Université Paris Cité

# Sommeil et Psychiatrie

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aesp.

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Centre de référence Chronos psychiatrie, CHRONObiologie et Sommeil

NEURO DIDEROT

cnrs

Instituts thématiques Inserm

# Liens d'intérêt



↓ *Speaker honorarium*:

Biocodex, Bioprojet, Idorsia, Janssen-Cilag, Isis Medical, Jazz pharmaceuticals, NordicPharma, Pharmanovia, ProBTP.

↓ *Fees for consulting*:

Apneal, Arrow, Biocodex, Di&Care, Idorsia, Jazz pharmaceuticals, Myndblue, Petit Bambou, Pileje.

↓ *Advisory board honorarium*:

Apneal, Di&Care, Idorsia, Janssen-Cilag, Myndblue.

# Sleep = core dimension

## A large-scale study of chronic sleep disorders in psychiatric inpatients: Prevalence, Hospitalization burden, restraint use, and comorbidities

EUROPEAN PSYCHIATRIC ASSOCIATION

GHU PARIS PSYCHIATRIE & NEUROSCIENCES
Centre de référence Chronos
psychiatrie, CHRONObiologie et Sommeil

Pierre Alexis Geoffroy[1], Romain Roure[2], Sophie B.Sebille[2], Julia Maruani[3], Estelle Taupinard[4], Michel Lejoyeux[3], Anne Perozziello[2] and Sibylle Mauries[3]

### Population & Data Source

13,913 adult psychiatric inpatients

2021-2023

Paris Psychiatry Hospital Group- Health Data Warehose

**81%** had chronic **sleep disorders (CSD)**

### Main Findings

↑ Hospitalizations per patients

↑ Longer stay duration

↑ Seclusion

↑ Physical restraint

↑ Resistance to drugs

↑ Depression, Bipolar disorders, Anxiety disorders, SUD, etc

### Population

**Sleep disorders = ICD-10 codes, hypnotic prescriptions, or mentions in medical records.**
CSD = Indexof Length of Stays with Disorders (ILSD) >0.5,
No sleep disorders : ILSD=0

### Comorbidities

↑ Psychiatric comorbidities

↑ Non-Psychiatric comorbidities

↑ Self-harm

↑ Psychoactive substance use

↑ Stress

*(Geoffroy PA et al, European Psychiatry, 2025)*

Journal of Affective Disorders 386 (2025) 119403

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

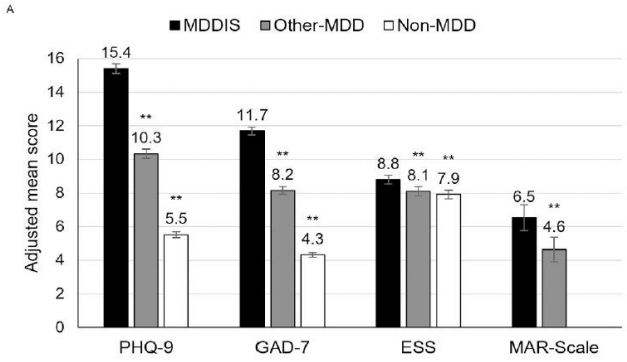
Research paper

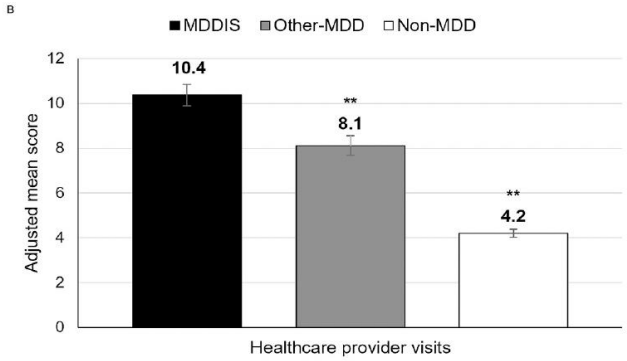
# Examining the burden of major depressive disorder with moderate-to-severe insomnia symptoms in five European countries

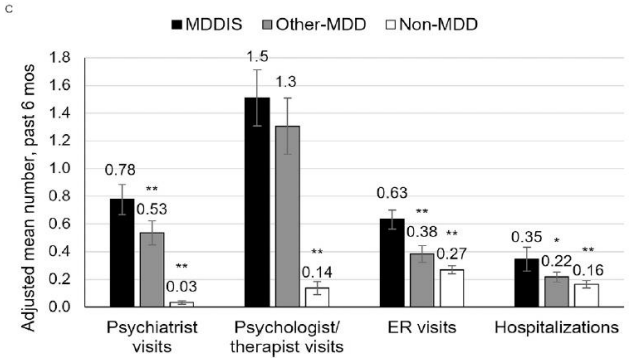
Jesper Gottorp Riise [a], M. Janelle Cambron-Mellott [b], Zhiheng Zhang [c,*], Véronique Huber [d], Alanna Pfau [c], Leiyu Yue [b], Nilanjana Dwibedi [c], Abisola Olopoenia [b], Pierre A. Geoffroy [e,f,g]

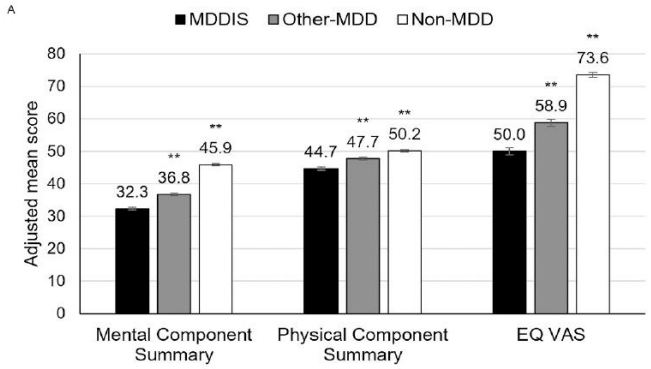
European (France, Germany, UK, Italy, Spain) 2020 National Health and Wellness Survey

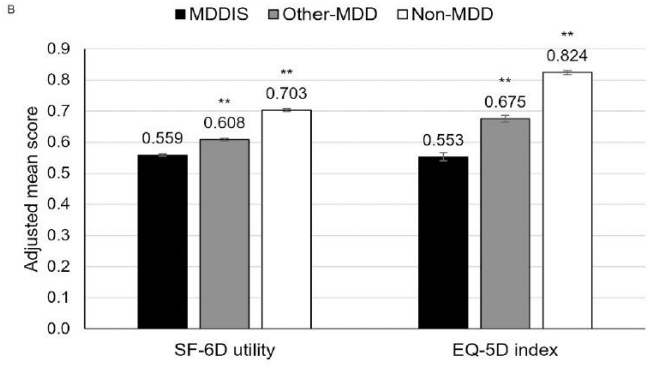
**1888 MDDIS, 3905 other-MDD, and 52,074 non-MDD participants**

