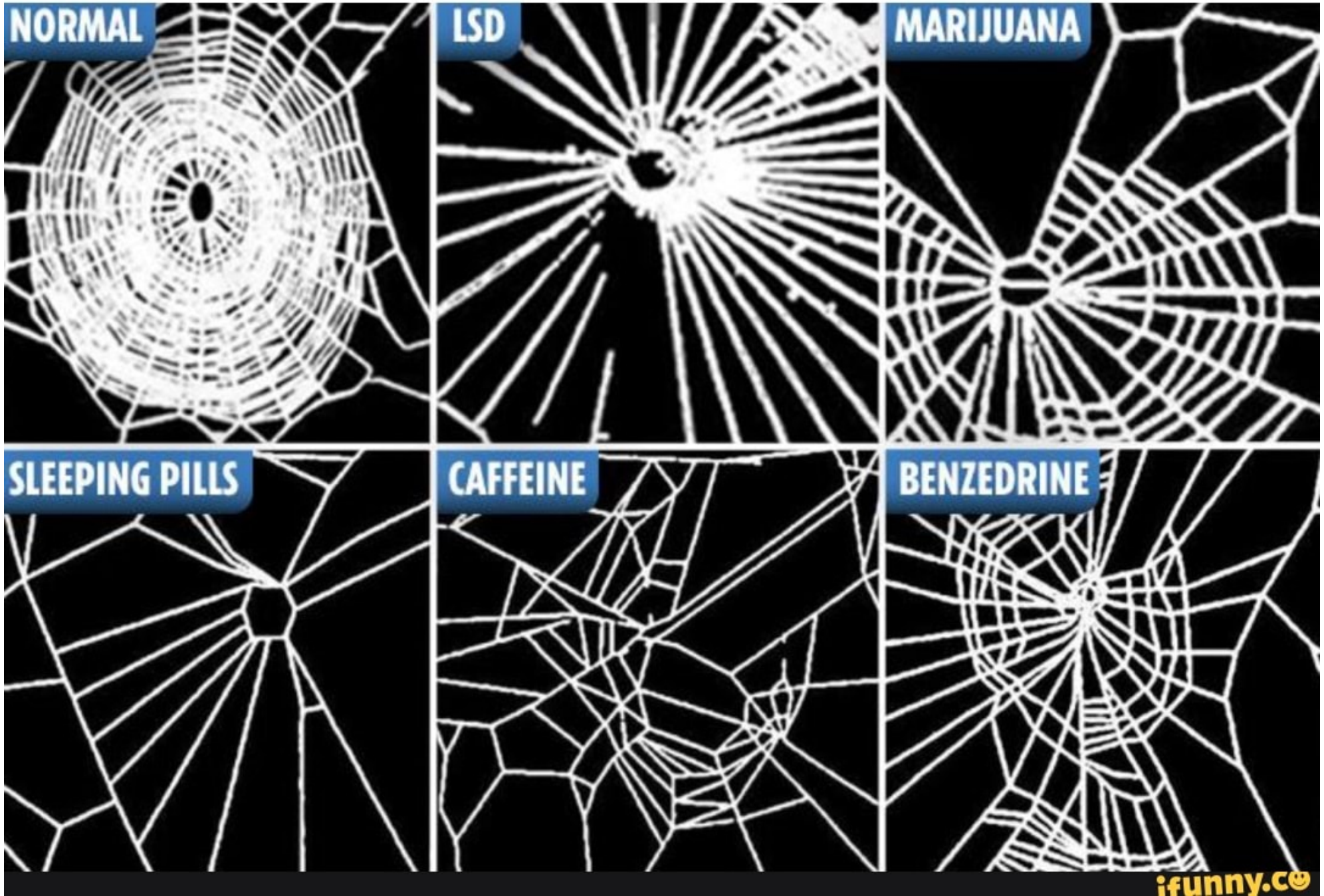


A Mean (SE) resting state EEG power for the LSD and placebo conditions per test day. **B** Scatterplots of mean change in resting state delta, theta and alpha EEG power (the mean over the two dosing days minus baseline) for the LSD and placebo condition as a function of baseline resting state EEG power. Bas=baseline, FU=Follow-up. Eyes open condition; ***p < 0.001; **p < 0.01.

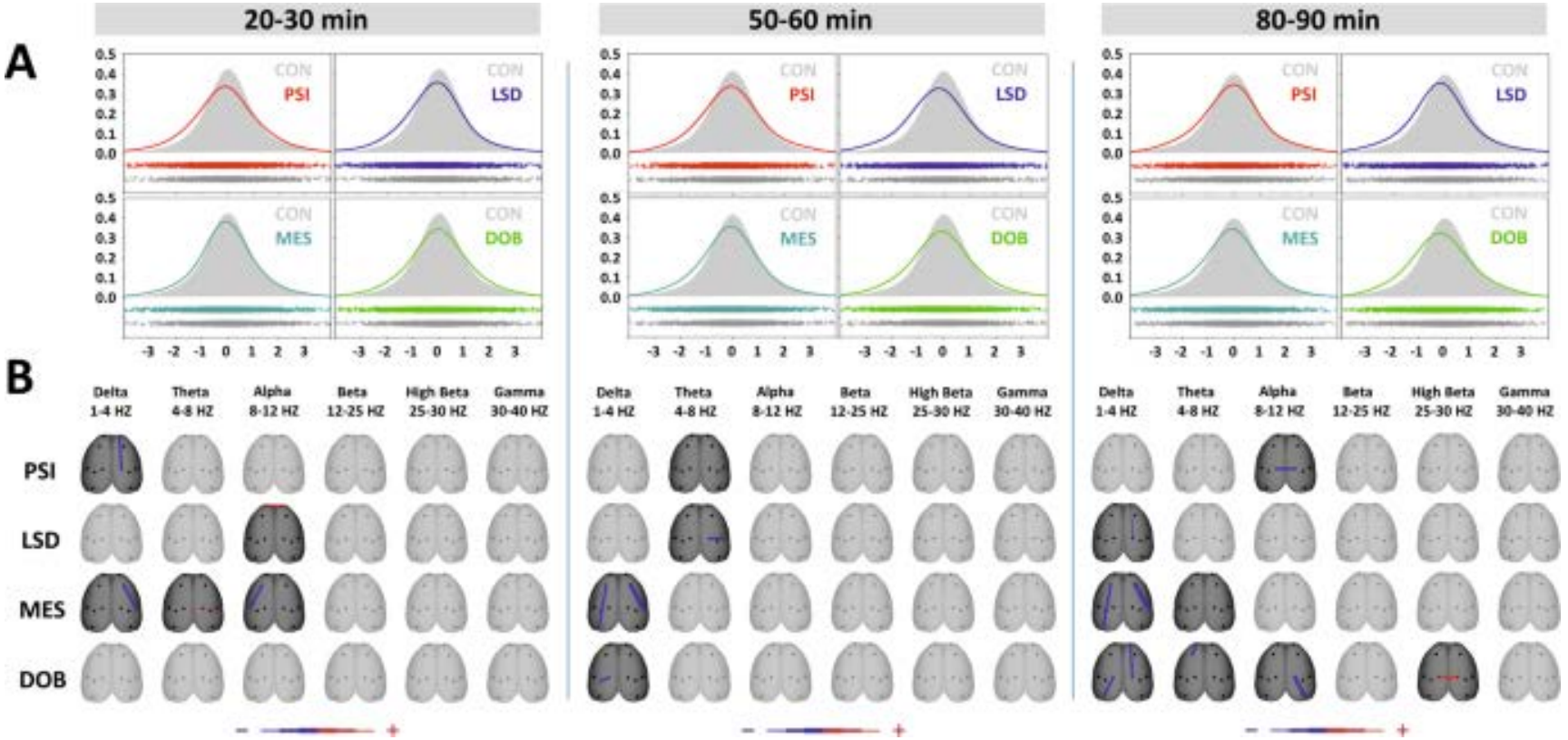
Today: Murray et al. 2024 „Komplexität“



NASA tested different drugs on a spider 🤦



Today: Vejmola et al. 2021 „Konnektivität“



(e.g., lysergic acid diethylamide (LSD), psilocybin, N,N-dimethyltryptamine (DMT), 5-methoxy-dimethyltryptamine (5-MeO-DMT)) [2, 3], and phenethylamine derivatives (e.g., mescaline, 2,5-dimethoxy-4-bromoamphetamine (DOB))

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Wirkung auf EEG geklärt.

- Zusammenhang behaviorale Reaktionen und ZNS/CNS Aktivität zur Baseline?

- Und was ist mit dem autonomen Nervensystem?

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Isbell et al. 1956

TABLE 2.—*Reproducibility of Response to 60γ LSD on Three Separate Occasions*

Measure	Trial		
	1	2	3
Patellar Reflex*	3.32±0.47	3.01±0.38	3.01±0.52
Pupillary Diameter*	3.02±0.20	3.73±0.37	3.02±0.18
Blood Pressure*	2.40±0.36	2.30±0.18	2.39±0.38
Questions†	101±24	97±29	93±19
Grade†	1.5 ±0.32	1.1 ±0.3	1.5 ±0.11

* Expressed as the mean ± the standard error of the area under curves (square inches).
† Means ± standard errors. For methods, see text.

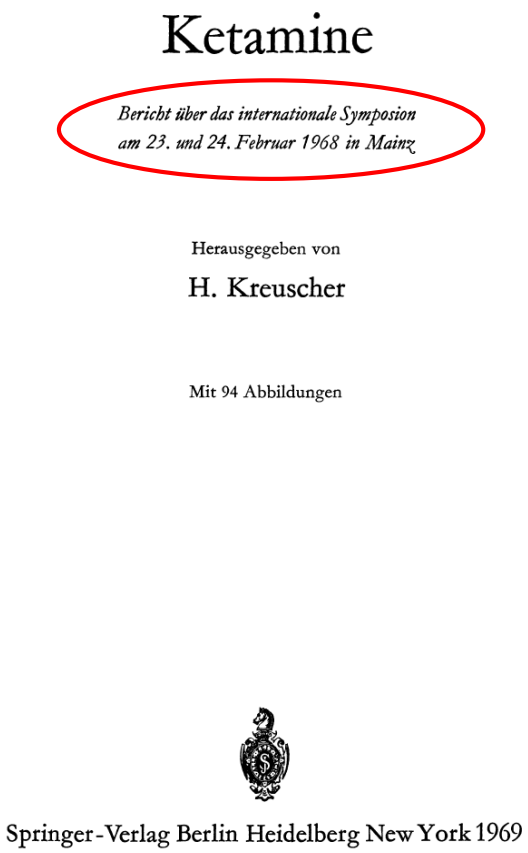
Studies on Lysergic Acid Diethylamide (LSD-25)

I. Effects in Former Morphine Addicts and Development of Tolerance During Chronic Intoxication

HARRIS ISBELL, M.D.
R. E. BELLEVILLE, M.A.
H. F. FRASER, M.D.
ABRAHAM WIKLER, M.D.
and
C. R. LOGAN, Lexington, Ky.

action has been referred to as "experimental schizophrenia" or "experimental psychiatry." Because some of the symptoms induced by LSD also occur in schizophrenia, it has been suggested that schizophrenia may be due to a toxin.[21] to a deficiency of some

Ketamin – Anästhesie und Dissoziation


Ketamine

Bericht über das internationale Symposion am 23. und 24. Februar 1968 in Mainz

Herausgegeben von

H. Kreuscher

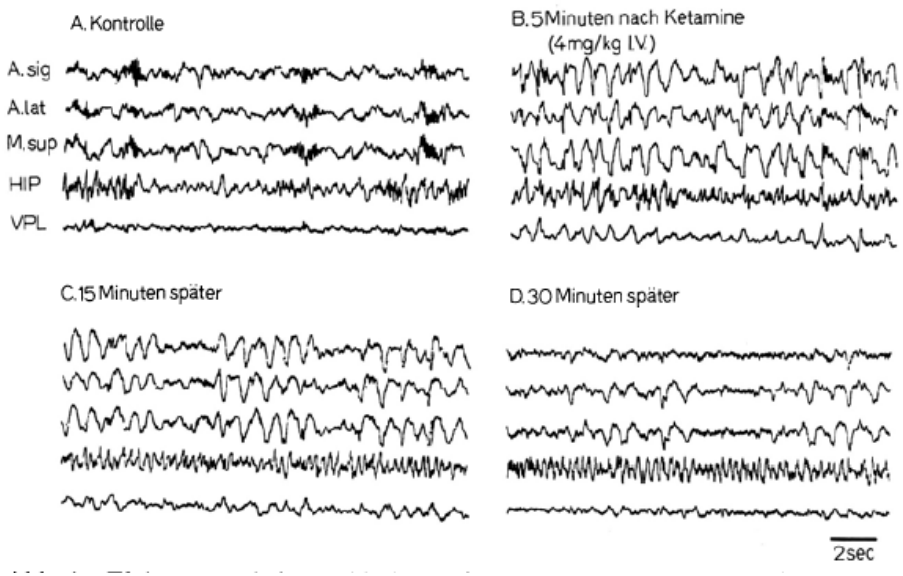
Mit 94 Abbildungen

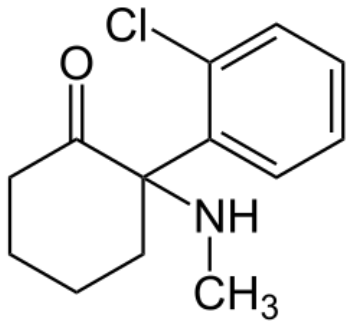
Springer-Verlag Berlin Heidelberg New York 1969

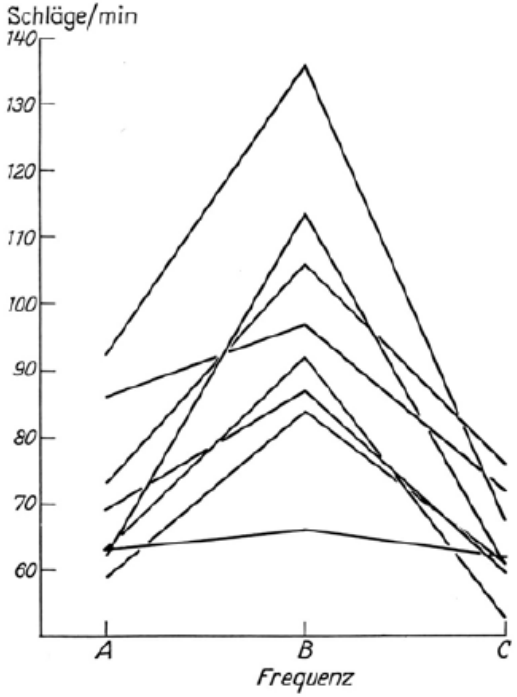
„Dissoziative Anaesthesie mit Ketamine ist gekennzeichnet durch komplette Analgesie, verbunden mit nur oberflächlichem Schlaf. Der Patient ist abgeschaltet ("disconnected"). AIle Schutzreflexe wie Husten, Niesen, Schlucken, Lidschlag etc. sind erhalten und oft sogar gesteigert. […] Das Kreislaufsystem ist stimuliert mit Anstieg des systolischen und diastolischen Blutdrucks und Erhöhung der Pulsfrequenz.“