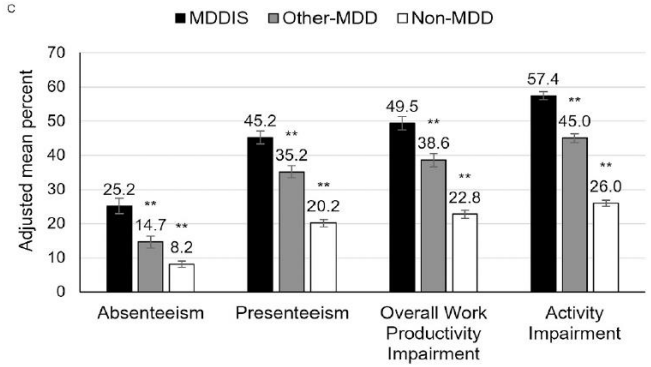


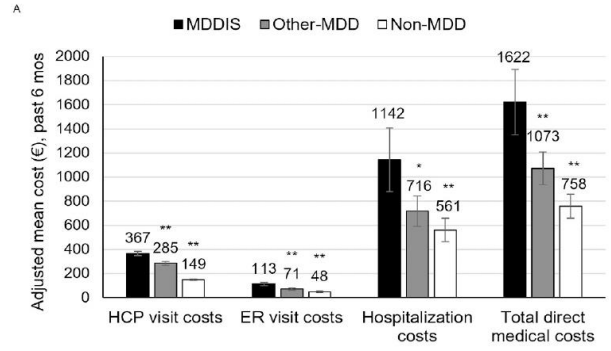



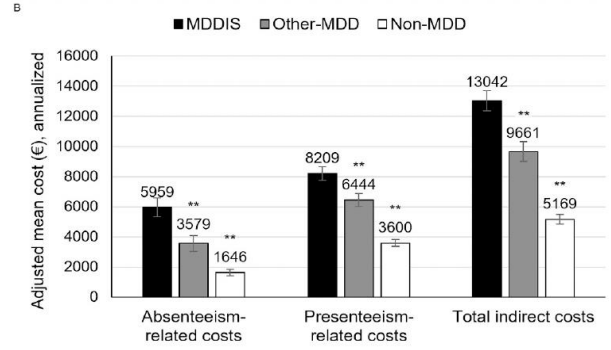



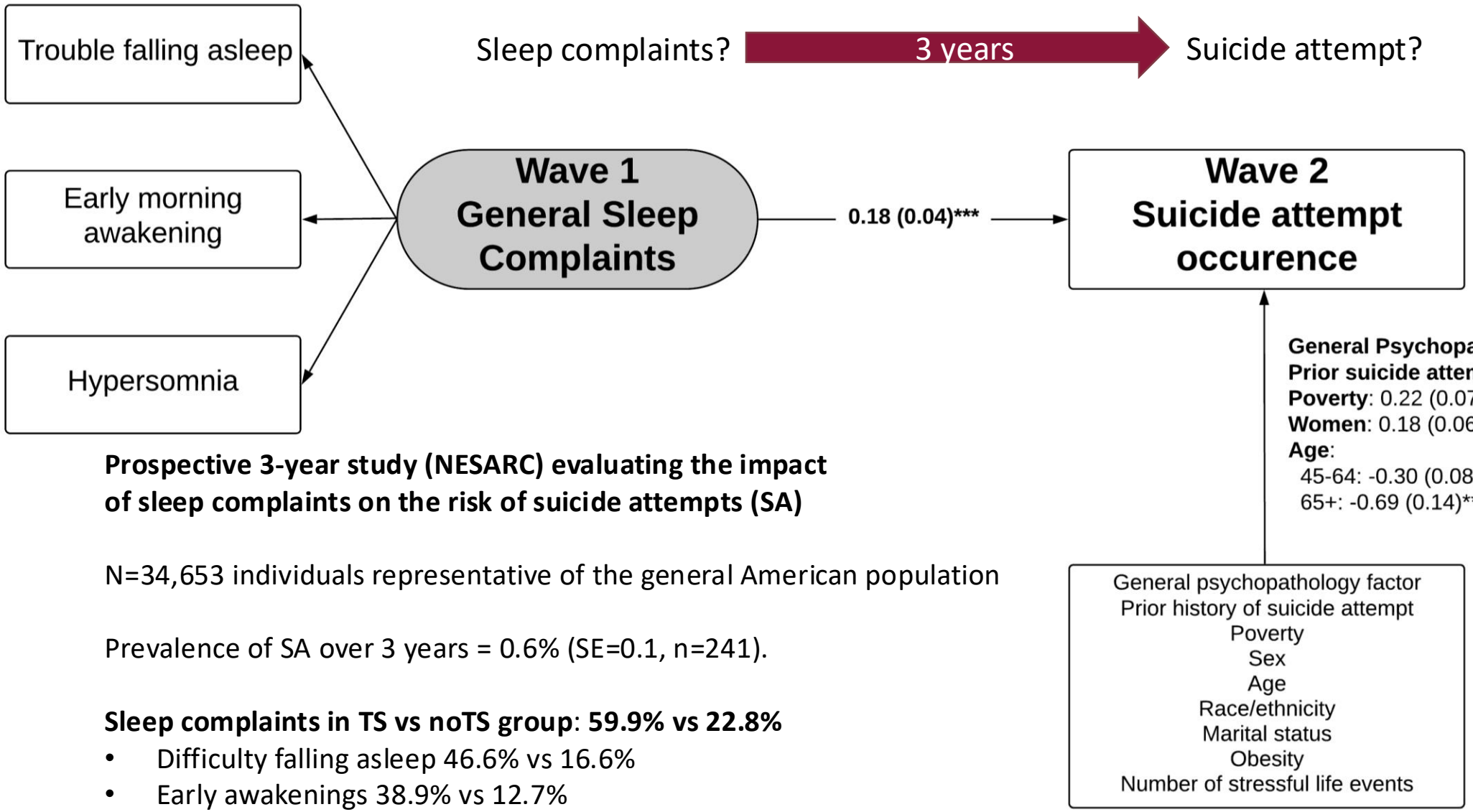



# Sleep complaints predictive of suicidal behavior independently of any psychopathology


N Hoertel


H Peyre




**Prospective 3-year study (NESARC) evaluating the impact of sleep complaints on the risk of suicide attempts (SA)**

N=34,653 individuals representative of the general American population

Prevalence of SA over 3 years = 0.6% (SE=0.1, n=241).

**Sleep complaints in TS vs noTS group**: **59.9% vs 22.8%**

- Difficulty falling asleep 46.6% vs 16.6%
- Early awakenings 38.9% vs 12.7%
- Hypersomnia 35.0% vs 10.7%

*(Geoffroy et al, Mol Psychiatry, 2021)*

# Bad Dreams and Nightmares Preceding Suicidal Behaviors

Pierre A. Geoffroy, MD, PhD[a,b,c,d,*]; Rodolphe Borand, MD[a]; Marine Ambar Akkaoui, MD, MSc[e,f]; Séverine Yung, MD[a]; Yasmine Atoui, MD[a]; Emeline Fontenoy, MD[a]; Julia Maruani, MD, MSc[a,c]; and Michel Lejoyeux, MD, PhD[a,b,c]

*(Geoffroy PA et al, J Clin Psy, 2022)*

**Nightmares** (52.5%)
Onset: 87.3 days

**Bad dreams** (67.5%)
Onset: 111.0 days

**Suicidal scenarii during dreams** (22.5%)
Onset: 45.2 days

4 mois — 3 mois — 1,5 mois

**Suicidal crisis (Thoughts and Attempts)**

DOI: 10.1111/bdi.13325

BIPOLAR DISORDERS WILEY

LETTERS

## How are you dreaming? A very simple question to screen for suicide risk

Nightmares are a very common experience in the general population, with approximately 35%–45% of individuals experiencing at least one nightmare per month.[1] Nightmare disorder, which is characterized by repeated nightmares causing significant distress or impairment, is less frequent but still common, affecting 2%–8% of the

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Pierre Alexis Geoffroy[1,2,3,4]

***80%*** *of individuals with suicidal behavior (suicidal thoughts or attempts) had* ***altered dream content***

nature medicine

Article

https://doi.org/10.1038/s41591-025-03560-7

# Prediction of mental health risk in adolescents

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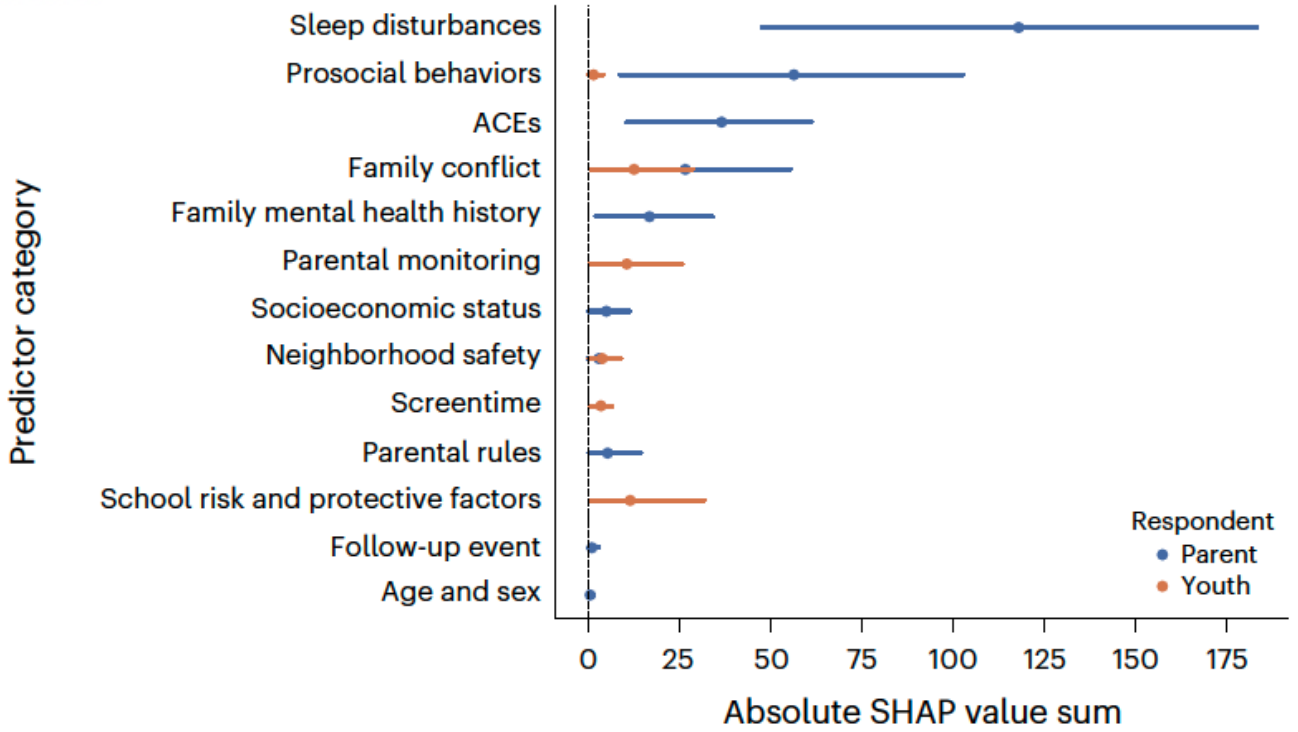
Published online: 05 March 2025

Elliot D. Hill[1,2] ✉, Pratik Kashyap[3], Elizabeth Raffanello[3], Yun Wang[4], Terrie E. Moffitt[5,6,7], Avshalom Caspi[5,6,7], Matthew Engelhard[1,2,8] & Jonathan Posner[3,8]

Prospective prediction of mental health risk in adolescence can facilitate early preventive interventions. Here, using psychosocial questionnaires and neuroimaging measures from over 11,000 children in the Adolescent Brain and Cognitive Development Study, we trained neural network models to stratify general psychopathology risk. The model trained on current symptoms accurately predicted which participants would convert into the highest psychiatric illness risk group in the following year (area under the receiver operating characteristic curve = 0.84). The model trained solely on potential etiologies or disease mechanisms achieved an area under the receiver operating characteristic curve of 0.75 without relying on the child's current symptom burden. Sleep disturbances emerged as the most influential predictor of high-risk status, surpassing adverse childhood experiences and family mental health history. Including neuroimaging measures did not enhance predictive performance. These findings suggest that artificial intelligence models trained on readily available psychosocial questionnaires can effectively predict future psychiatric risk while highlighting potential targets for intervention. This is a promising step toward artificial intelligence-based mental health screening for clinical decision support systems.



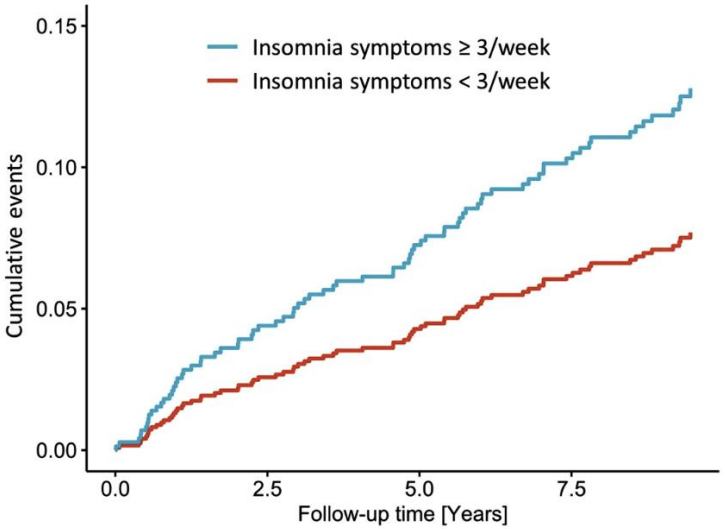
Contents lists available at ScienceDirect

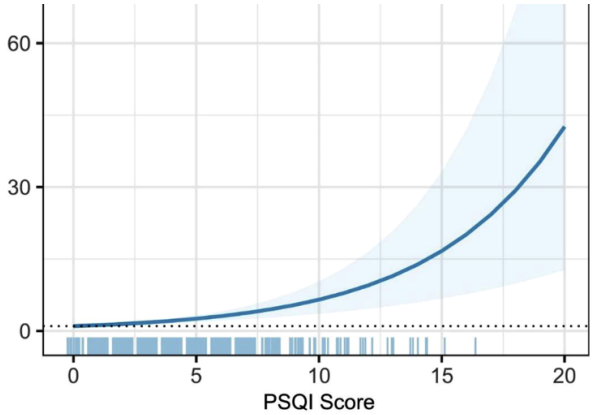
Psychiatry Research

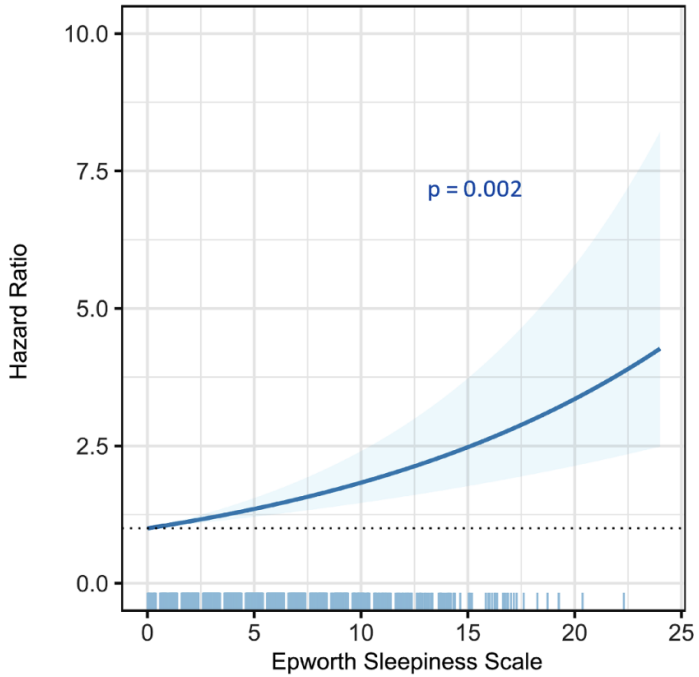
journal homepage: www.elsevier.com/locate/psychres

# Sleep disturbances and incident risk of major depressive disorder in a population-based cohort

Geoffroy Solelhac [a,*], Théo Imler [a], Marie-Pierre F. Strippoli [b], Nicola Andrea Marchi [a], Mathieu Berger [a], Jose Haba-Rubio [a,c], Tifenn Raffray [a,c], Virginie Bayon [a], Anne Sophie Lombardi [a], Setareh Ranjbar [b], Francesca Siclari [a,i,j], Peter Vollenweider [h], Pedro Marques-Vidal [h], Pierre-Alexis Geoffroy [d,e,f], Damien Léger [g], Aurélie Stephan [a,1], Martin Preisig [b,1], Raphaël Heinzer [a]




*(Solelhac G et al., Psychiatry Res, 2024)*

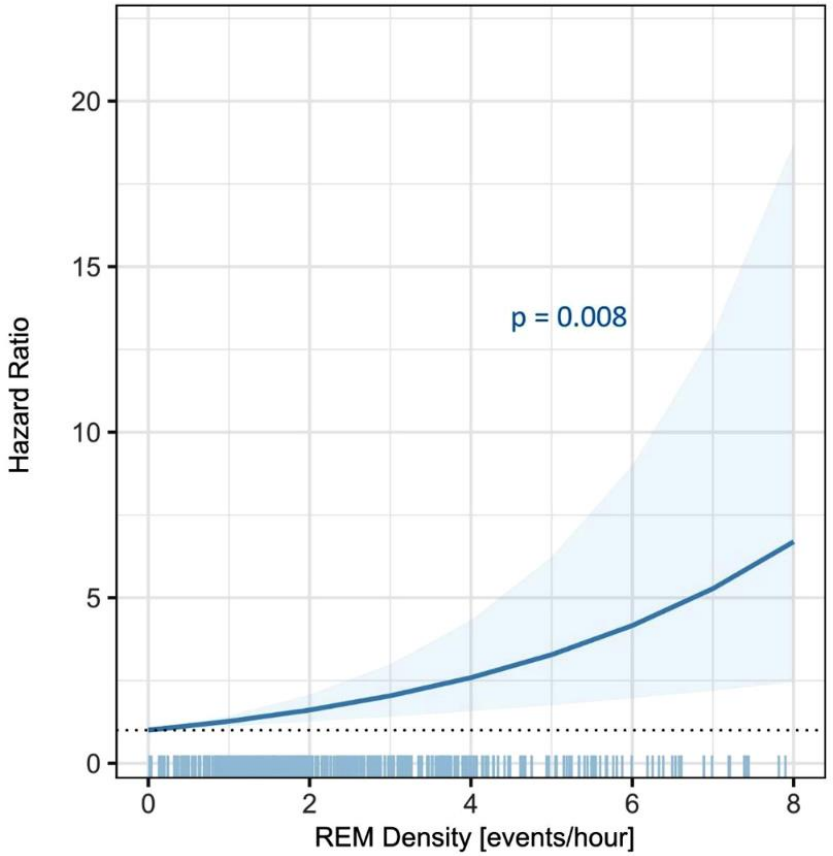
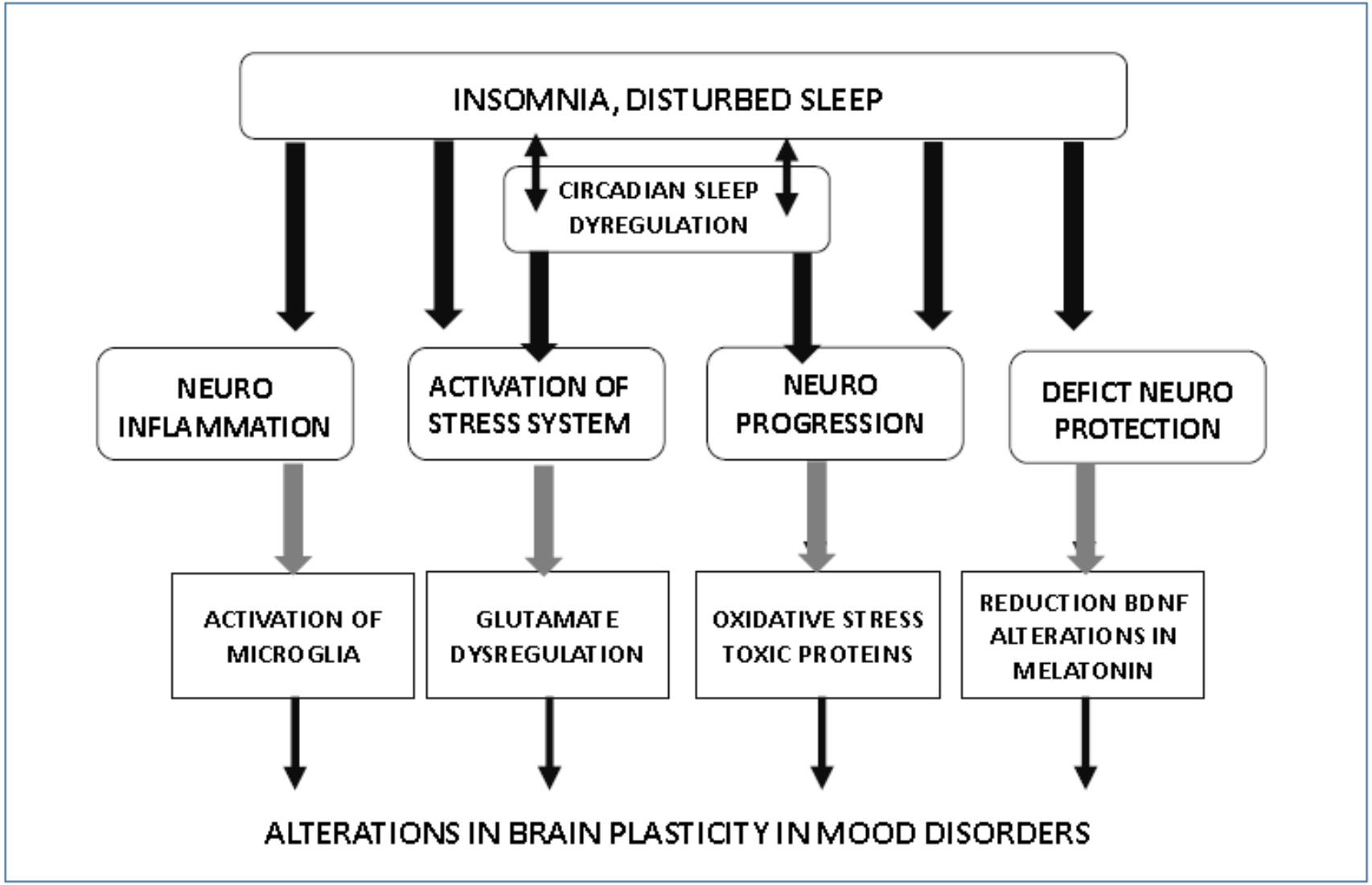



**Fig. 6.** Association between major depressive disorder incidence risk and rapid eye movements (REM) density in men. Data are multiple-adjusted Cox proportional hazards regression models showing simulated hazard ratio values with 95 % confidence intervals. Distribution of hazard ratio values are shown as a function of PSQI score and are derived from 1000 simulations using the approach described by King et al. (2000) (King et al., 2000). Models are adjusted for age, sex, and current smoking status. Distribution of REM density is shown on the rug plot along the *x*-axis. The *p*-value shown relates to the hazard ratio value in the original Cox proportional hazards regression model (1.270 [95 % confidence interval 1.064–1.516].