Talk: „Dissociative Anaesthesie mit Ketamine (CI-581)“

Ketamin – Physiologie



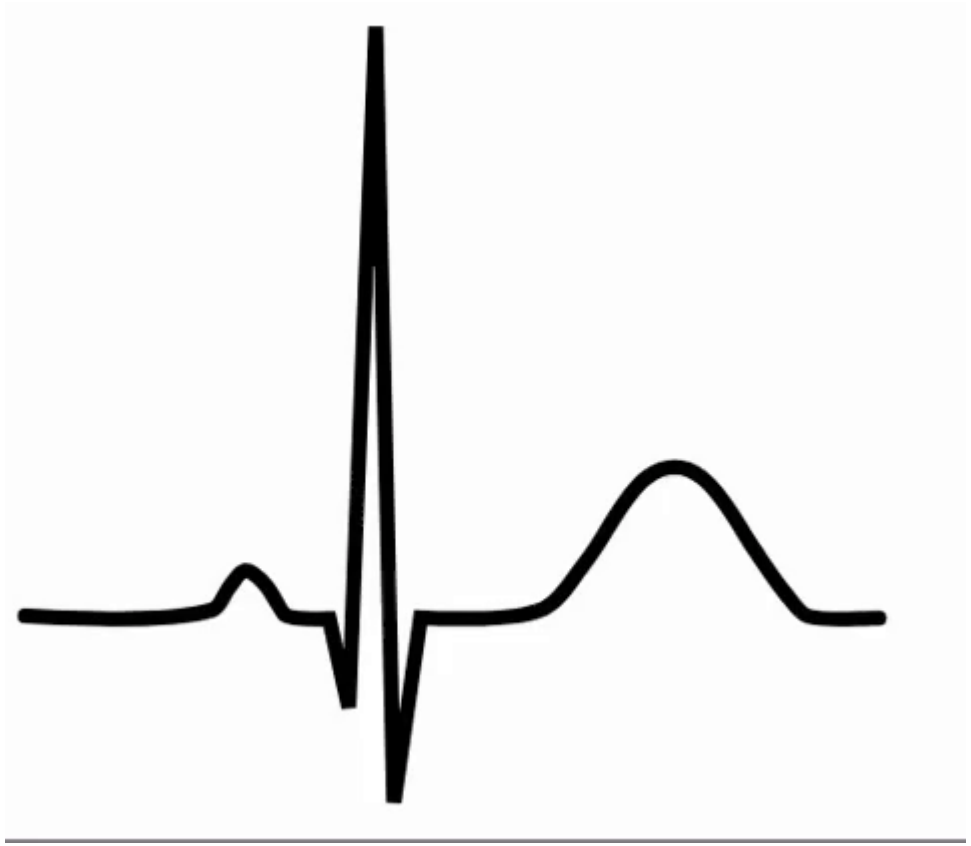




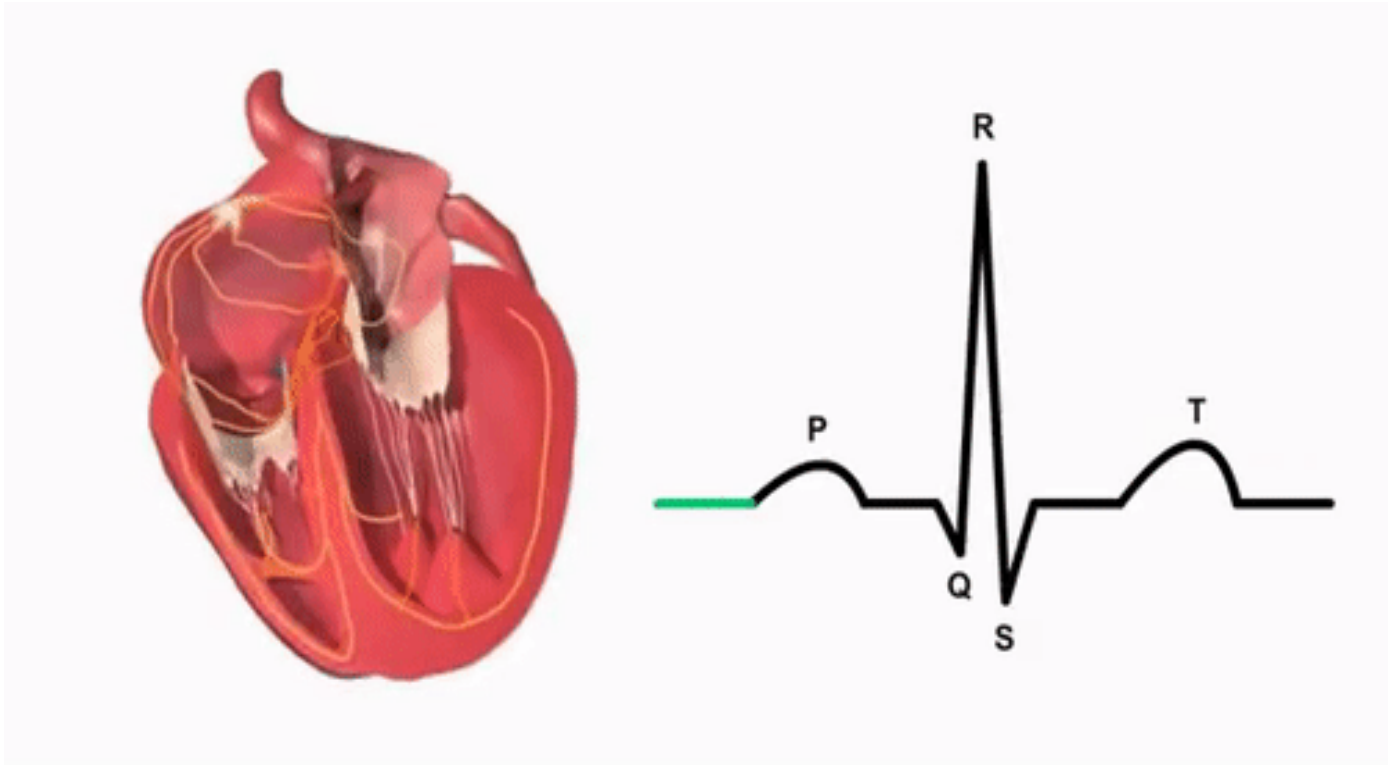
Domino et al. 1968

Kreuscher & Gauch 1968

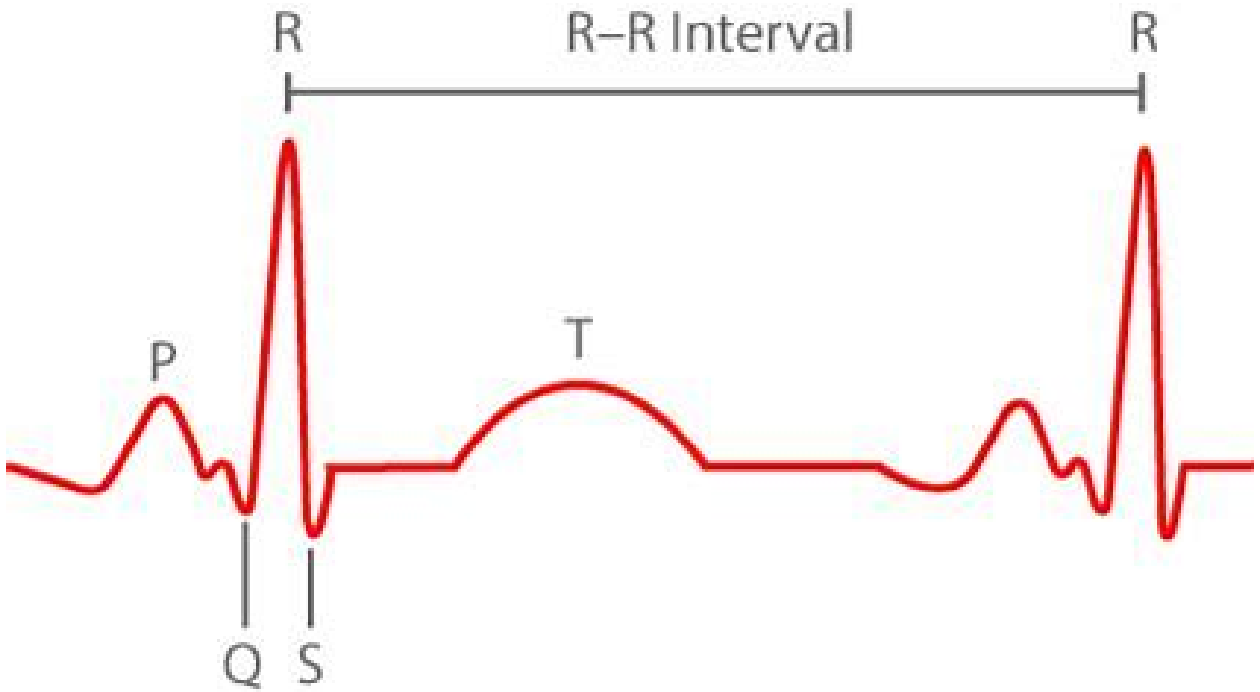
Electrocardiogram



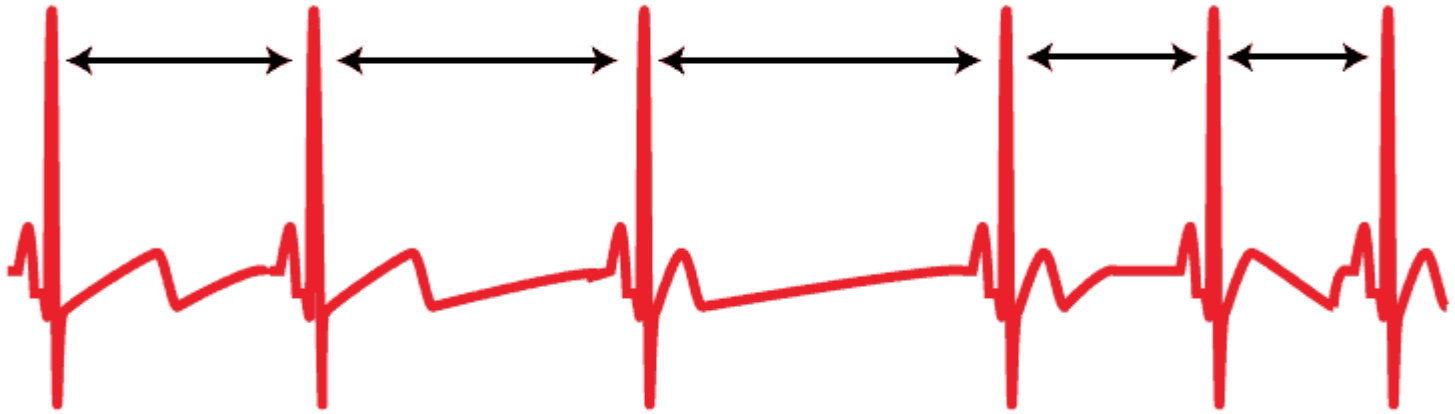
Electrocardiogram



Electrocardiogram



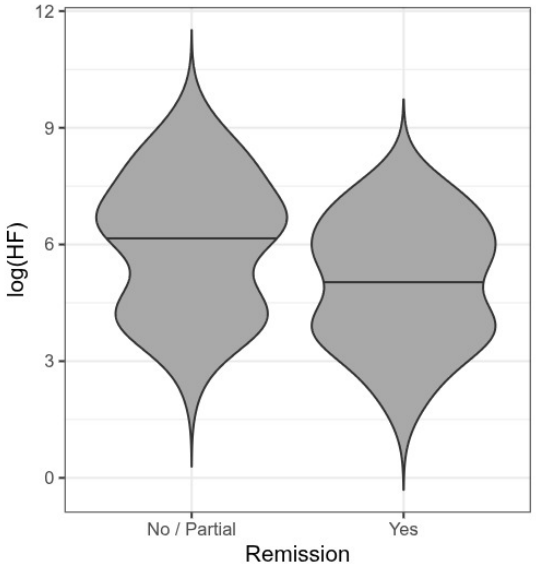
Electrocardiogram ➔ HRV

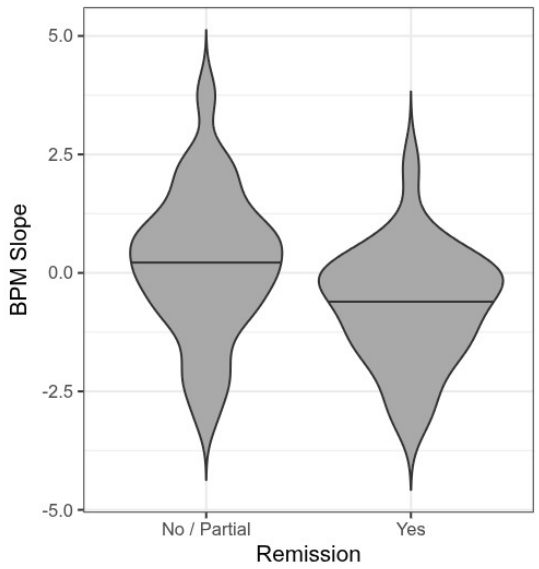


➔ High HRV associated with PARASYMPATHETIC ACTIVITY
➔ Low HRV associated with SYMPATHETIC ACTIVITY

Autonomic Function: Course of Psychosis

- Can HRV at baseline predict the course of first time psychosis
- 78 patients with first psychotic symptoms
- ECG recorded during rest for 2min





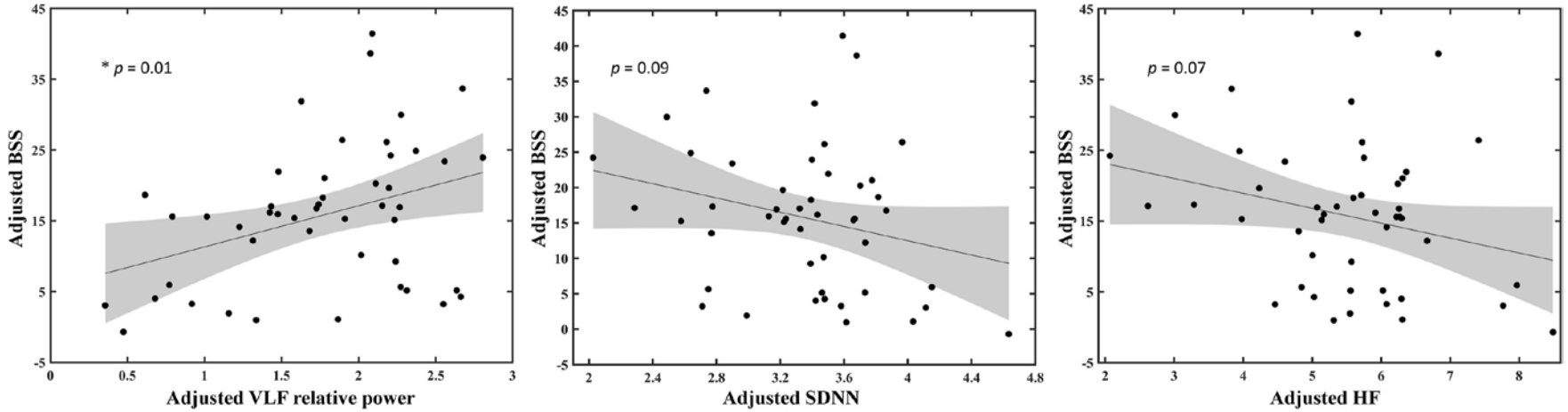
)n with AUC 0.71

Rohde et al, 2025, in revision

Scores at admission	Full sample (n_= 78)		Female patients (n = 35)		Male patients (n = 43)	
	Mean	SE	Mean	SE	Mean	SE
Age (years)	30.79	1.194	32.86*	2.244	29.12*	1.128
CGI-S	5.34	.112	5.20*	.191	5.46*	.126
HoNOS	20.16	1.074	19.97*	1.586	20.32*	1.478
BPM [bpm]	78.58	1.684	78.51*	2.465	78.63*	2.330
BPM slope	-.1058	.16747	-.0857*	.23771	-.1221*	.23668
HF [ms²]	1064.354	220.402	1448.666*	449.975	751.542*	151.460
LF [ms²]	694.022	155.550	879.413*	324.223	543.123*	99.955
LF/HF	2.228	.462	2.218*	.768	2.236*	.568

Autonomic Function: Suicidality

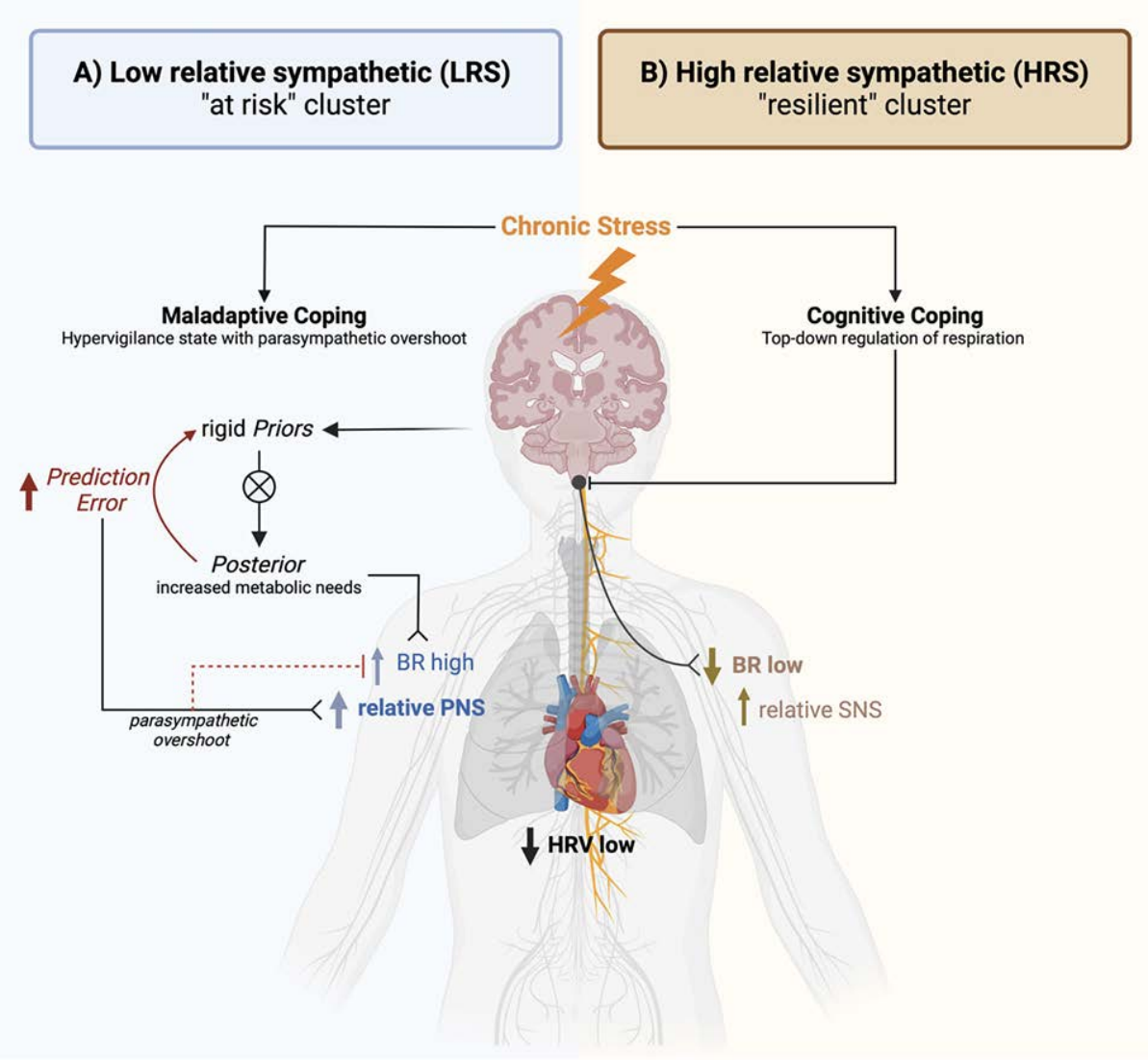
- 52 Patients after a suicide attempt
- 43 healthy controls
- ECG recordings for 10min
- Larger Sympathetic and Lower Parasympathetic Activity in Patients