# Neurobiological mechanisms



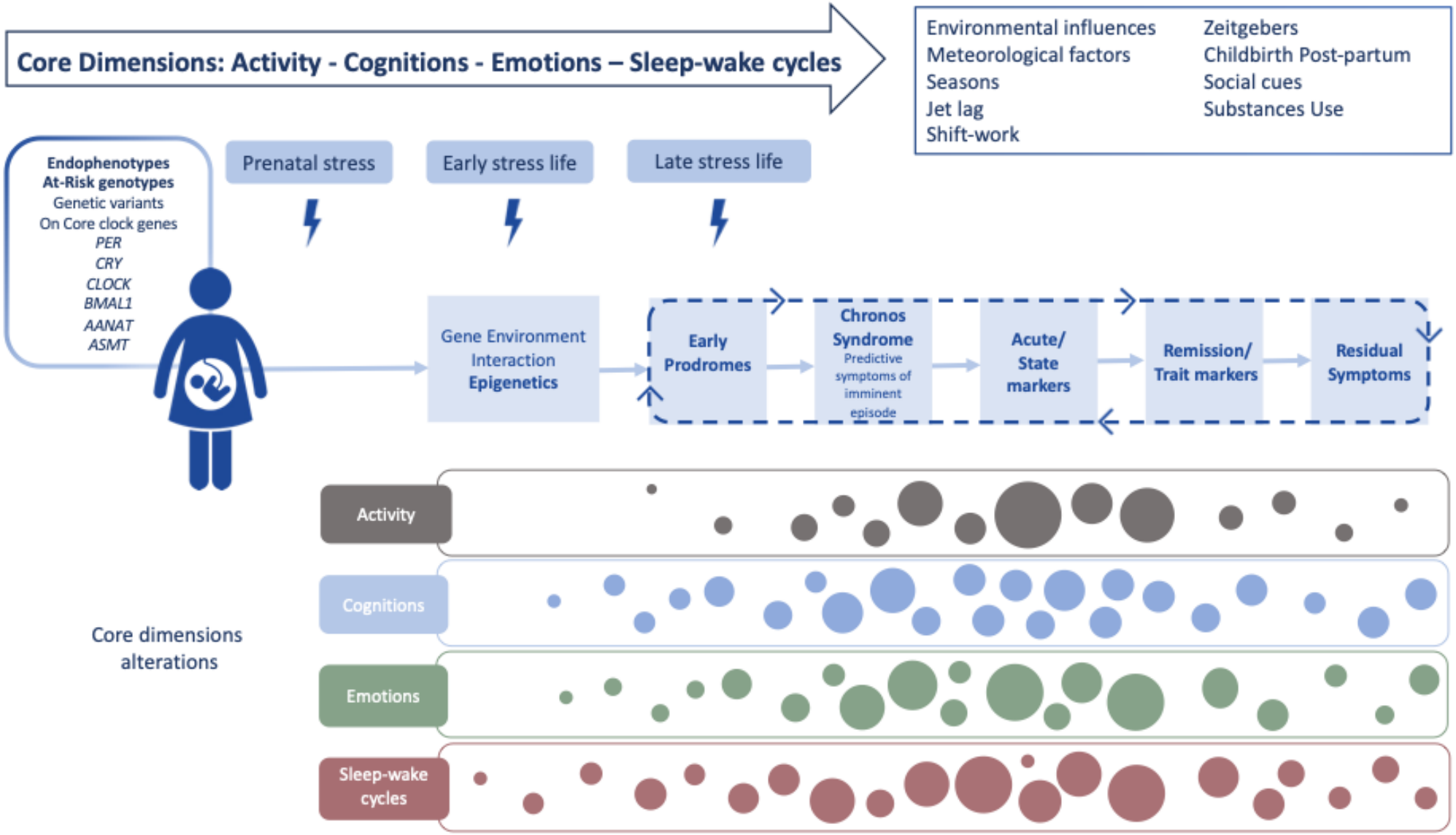

L Palagini


D Riemann

(Palagini L, Geoffroy PA, Riemann D, Current Medical Chemistry, 2022)

# Progression from vulnerability to Mood Disorders: symptoms evolution across the 4 primary dimensions (ACES – Activity, Cognitions, Emotions, Sleep-Wake Cycles)






*(Geoffroy PA & Maruani J, Biological Psychiatry, 2025)*

# Dark skies before the storm: The Chronos syndrome

Pierre A. Geoffroy[1,2,3,4]

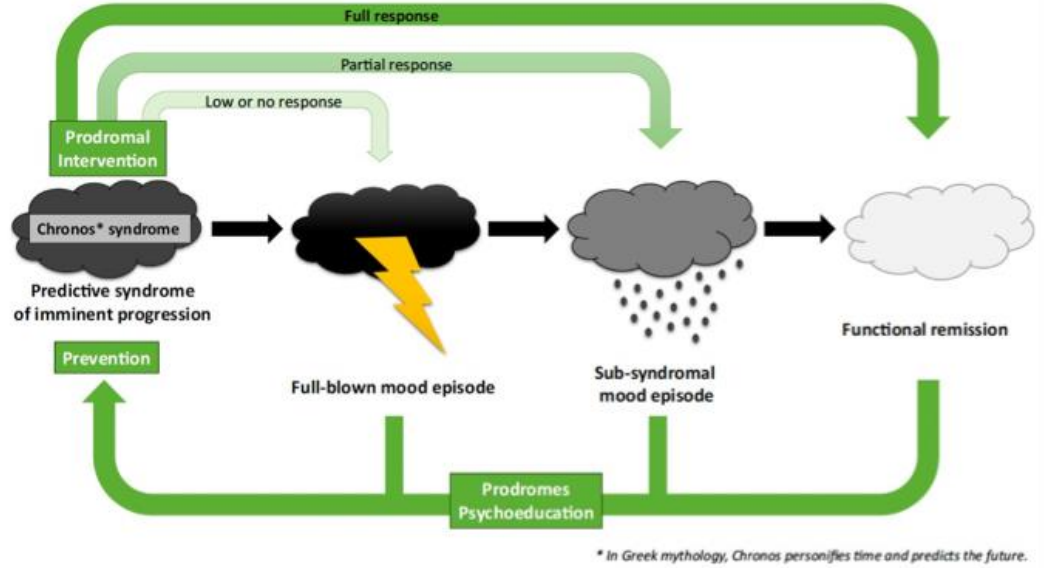



FIGURE 1 **"Chronos syndrome": a clinical syndrome reliably predicting an imminent transition to a mood episode.** Addressing the "Chronos syndrome" during the prodromal phase could lead to more effective interventions, akin to anticipating dark skies before the storm, with the potential to limit or stop the progression to a full-blown mood disorder while empowering psychoeducation and prevention strategies.

**Chronos Syndrome / Depression**

*"The very first signs are usually a slightly restless night. I wake up and think 'oh damn, something's wrong,' and typically in the morning I wake up with a knot in my stomach and I know I'm not doing well… Then come the cognitive problems…*

*The classic early symptoms are loss of confidence, cognitive difficulties (I feel disconnected from the world, I don't understand well what people are saying to me, it's very unpleasant, I feel slowed down), I lose social ease, become a bit paranoid and just want to sleep. I go to bed around 11 p.m., sleep 9 hours instead of my usual 6.5 to 7 hours, but the sleep is of poorer quality.*
*I sometimes wake up anxious during the night, and every morning it's the same:*
*I don't feel well… and I'm a little scared; I've got this knot in my stomach…"*

**Chronos Syndrome / Mania**

*"The warning signs are when I get excited, I feel talkative, very reactive on social media, which normally isn't like me—I don't usually respond quickly or post much.*