Rüesch et al. 2023

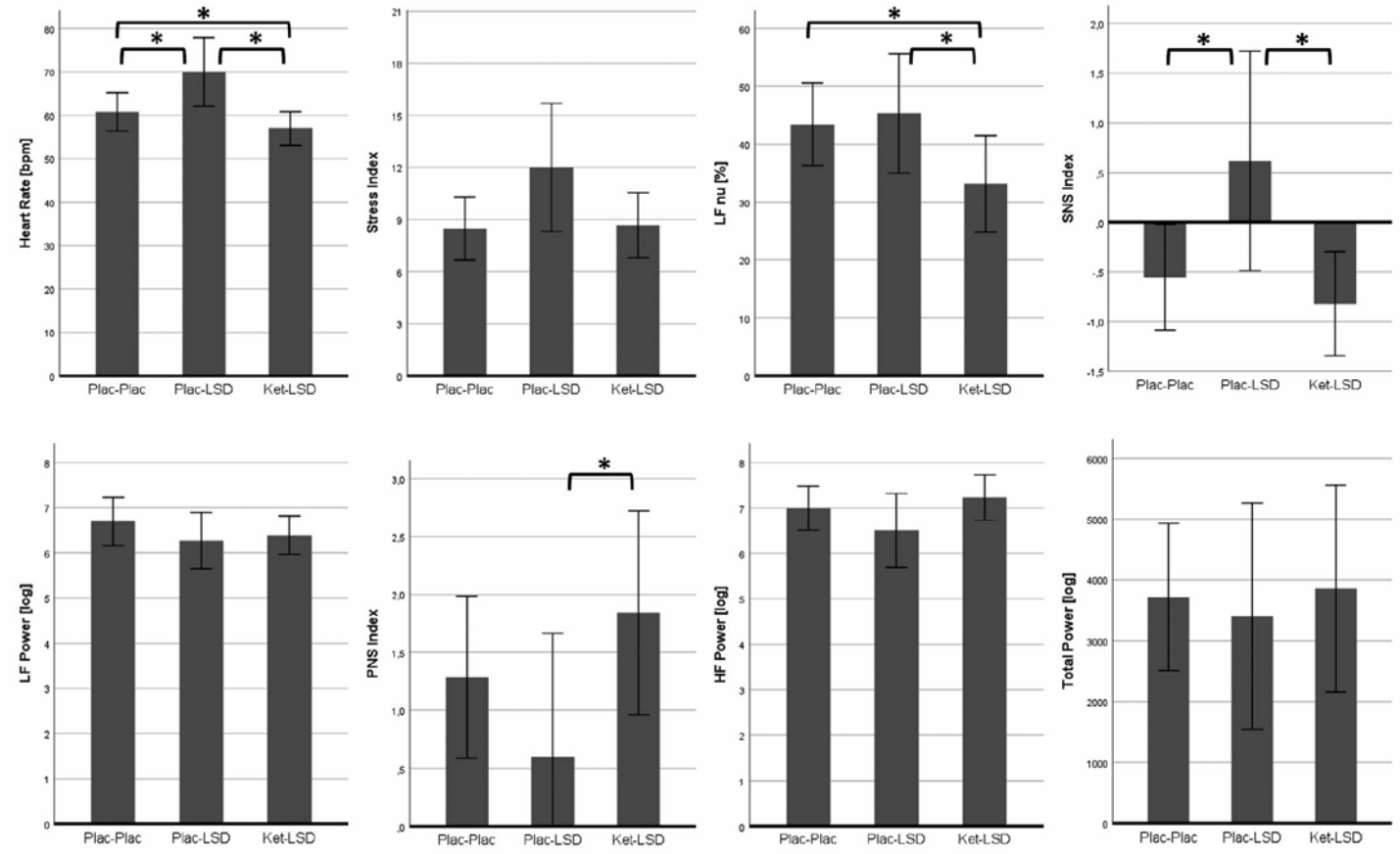
Autonomic Function: Suicidality

- >15.000 Subjects from UK-Biobank
- 10-60sec ECG recording
- Association between HRV and Depression/Suicidality
- High Relative Sympathetic Activity as Resilience Factor for Suicidality and Depression