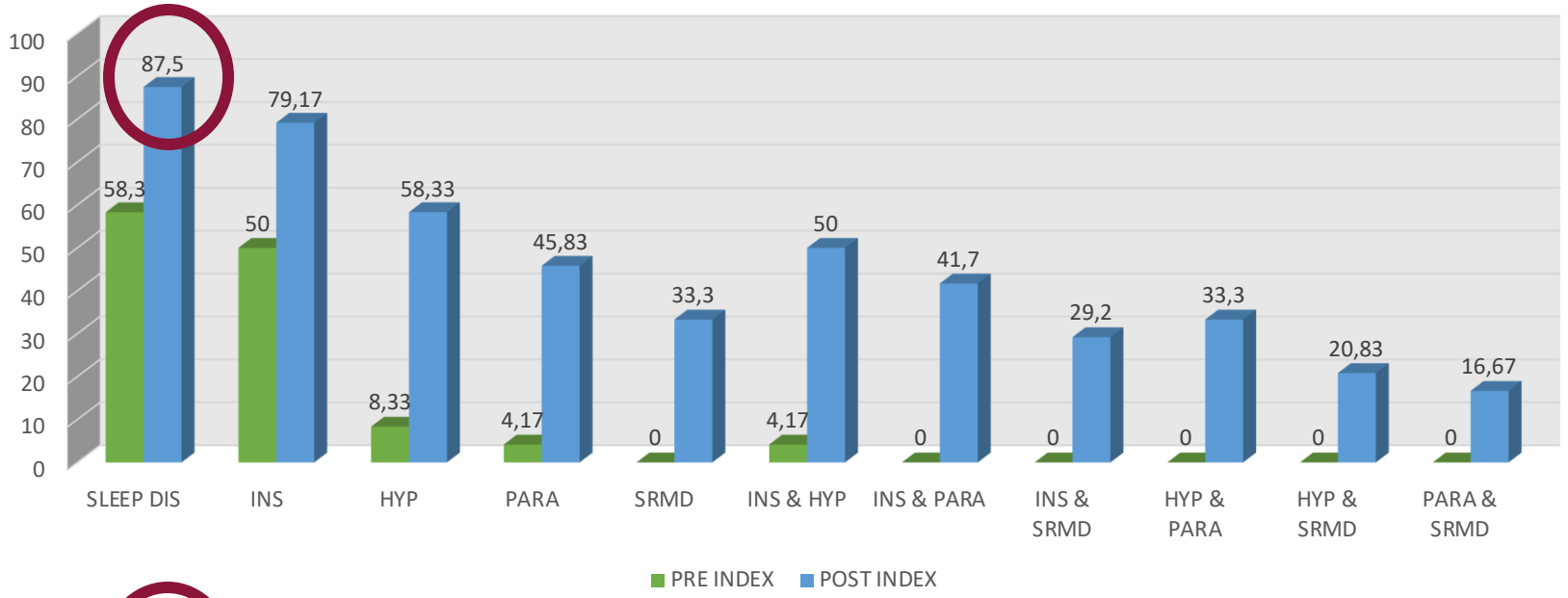
*That's often how it starts: I go out more, drink and smoke, and sleep less.*

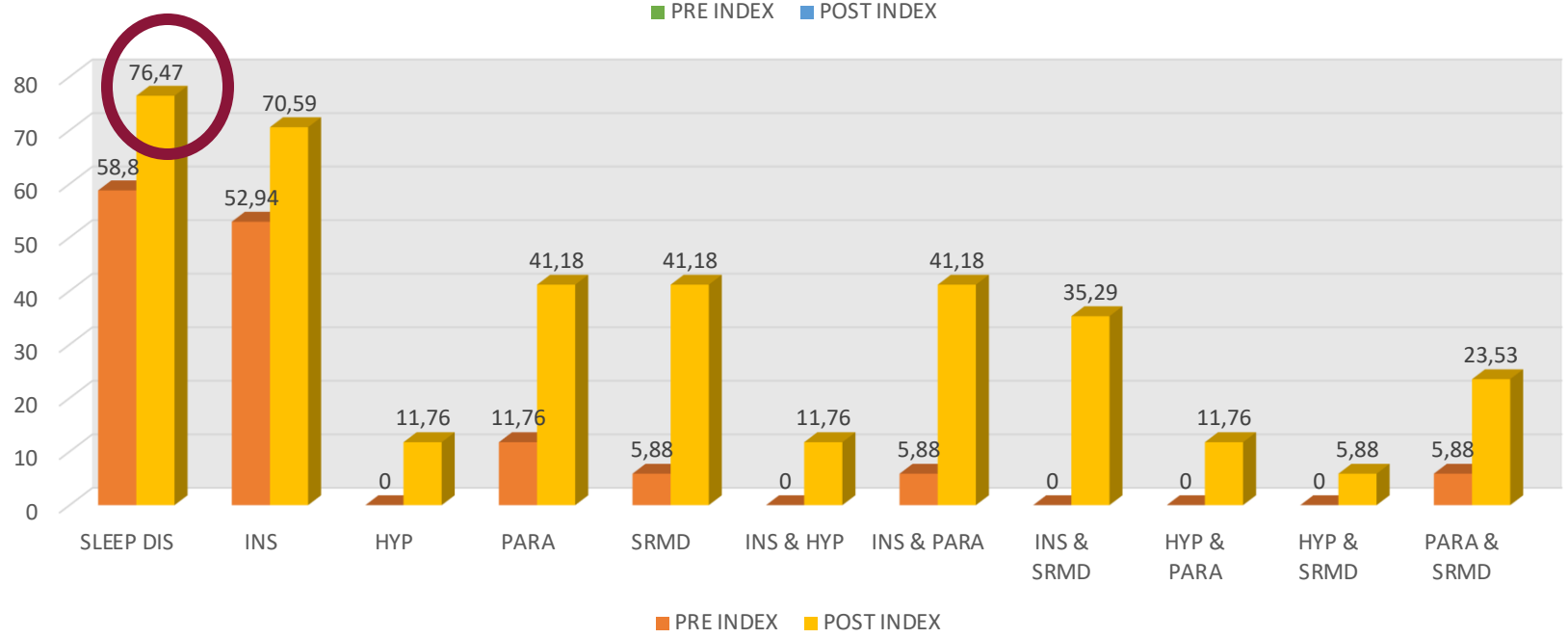
*The decreasing sleep is my red flag, the sign that I need to slow down, otherwise I completely lose control and become unstoppable…"*

**Jean, 55 years old, BD1**

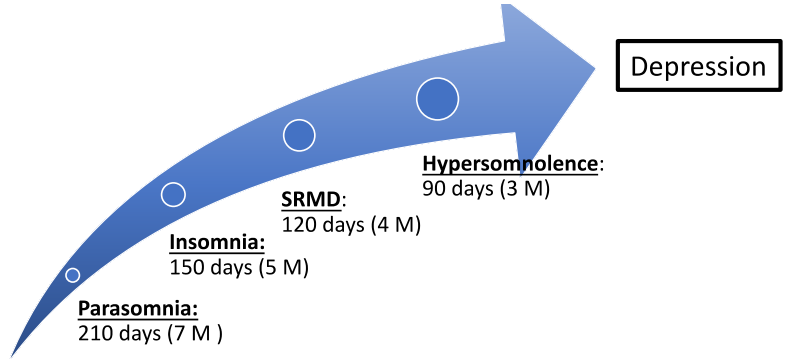
*(Geoffroy PA, Bipolar Disord, 2023)*

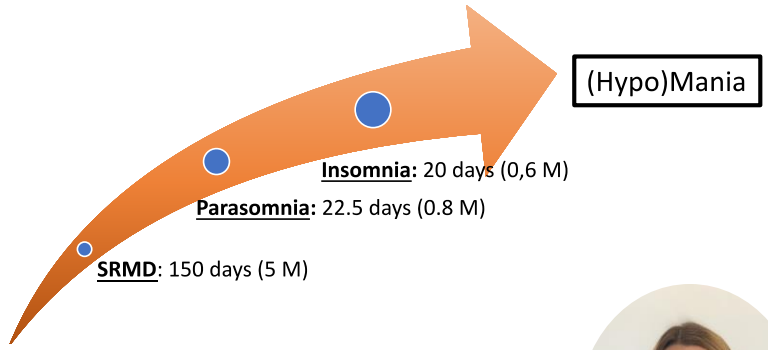
# Chronos syndrome and Sleep prodromes




**87,5%** report sleep disturbances prior to their **depressive episode**
**76,5%** prior to **Mania**




Louise Basquin

*Basquin et al, Bipolar Disorders, 2024*

# Chronos syndrome and Sleep prodromes

TABLE 1 Percentage and numbers of individuals experiencing each symptom of sleep alterations after interview.

| | Yes (*n*, [%]) | Onset (median n days [months]) | Depression (24 patients with depression) (*n*, [%]) | Mania (17 patients with (hypo)mania) (*n*, [%]) | Onset for depression (median in days [months]) | Onset for mania (median in days [months]) |
|---|---|---|---|---|---|---|
| Insomnia | 31 (75.6) | 60 (2) | 19 (79,2) | 12 (70,6) | 150 (5) | 20 (0.7) |
| Nocturnal awakenings | 19 (46.3) | 42 (1.4) | 13 (54.2) | 6 (35.3) | 60 (2) | 20 (0.7) |
| Early awakenings | 18 (43.9) | 36 (1.2) | 10 (41.7) | 8 (47.1) | 81 (2.7) | 20 (0.7) |
| Onset insomnia | 18 (43.9) | 42 (1.4) | 11 (45.8) | 7 (41.2) | 227,5 (7.6) | 10 (0.3) |
| Poor quality sleep | 16 (39.0) | 150 (5) | 12 (50) | 4 (23.5) | 180 (6) | 95 (3.2) |
| Hypersomnolence disorders | 16 (39.0) | 90 (3) | 14 (58.3) | 2 (11.8) | 90 (3) | 80 (2.6) |
| Increased total sleep time | 13 (31.7) | 60 (2) | 12 (50) | 1 (5.9) | 51 (1.7) | 150 (5) |
| Sleepiness | 8 (19.5) | 45 (1.5) | 6 (25) | 2 (11.8) | 45 (1.5) | 80 (2.7) |
| Sleep inertia | 6 (14.6) | 105 (3.5) | 6 (25) | 0 (0.0) | 105 (3.5) | 0 |
| Parasomnia | 18 (43.9) | 150 (5) | 11 (45.8) | 7 (41.2) | 210 (7) | 22.5 (0.8) |
| Epic dreaming | 11 (26.8) | 51 (1.7) | 7 (29.2) | 4 (23.5) | 111 (3.7) | 37.5 (1.3) |
| Nightmares | 8 (19.5) | 210 (7) | 6 (25) | 2 (11.8) | 370 (12.3) | 77 (2.6) |
| Bad dreams | 8 (19.5) | 120 (4) | 6 (25) | 2 (11.8) | 135 (4.5) | 77 (2.6) |
| Sleep talking | 5 (12.2) | 42 (1.4) | 3 (12.5) | 2 (11.8) | 365 (12) | 16.5 |
| Suicidal scenarios among dreams | 4 (9.8) | 197,5 (6.5) | 4 (16.7) | 0 (0.0) | 197.5 (6.5) | 0 |
| Hypnagogic hallucinations | 3 (7.3) | 150 (5) | 2 (8.3) | 1 (5.9) | 165 (5.5) | 2 (0.06) |
| Sleepwalking | 2 (4.9) | 1801,5 (60) | 1 (4.2) | 1 (5.9) | 3600 (120) | 3 (0.1) |
| Hypnopompic hallucinations | 1 (2.4) | 180 (6) | 1 (4.2) | 0 (0.0) | 180 (6) | 0 |
| SRMD | 15 (36.6) | 150 (5) | 8 (33.3) | 7 (41.2) | 120 (4) | 150 (5) |
| Bruxism | 9 (22.0) | 150 (5) | 3 (12.5) | 6 (35.3) | 60 (2) | 257.5 (8.5) |
| Restless legs syndrome | 7 (17.1) | 180 (6) | 5 (20.8) | 2 (11.8) | 180 (6) | 95 (3.2) |

*Note*: Survival medians were calculated from Kaplan Meier curves.