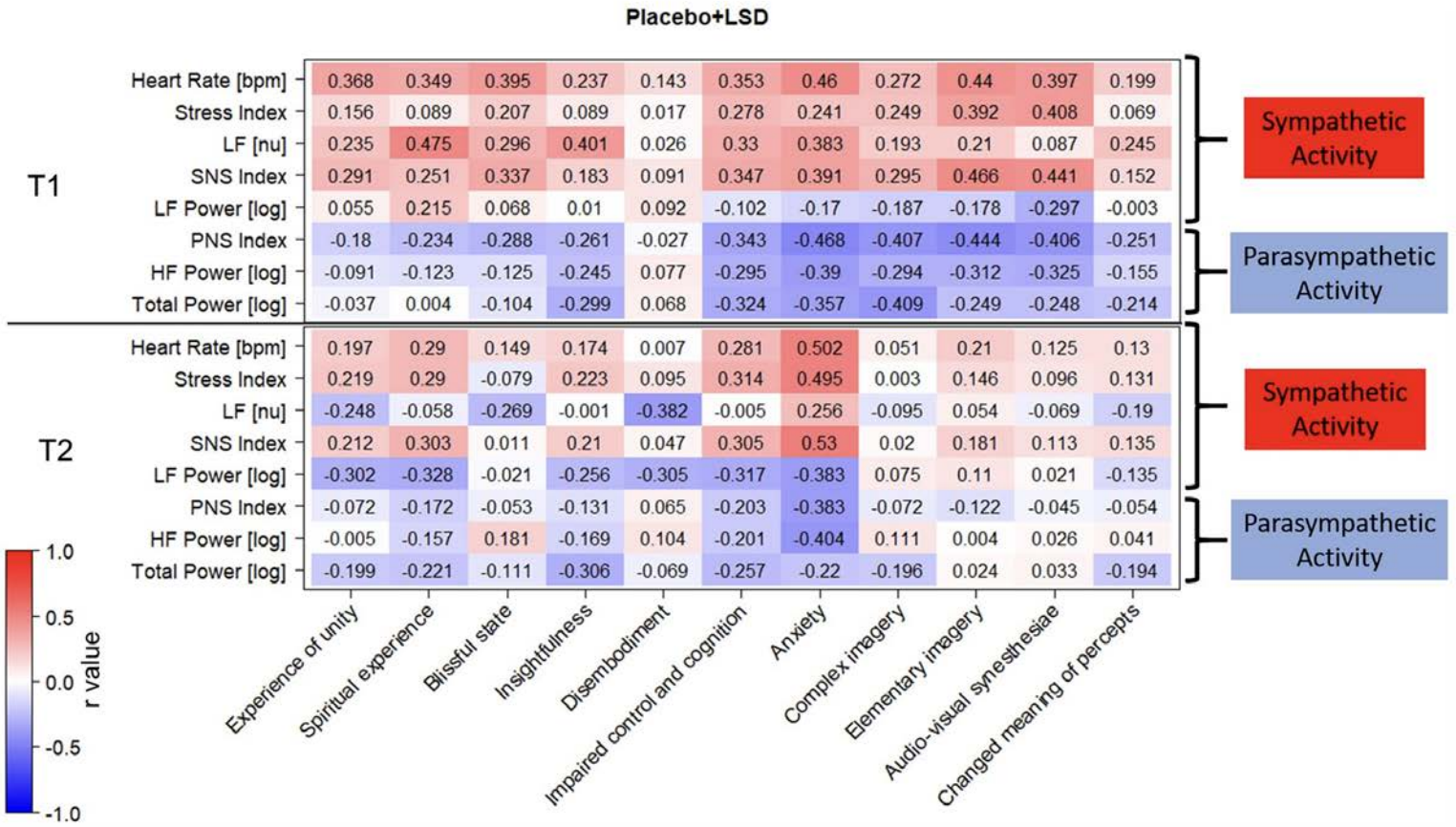
Weber et al. 2025

Autonomic Function: LSD and Ketanserine



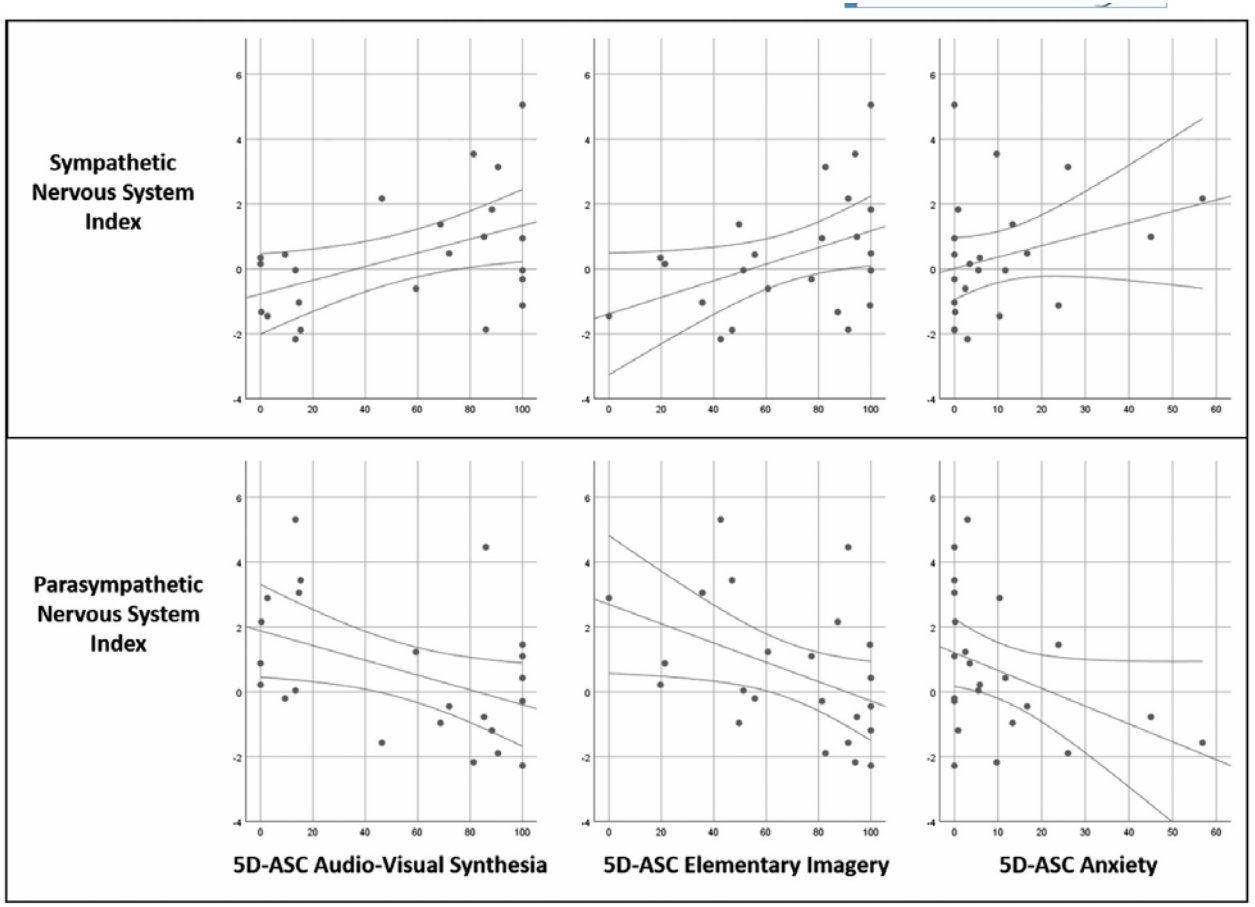
Olbrich et al. 2021

Autonomic Function: LSD and Ketanserine



Olbrich et al. 2021

Autonomic Function: LSD and Ketanserine



Olbrich et al. 2021

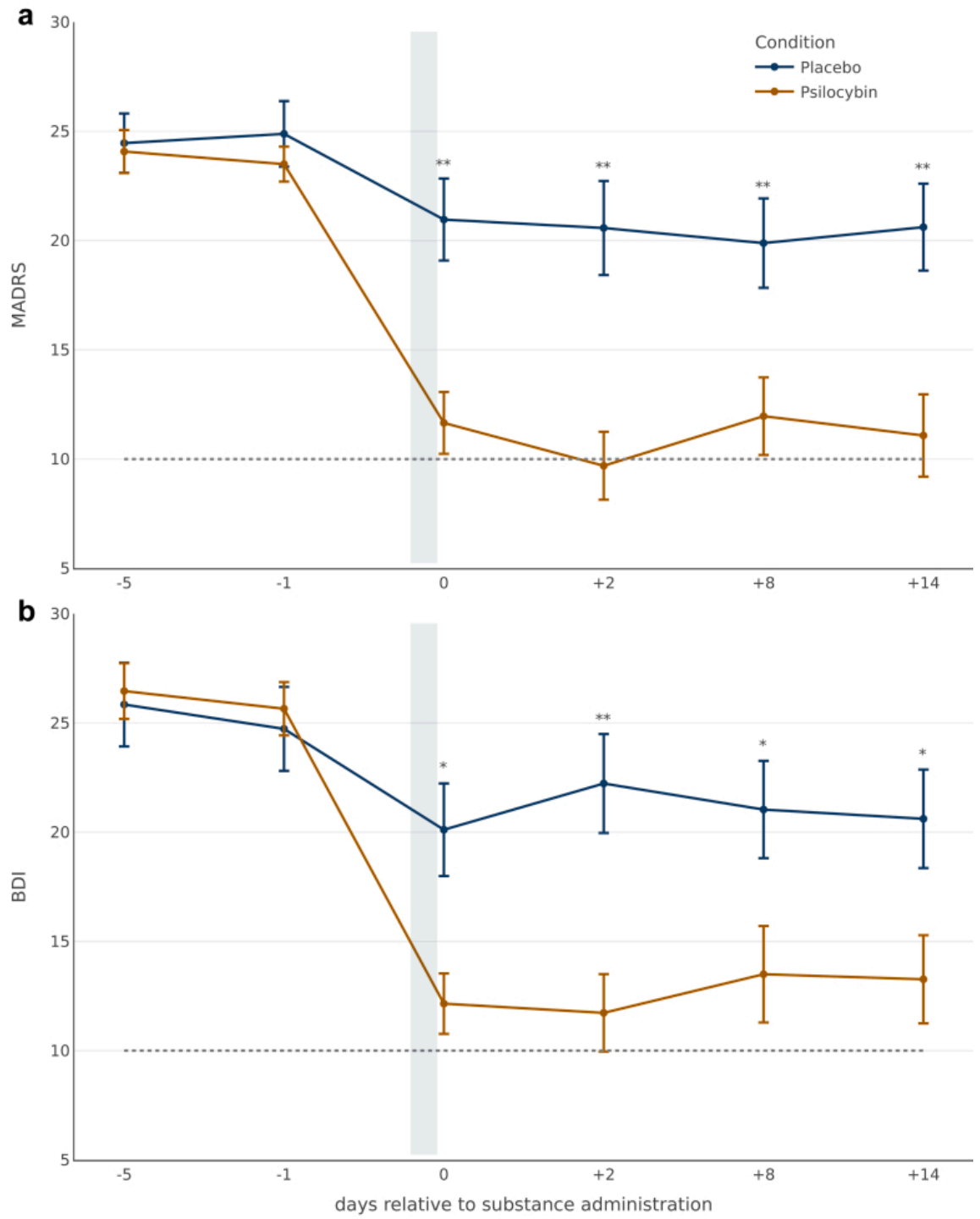
Prädiktion EKG

eClinicalMedicine
Part of THE LANCET *Discovery Science*

▸ eClinicalMedicine. 2022 Dec 28;56:101809. doi: 10.1016/j.eclinm.2022.101809

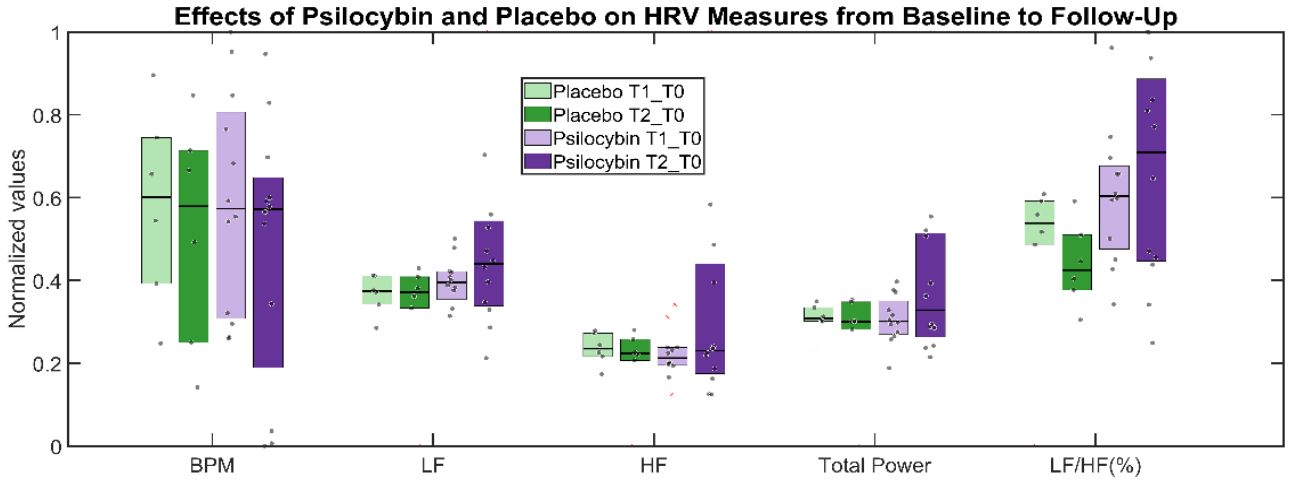
Single-dose psilocybin-assisted therapy in major depressive disorder: A placebo-controlled, double-blind, randomised clinical trial

Robin von Rotz [a,*], Eva M Schindowski [a], Johannes Jungwirth [a], Anna Schuldt [a], Nathalie M Rieser [a], Katharina Zahoranszky [a], Erich Seifritz [b], Albina Nowak [b], Peter Nowak [b], Lutz Jäncke [c], Katrin H Preller [a,d], Franz X Vollenweider [a,d]



ANS und Psilocybin bei Depression

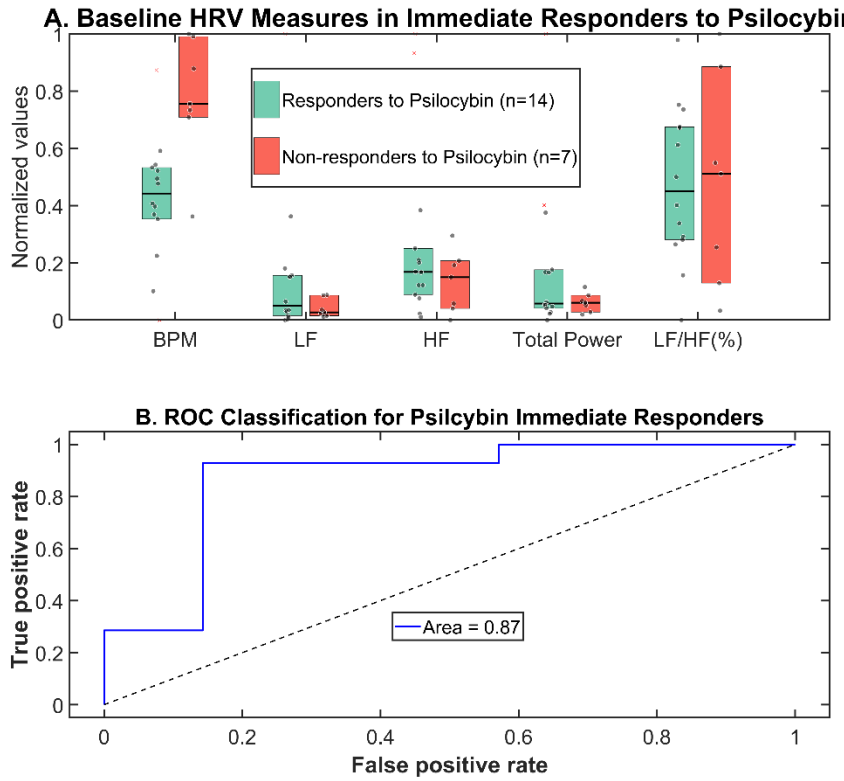
- RCT cross-over with n=52
- ECG assessed during resting state (in MRI)
- Psilocybin kept LF/HF ratio increased over time
- Association with increased „openness“ after Psilocybin



Ip et al. 2025 under rev

ANS und Psilocybin bei Depression

- Responders showed significantly reduced Heart Rate at Baseline compared to Non-Responders



Prädiktion und EEG

ELSEVIER
iScience

▸ iScience. 2023 Apr 7;26(5):106589. doi: 10.1016/j.isci.2023.106589

TMS-EEG and resting-state EEG applied to altered states of consciousness: oscillations, complexity, and phenomenology

Andres Ort [1,6,*], John W Smallridge [1,6,7,**], Simone Sarasso [2], Silvia Casarotto [2,3], Robin von Rotz [1], Andrea Casanova [1], Erich Seifritz [4], Katrin H Preller [1], Giulio Tononi [5], Franz X Vollenweider [1]