Abbreviations: SRMD, Sleep-related movement disorders.

**Multiple therapeutic targets and highly personalized approaches +++**

*Basquin et al, Bipolar Disorders, 2024*

Received: 26 February 2024 | Revised: 7 July 2024 | Accepted: 11 July 2024
DOI: 10.1111/acps.13739

ORIGINAL ARTICLE

Acta Psychiatrica Scandinavica WILEY

# Exploring actigraphy as a digital phenotyping measure: A study on differentiating psychomotor agitation and retardation in depression

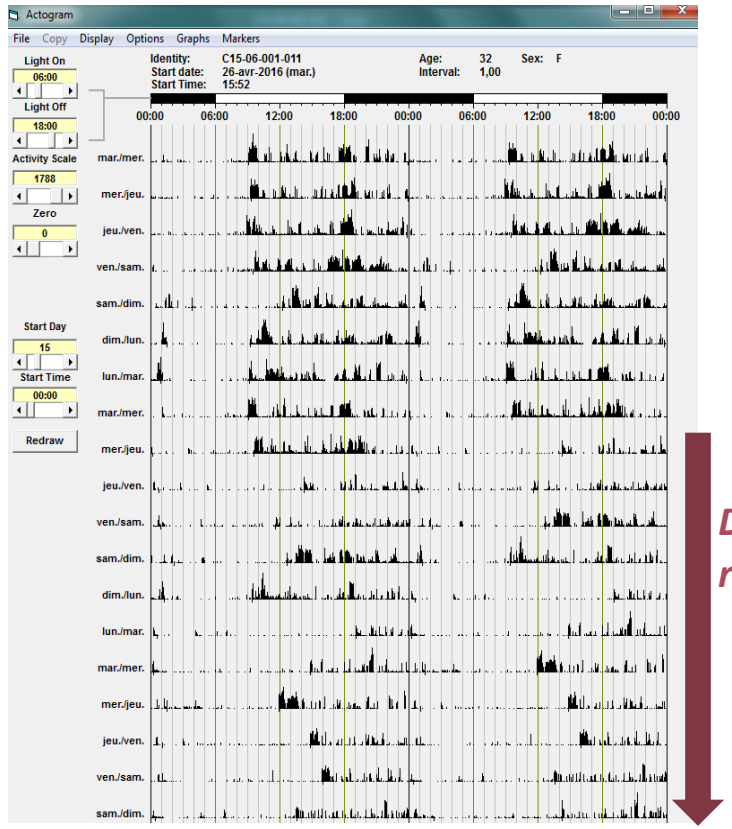
Julia Maruani[1,2,3] | Sibylle Mauries[1,2,3] | Feriel Zehani[3] | Michel Lejoyeux[1,2,3] | Pierre A. Geoffroy[1,2,3]

Inserm
La science pour la santé
From science to health

**TABLE 4** Multivariate analysis—Comparison of patients with major depressive episode (MDE) and psychomotor retardation (PMR) or agitation (PMA) regarding objective sleep and circadian rhythm markers assessed with actigraphy.

| | Groups mean (SD) or n (%) | | Comparison PMR vs PMA | |
|---|---|---|---|---|
| **Variables** | **PMR ($n$ = 58; 78.4%)** | **PMA ($n$ = 16; 21.6%)** | **Z-score** | **$p$*** |
| M10 average | 10463.26 (±4069,59) | 15046.75 (±3425.03) | 4.12 | **0.002** |
| Relative amplitude | 0.80 (±0.13) | 0.89 (±0.05) | 277 | **0.027** |
| Rest per 24 h% | 46.62 (±9.13) | 41.61 (±6.88) | −2.03 | 0.069 |
| Interdaily stability | 0.36 (±0.12) | 0.48 (±0.09) | 3.67 | **0.006** |
| Intradaily variability | 0.91 (±0.17) | 0.75 (±0.14) | −2.94 | **0.012** |

*Note*: Bold values indicate a statistically significant difference with a $p$-value less than 0.05.
*$p$-value adjusted for current tobacco smoking and current alcohol use disorder.




A subtle clinical presentation, not easy to evaluate, with major therapeutic consequences!

# Predictive biosignature of major depressive disorder derived from physiological measurements of outpatients using machine learning

nature SCIENTIFIC REPORTS

Nicolas Ricka ✉, Gauthier Pellegrin, Denis A. Fompeyrine, Bertrand Lahutte & Pierre A. Geoffroy

Seeking an **individual biosignature for depressive symptoms**.

**Daily measurements over 6 months (medical device):**
100 physiological markers physical activity, heart rate, heart rate variability, respiratory rate, sleep

| Method | 2-class accuracy (TPR; TNR) | Predicted MADRS MAE |
|---|---|---|
| Constant (baseline) model | 51.7% | 9.63 (95% CI 7.83–11.43) |
| Optimistic model (prediction without physiological data) | 74.4% (33.3%; 97.8%) | 7.21 (95% CI 4.7–9.7) |
| Our model (baseline + deep learning approach) | **86% (79%; 94%)** | **6.7 (95% CI 3.4–10.1)** |

**Prediction for the next 3 months**
Sensitivity = 79%
Specificity = 94%

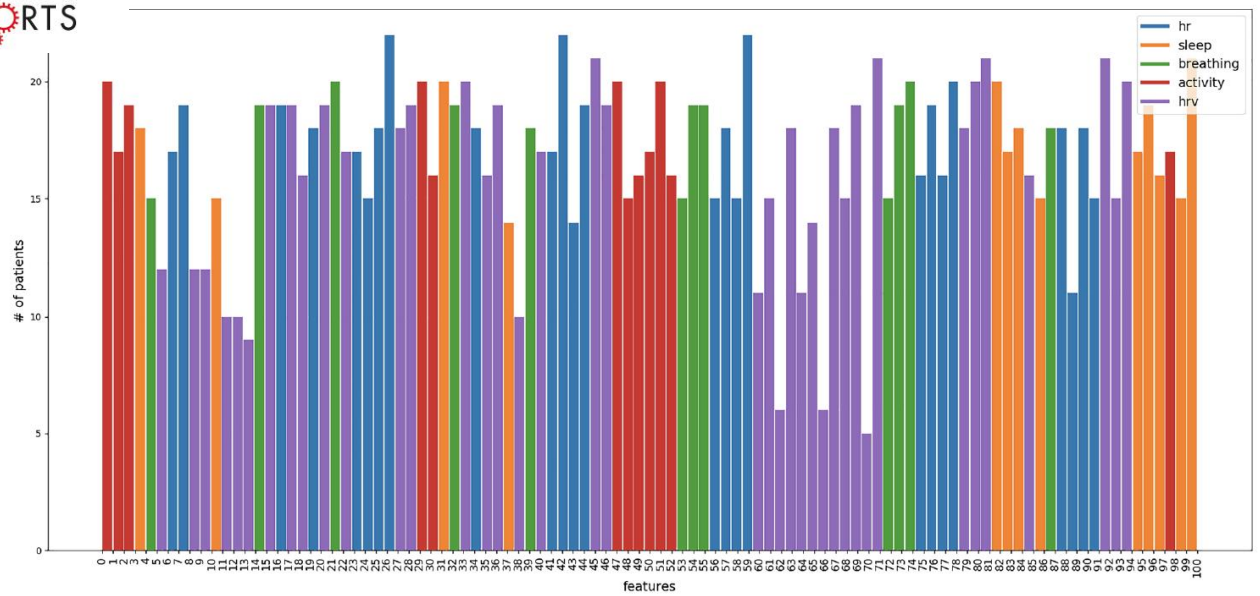
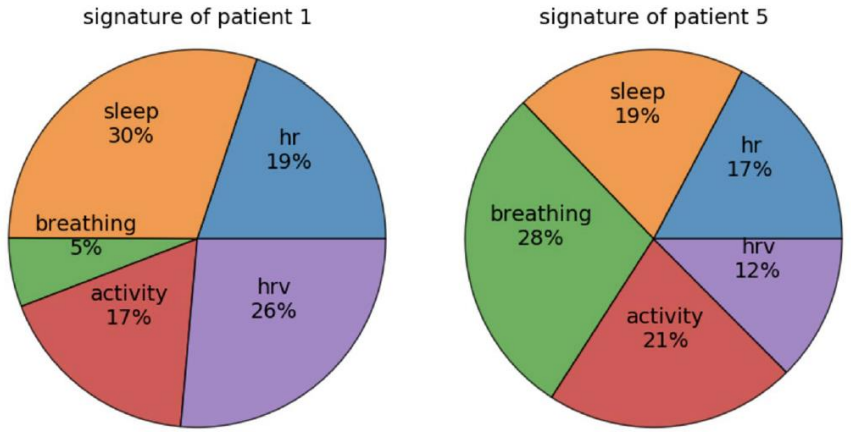



**Figure 6.** Histogram of features apparition in biosignatures. Histogram of unique features included in the biosignature of each patient. No feature was selected only for a single patient, and no feature was selected for all patients in the cohort. The colors represent the feature group to which the physiological variable belongs.