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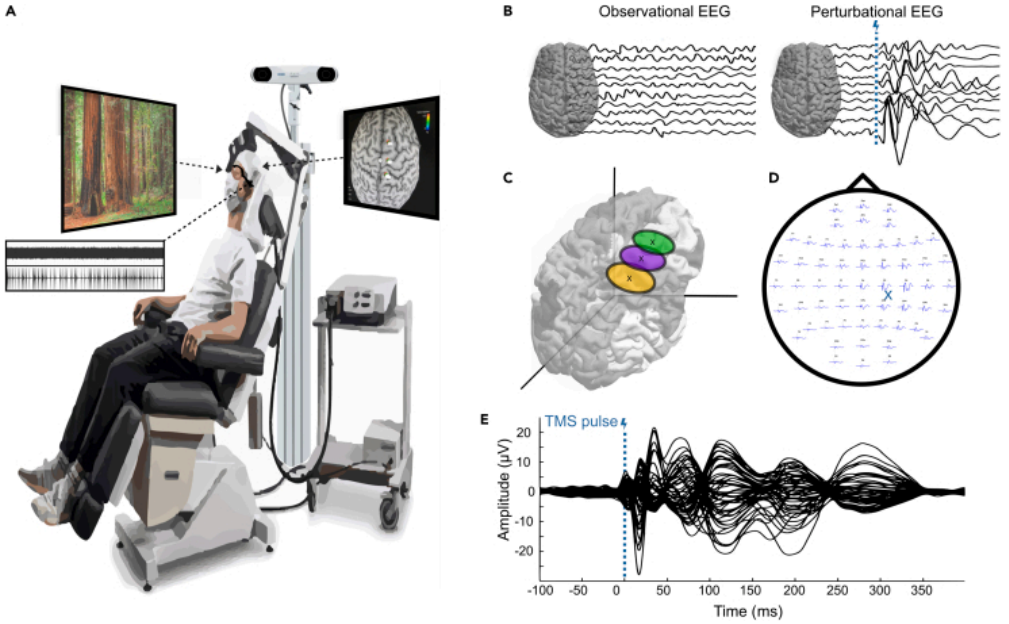
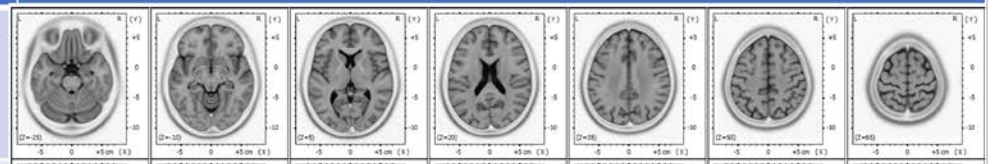
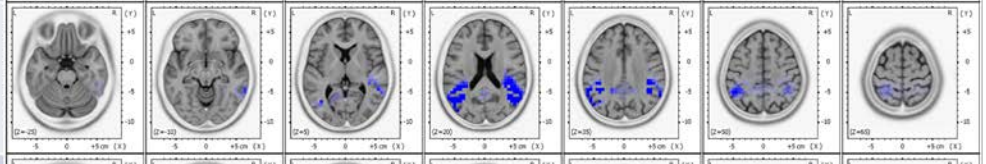
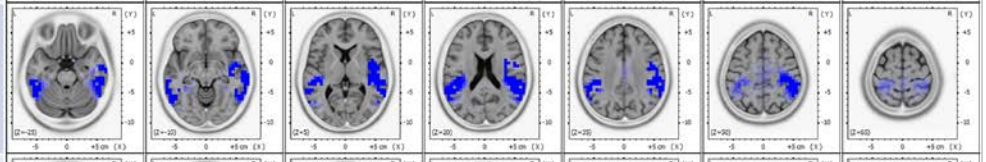
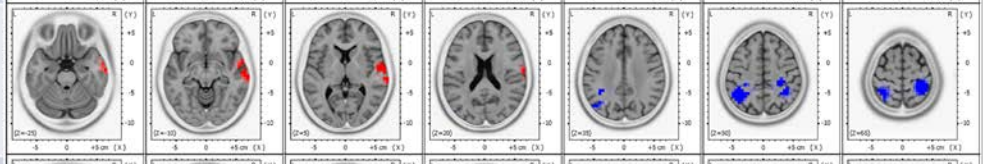
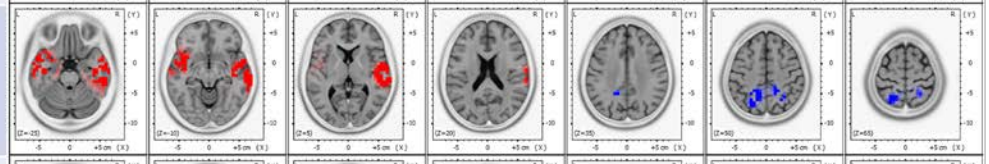
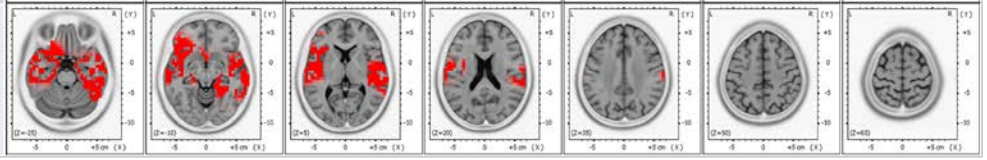
PMCID: PMC10149373 PMID: 37138774



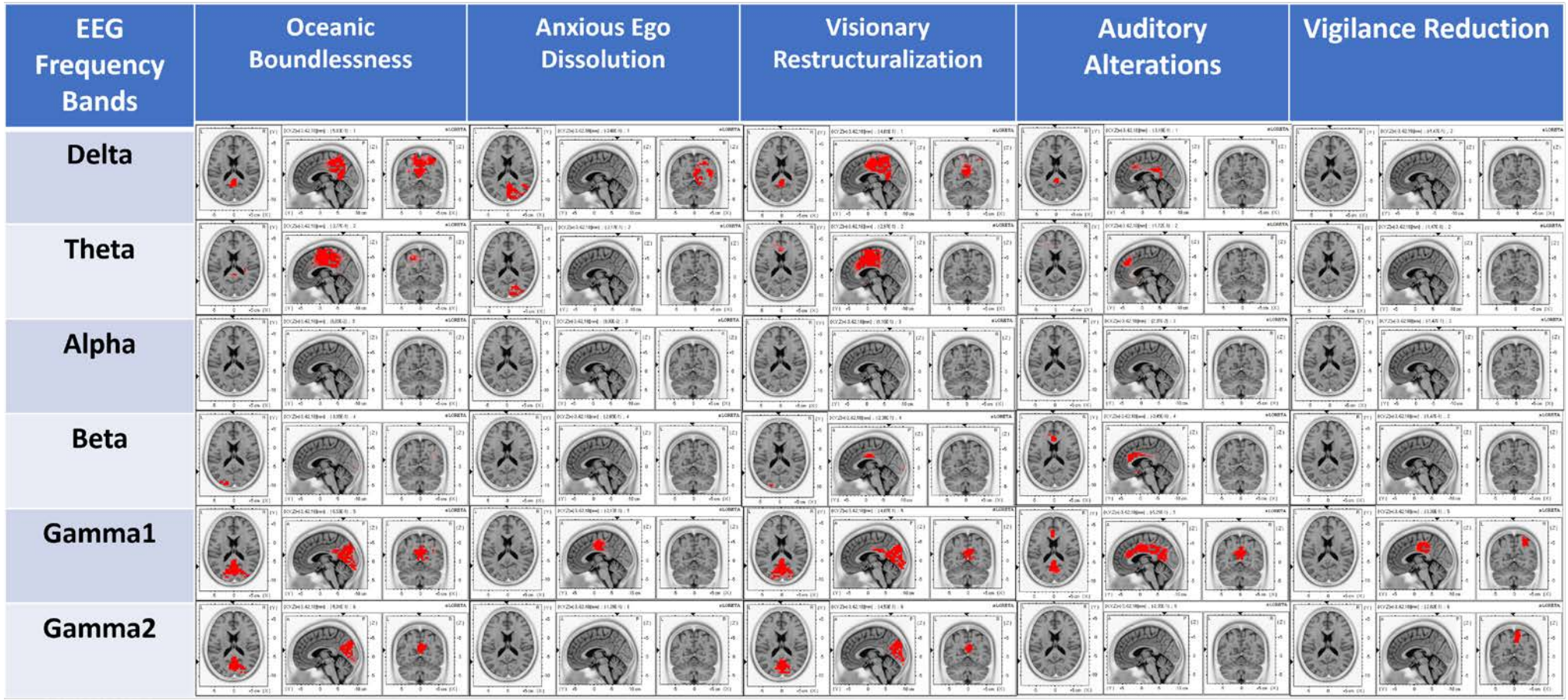
Prädiktion EEG – Effekt des LSD

- Verminderung langsamer Frequenzer
- Erhöhung hoher (gamma) Frequenzen
- Cheng et al. revisio

EEG Frequency Bands	EEG Power Changes for Placebo versus Psilocybin from Baseline to Peak Condition
Delta	
Theta	
Alpha	
Beta	
Gamma1	
Gamma 2	