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*(Ricka N et al, Scientific Reports, 2023)*

Psychiatry Research 329 (2023) 115527

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journal homepage: www.elsevier.com/locate/psychres

# Predictors of cognitive behavioral therapy for insomnia (CBT-I) effects in insomnia with major depressive episode

Julia Maruani [a,b,c,*], Emilie Stern [c,d], Charlotte Boiret [b], Jeanne Leseur [a], Alix Romier [a,b], Michel Lejoyeux [a,b,c], Pierre A. Geoffroy [a,b,c,e,*]

J Maruani

**Effectiveness of CBT-I in patients with a major depressive episode (MDE) versus Sleep Education (SE).**

**CBT-I compared to SE**:
↓ **significantly reduces the severity of insomnia**: greater effect on early awakenings,
↑ increases sleep satisfaction,
↓ decreases the perception that sleep problems impact quality of life and daily functioning.

↑ **increases the proportion of participants changing ISI category** (CBT-I 54.6% vs. 23.8%)
↑ **increases responses** (CBT-I 30.3% vs. 0%)
↑ **increases remissions** (CBT-I 21.21% vs. 0%)

**Greater reduction in the use of hypnotic medications +++**

**Greater improvement in depressive symptoms +++**

**Table 2**
Comparison of the effects of CBT-I and Sleep education (SE) groups on sleep outcomes and on depression and anxiety symptoms in patients with major depressive episode (MDE) and insomnia.

| | CBT-I ($n = 30$) | SE ($n = 21$) | Khi2, T- Student, Mann-Whitney U | P-value | Δ mean (Δ SD) | Effect size |
|---|---|---|---|---|---|---|
| *Sleep parameters, mean (SD)* | | | | | | |
| ISI | | | | | | |
| Δ ISI | 6.30 (5.95) | 1.95 (3.58) | 3.01 | **0.004** | 4.35 (1.44) | 0.84 |
| Δ ISI1a | 0.68 (1.06) | 0.20(0.77) | 248 | 0.114 | 2.35E-05 | 0.248 |
| Δ ISI1b | 0.67(1.16) | 0.35(0.99) | 273 | 0.275 | 4.95E-05 | 0.173 |
| Δ ISI1c | 0.86(1.38) | 0.11(0.88) | 190 | **0.022** | 1.000 | 0.375 |
| Δ ISI2 | 1.09(0.28) | 0.50(0.61) | 225 | **0.045** | 1.000 | 0.318 |
| Δ ISI3 | 1.03(1.36) | 0.30(0.92) | 219 | **0.047** | 1.000 | 0.317 |
| Δ ISI4 | 1.00(1.24) | 0.45(0.61) | 234 | 0.089 | 1.39E-05 | 0.269 |
| Δ ISI5 | 1.03(1.21) | 0.20(0.70) | 201 | **0.013** | 1.000 | 0.392 |
| ISI response | | | | **0.005** | | |
| Yes | 10 (30.3%) | 0 (0%) | | | | |
| No | 23 (69.7%) | 21 (100%) | | | | |
| ISI remission | | | | **0.024** | | |
| Yes | 7 (21.21%) | 0 (0%) | | | | |
| No | 26(78.79%) | 21(100%) | | | | |
| ISI change of category | | | | **0.026** | | |
| Yes | 18 (54.6%) | 5 (23.8%) | | | | |
| No | 15 (45.4%) | 16 (76.2%) | | | | |
| PSQI | | | | | | |
| ΔPSQI total score | 2.37 (4.13) | 1.33(2.55) | 0.93 | 0.357 | 1.033 (1.11) | 0.2645 |
| ΔPSQI Sleep subjective quality | 0.76(1.00) | 0.24(0.77) | 2.03 | **0.048** | 0.519 (0.25) | 0.566 |
| ΔPSQI sleep latency | 0.27(1.01) | 0.29(0.90) | 339 | 0.88 | 3.51 e-5 | 0.0231 |
| ΔPSQI Sleep duration | 0.033(1.16) | 0.29(1.19) | 313 | 0.966 | −3.97 e-5 | 0.008 |
| ΔPSQI Daytime dysfunction | 0.36(0.90) | 0.24(1.04) | 335 | 0.83 | 2.78 e-5 | 0.0346 |
| ΔPSQI Sleep efficiency | 0.40(1.57) | 0.24(1.38) | 274 | 0.41 | 4.09 e-5 | 0.009 |
| ΔPSQI Sleep disturbance | 0.21(0.70) | 0.14 (0.57) | 331 | 0.75 | 1.31 e-5 | 0.111 |
| ΔPSQI Sleep promoting medication | 0.75 (0.20) | −0.09 (0.18) | 216 | **0.003** | 5.77 e-5 | 0.167 |
| Excessive daytime sleepiness (ESS) ΔESS total score | 1.09 (4.22) | −0.28(3.20) | 1.27 | 0.208 | 1.379 (1.08) | 0.3585 |
| Horne and Ostberg | −1.10 (5.52) | 0.48 (9.03) | 270 | 0.497 | −1.00 (2.06) | 0.12 |
| Δ Horne and Ostberg total score | | | | | | |
| *Mood parameters, mean (SD)* | | | | | | |
| ΔCESD | 7.81(9.68) | 2.38 (7.99) | 2.13 | **0.038** | 5.43 | 0.599 |
| ΔGAD7 | 3.13 (3.78) | 1.700 (5.18) | 227 | 0.148 | 2 | 0.243 |

Abbreviations: ISI, Insomnia severity index; PSQI, Pittsburgh Sleep Quality; ESS, Epworth Sleepiness Scale; CESD, Center for Epidemiologic Studies-Depression scale; GAD7, Generalized Anxiety Disorder-7.

**Predictors of a decrease in ISI severity with CBT-I:**
•Treatment-resistant depression (TRD)
•Seasonal fluctuations in depressive symptoms and sleep cycles throughout the year
•Daytime dysfunction (especially for insomnia related to early awakenings)

**Factors of poor response to CBT-I:**
•Shorter sleep duration
→ Less improvement in daytime dysfunction and worries related to sleep disorders

**Hypnotic, anxiolytic, antidepressant, and mood stabilizer medications does not predict a less favorable response to CBT-I.**

Sleep Medicine Reviews 62 (2022) 101597

Contents lists available at ScienceDirect

Sleep Medicine Reviews

journal homepage: www.elsevier.com/locate/smrv

CLINICAL REVIEW

# Cognitive behavioral therapy for insomnia in patients with mental disorders and comorbid insomnia: A systematic review and meta-analysis

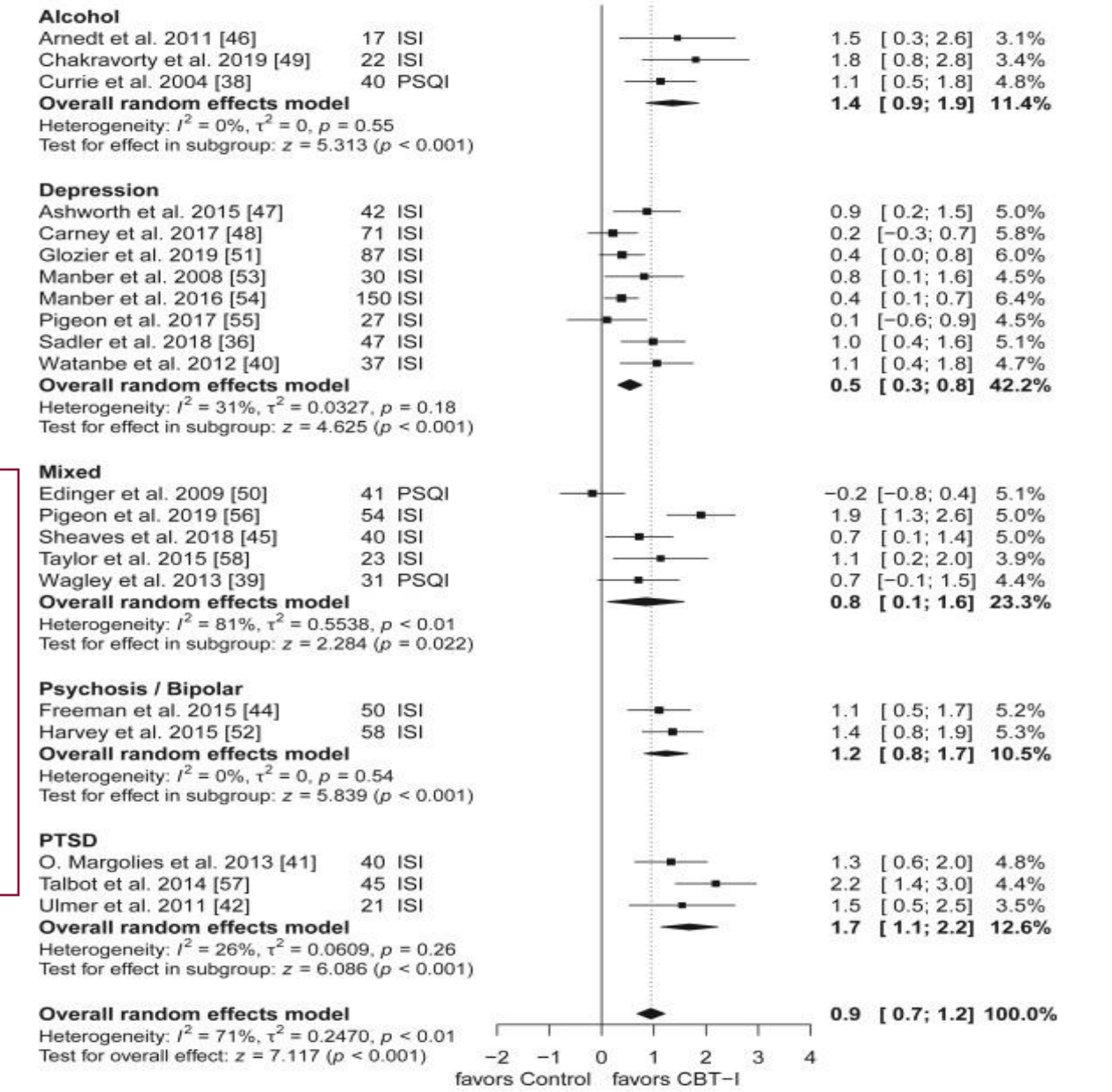
Elisabeth Hertenstein [a,*], Ersilia Trinca [a], Marina Wunderlin [b], Carlotta L. Schneider [a], Marc A. Züst [b], Kristoffer D. Fehér [a], Tanja Su [c], Annemieke v. Straten [d], Thomas Berger [e], Chiara Baglioni [f], Anna Johann [f,g], Kai Spiegelhalder [f], Dieter Riemann [f], Bernd Feige [f], Christoph Nissen [a]