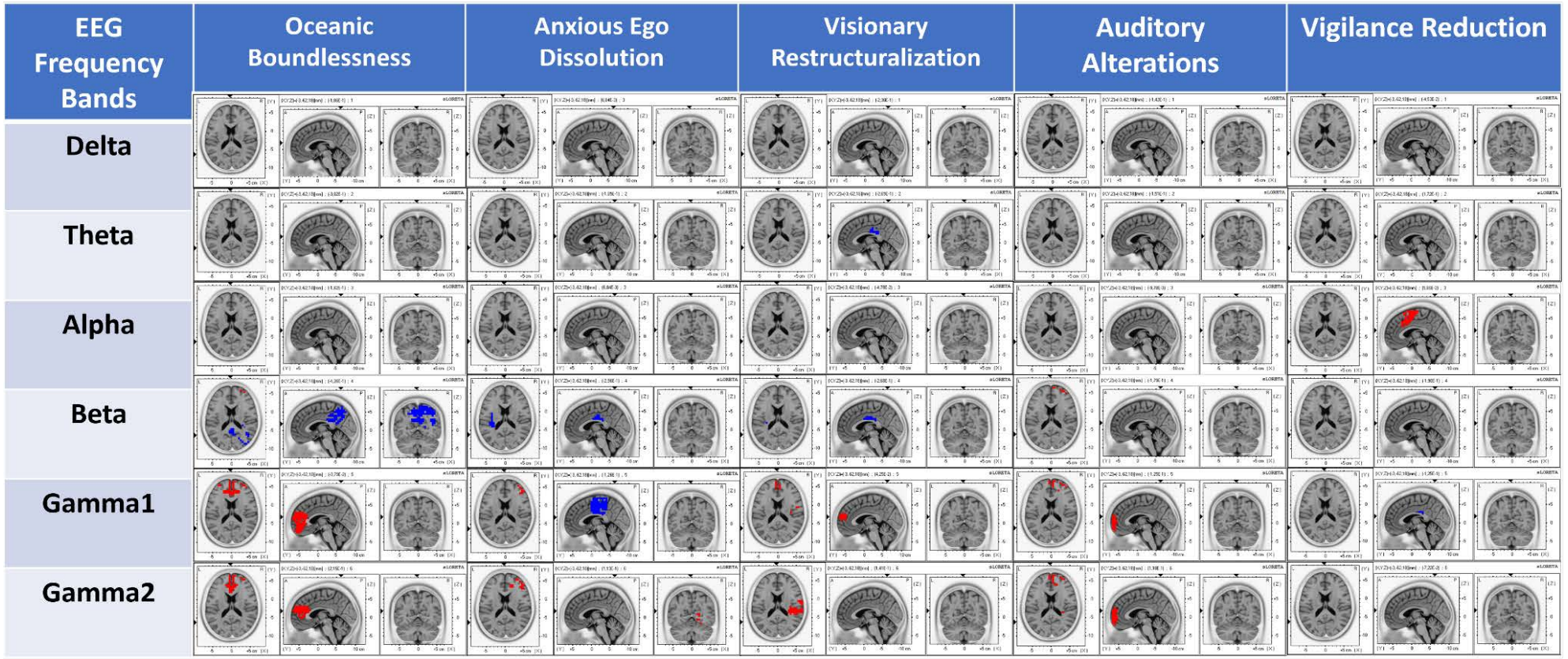
Prädiktion EEG – Korrelationen peak LSD

- Korrelationen EEG Aktivität und ASC
- Cheng et al. revision



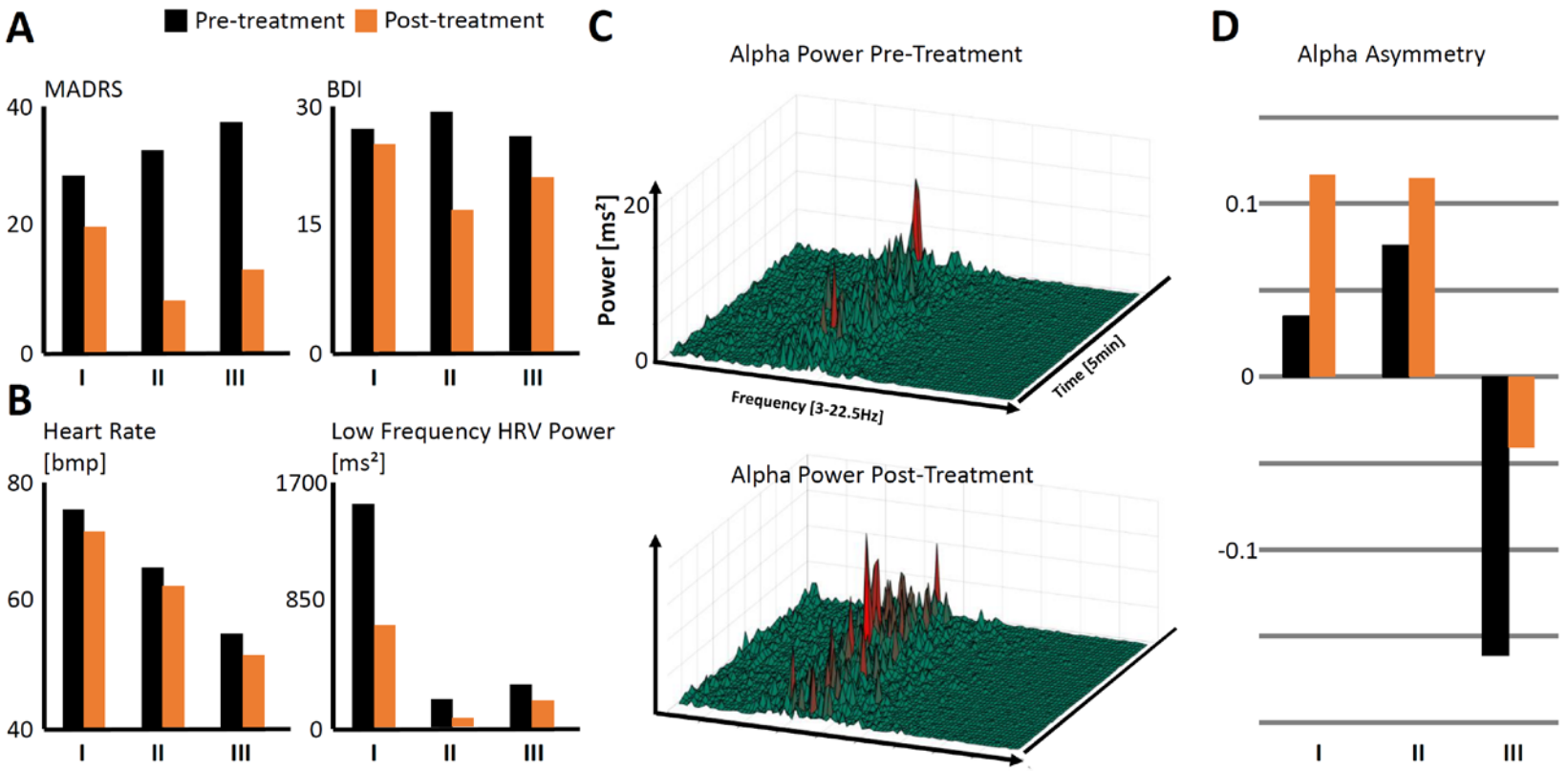
Prädiktion EEG – Korrelationen baseline

- Prädiktive Korrelationen zur Baseline
- Cheng et al. revision

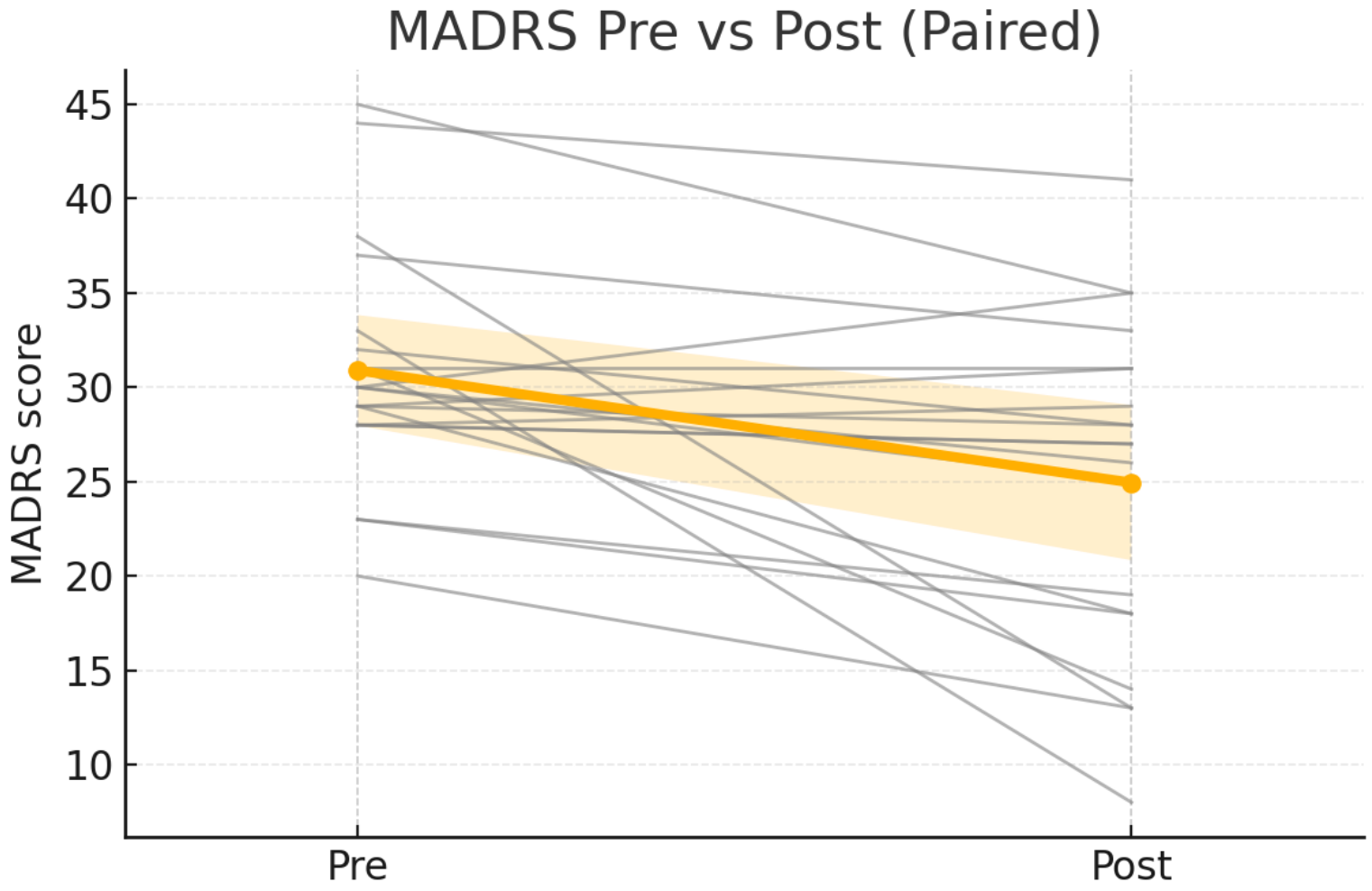


Ketamin und N2O (Lachgas)

- Entgegengesetzte Effekte des Ketamin und N2O auf das ZNS und ANS(Kronenberg et al. 2022)



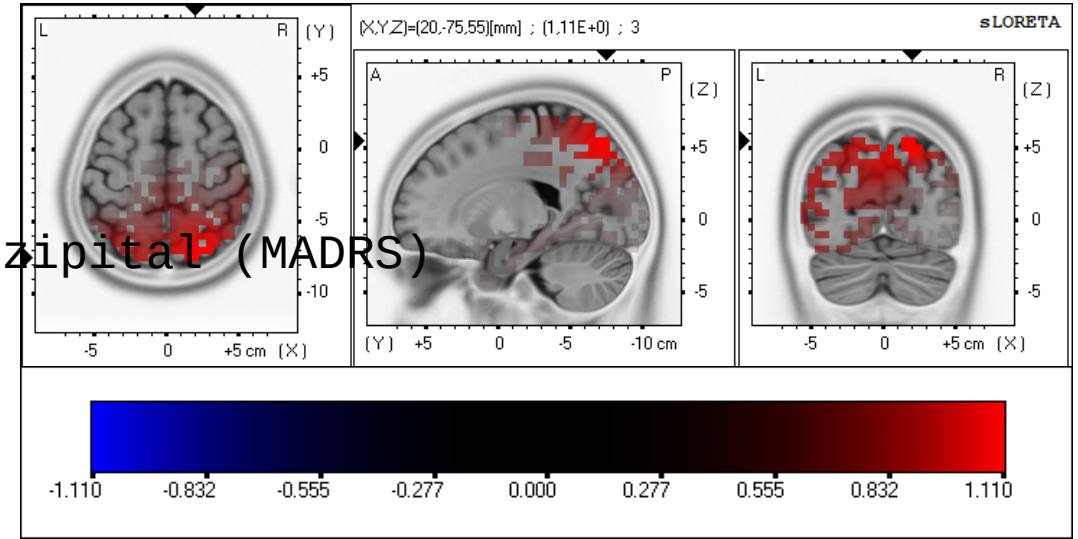
N2O bei Depressionen



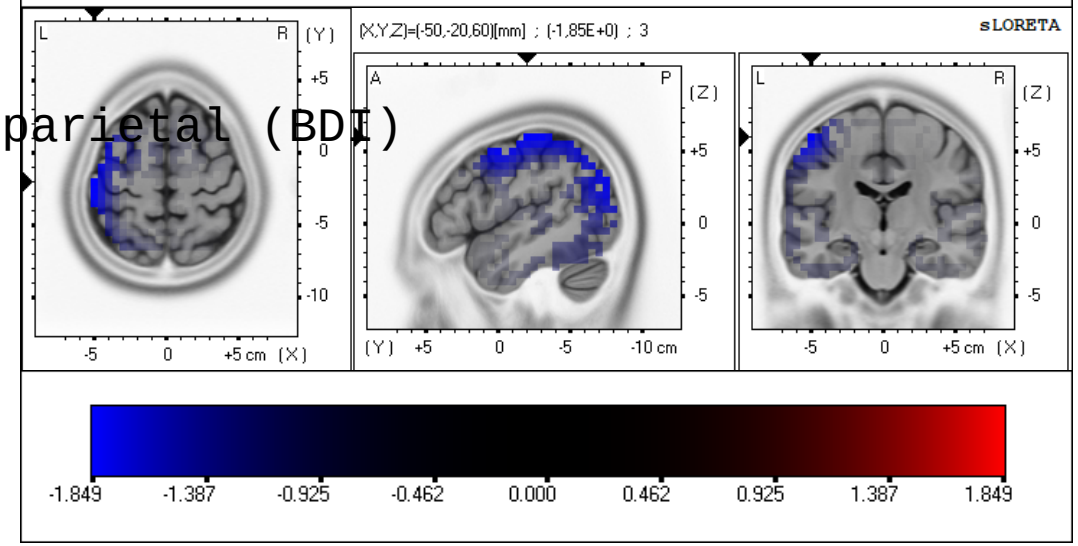
Olbrich et al. In p

N2O bei Depressionen

Prädiktive Erhöhung Alpha – Aktivität okzipital (MADRS)



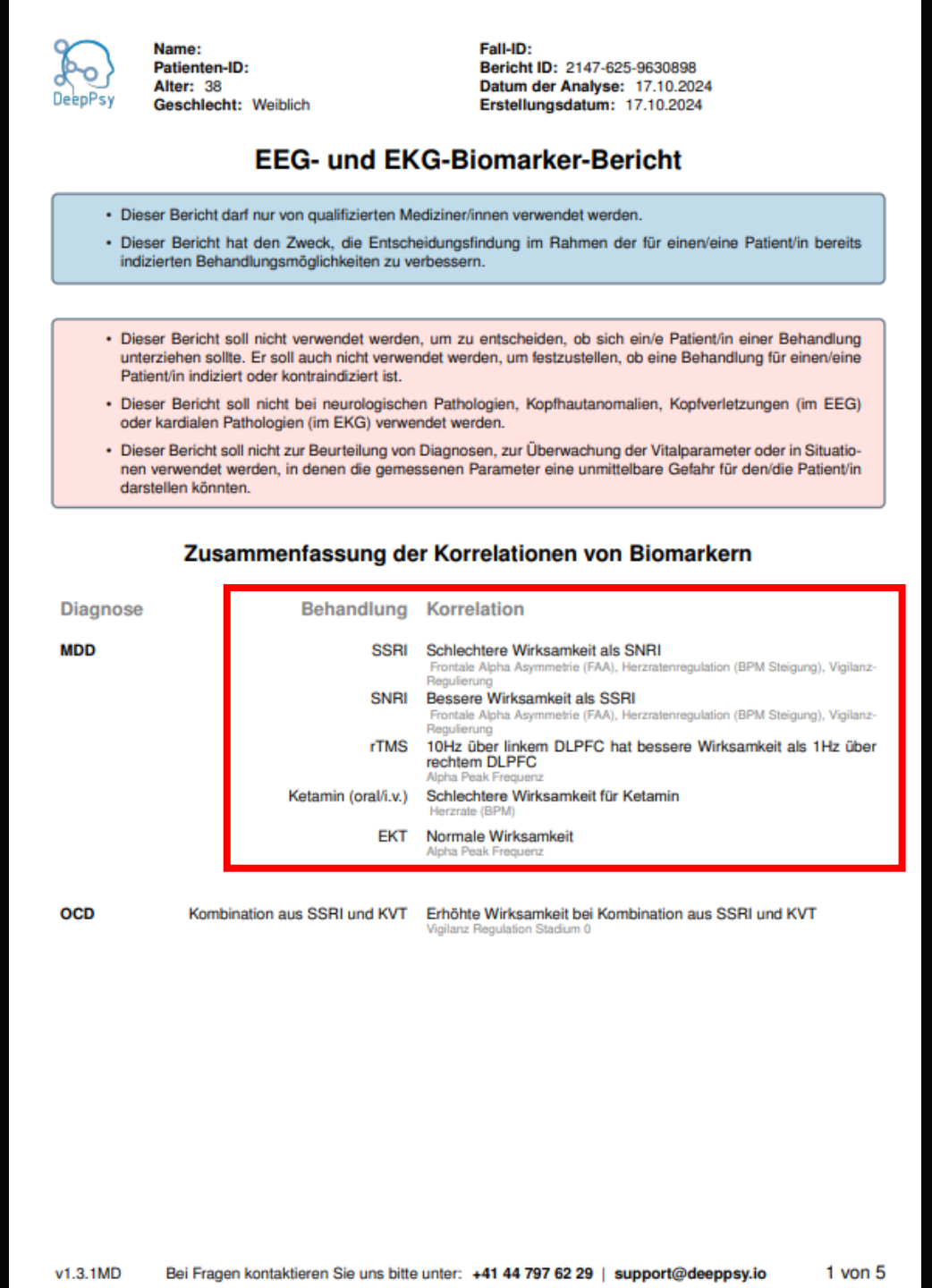
Prädiktive Verminderung Alpha Aktivität parietal (BDI)



Olbrich et al. In preparation

Verwendung in der Psychiatrie

- DeepPsy Report für EEG/EKG in Neuropsychiatrie (Michael Fischer) „Early Adapter“
- Implementierung in der PUK Oktober 2023
- Hinweise über Behandlungsstrategien basierend auf Hirnwellen und Herzaktivität



DeepPsy

Name:
Patienten-ID:
Alter: 38
Geschlecht: Weiblich

Fall-ID:
Bericht ID: 2147-625-9630898
Datum der Analyse: 17.10.2024
Erstellungsdatum: 17.10.2024

EEG- und EKG-Biomarker-Bericht

- Dieser Bericht darf nur von qualifizierten Mediziner/innen verwendet werden.
- Dieser Bericht hat den Zweck, die Entscheidungsfindung im Rahmen der für einen/eine Patient/in bereits indizierten Behandlungsmöglichkeiten zu verbessern.

- Dieser Bericht soll nicht verwendet werden, um zu entscheiden, ob sich ein/e Patient/in einer Behandlung unterziehen sollte. Er soll auch nicht verwendet werden, um festzustellen, ob eine Behandlung für einen/eine Patient/in indiziert oder kontraindiziert ist.
- Dieser Bericht soll nicht bei neurologischen Pathologien, Kopfhautanomalien, Kopfverletzungen (im EEG) oder kardialen Pathologien (im EKG) verwendet werden.
- Dieser Bericht soll nicht zur Beurteilung von Diagnosen, zur Überwachung der Vitalparameter oder in Situationen verwendet werden, in denen die gemessenen Parameter eine unmittelbare Gefahr für den/die Patient/in darstellen könnten.

Zusammenfassung der Korrelationen von Biomarkern

Diagnose	Behandlung	Korrelation
MDD	SSRI	Schlechtere Wirksamkeit als SNRI Frontale Alpha Asymmetrie (FAA), Herzratenregulation (BPM Steigung), Vigilanz-Regulierung
	SNRI	Bessere Wirksamkeit als SSRI Frontale Alpha Asymmetrie (FAA), Herzratenregulation (BPM Steigung), Vigilanz-Regulierung
	rTMS	10Hz über linkem DLPFC hat bessere Wirksamkeit als 1Hz über rechtem DLPFC Alpha Peak Frequenz
	Ketamin (oral/i.v.)	Schlechtere Wirksamkeit für Ketamin Herzrate (BPM)
	EKT	Normale Wirksamkeit Alpha Peak Frequenz
OCD	Kombination aus SSRI und KVT	Erhöhte Wirksamkeit bei Kombination aus SSRI und KVT Vigilanz Regulation Stadium 0

Verwendung in der Psychiatrie

- DeepPsy Report für EEG/EKG in Neuropsychiatrie (Michael Fischer) „Early Adapter“
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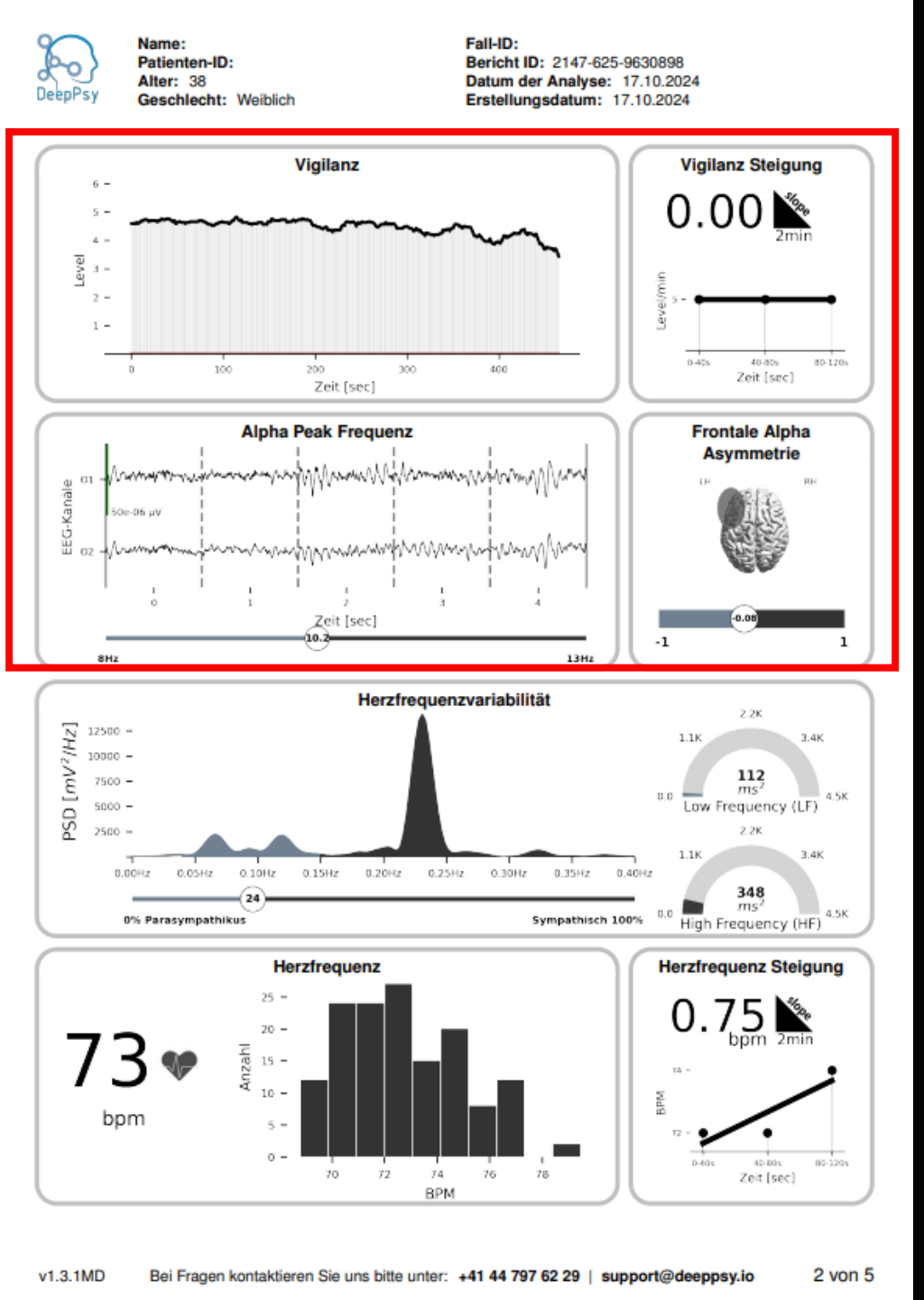

Prädiktion EEG/EKG Marker

- Report über Wirksamkeit von EKT, Ketamin und TMS-Therapie in „Difficulet-to-treat“ Depression
- Retrospektive Analyse: Therapie nach Empfehlung oder nicht

- ➔ Signifikant höhere Response-Rate bei Patienten, die Therapie entsprechend dem Report erhielten ($p<0.035$)
- ➔ Response Rate 43% versus 26%