**Efficacy on insomnia symptoms across psychiatric disorders**
→ Moderate to large effect sizes

**Efficacy also observed on psychiatric symptoms**

**CBT-I is effective in these populations**

It can also be used as an adjunctive (add-on) treatment
**→ To improve mental health outcomes in these disorders**

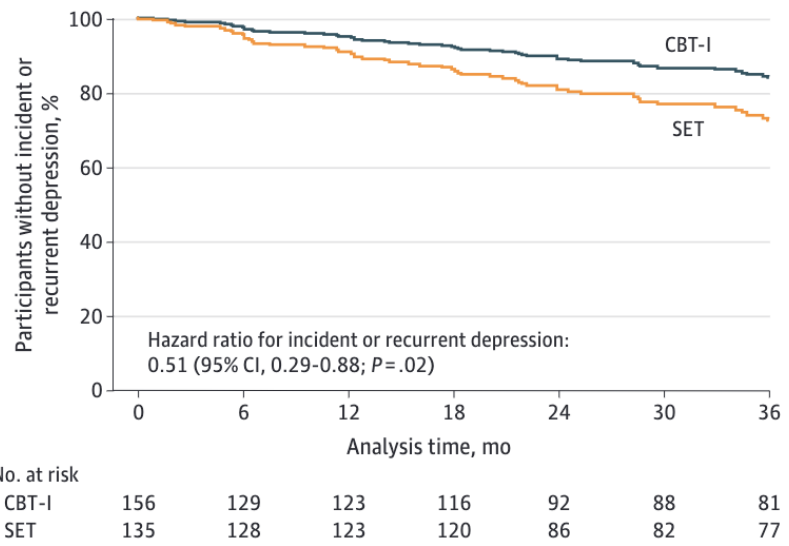


JAMA Psychiatry | Original Investigation

# Prevention of Incident and Recurrent Major Depression in Older Adults With Insomnia
## A Randomized Clinical Trial

Michael R. Irwin, MD; Carmen Carrillo, MA, MHS; Nina Sadeghi, BS; Martin F. Bjurstrom, MD; Elizabeth C. Breen, PhD; Richard Olmstead, PhD

**Figure 2. Time to Incident or Recurrent Depression Event by Treatment Group**




Older adults without depression but with insomnia were randomized to receive cognitive behavioral therapy for insomnia (CBT-I) or sleep education therapy (SET).

*(Irwin et al., JAMA Psy, 2022)*

Sleep Medicine 124 (2024) 650–658

Contents lists available at ScienceDirect

Sleep Medicine

journal homepage: www.elsevier.com/locate/sleep

# CBT-I for prevention and early intervention in mental disturbances: A systematic review and meta-analysis

Laura Palagini [a,*], Giulia Aquino [b], Gaspare Alfi [b], Leonardo Massoni [a], Matteo Gambini [a], Mario Miniati [a], Donatella Marazziti [a], Dieter Riemann [c,d], Angelo Gemignani [b], Pierre A. Geoffroy [e,f,g]

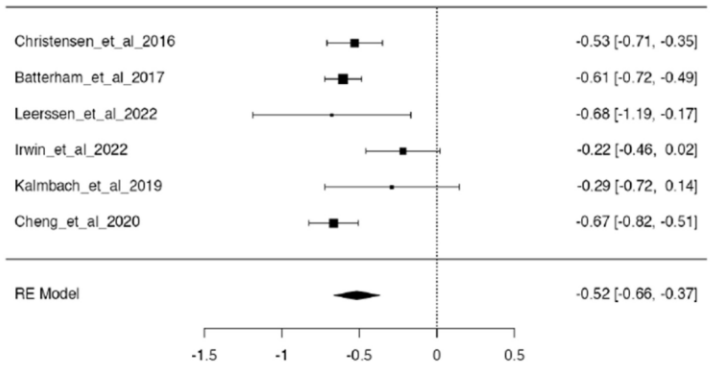



**Fig. 2.** A total of k = 6 studies were included in the analysis. CBT-I for insomnia was effective in reducing depressive symptoms (z = −6.8466, p < 0.0001; RE Model = −0.5168 (95 % CI: 0.6648 to −0.3689).

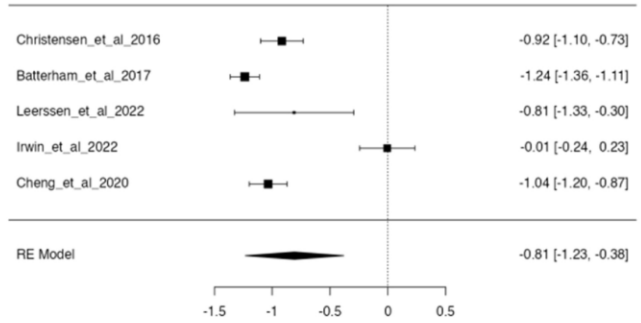


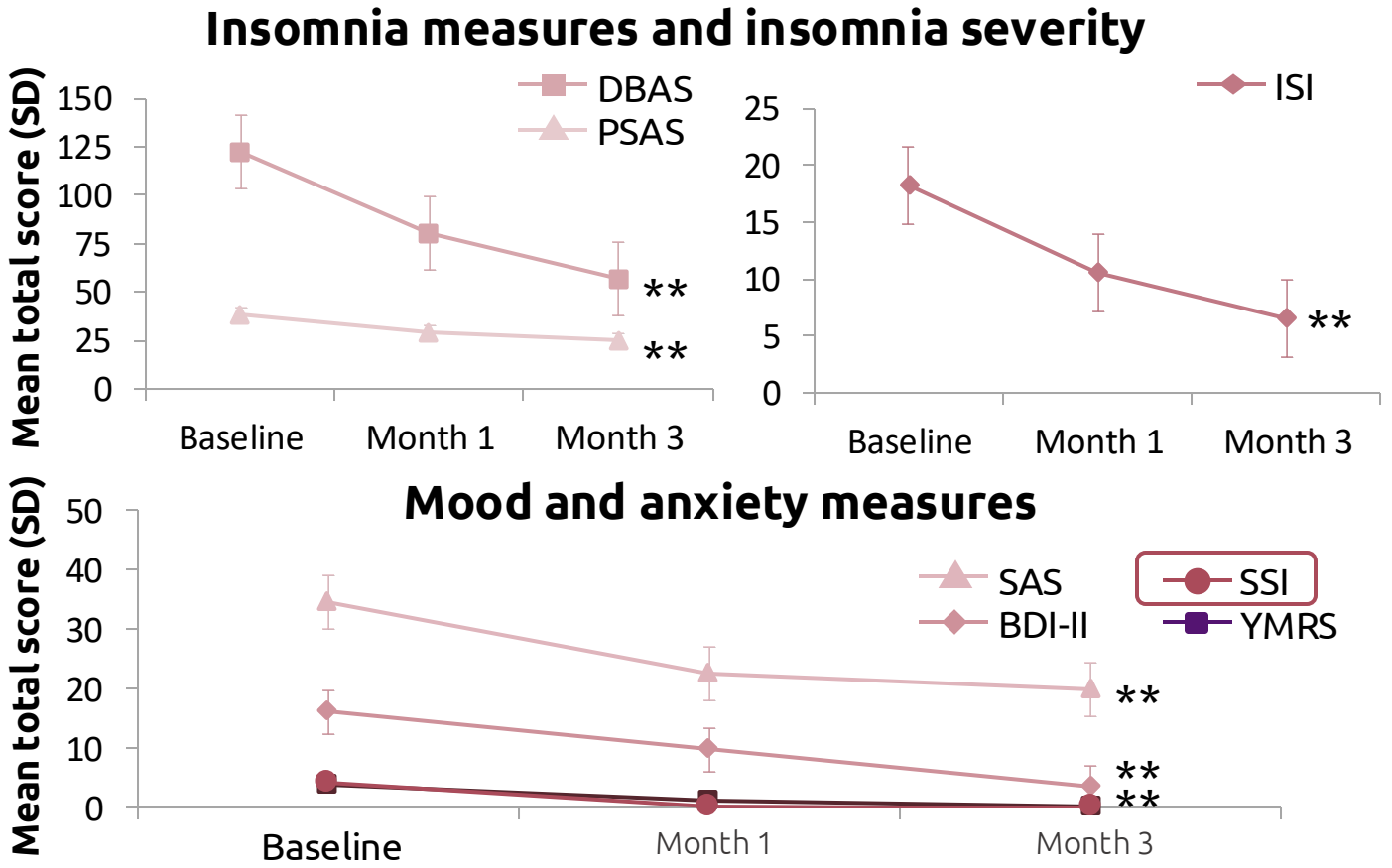

**Fig. 4.** Forest Plot for CBT-I on insomnia symptoms
CBT-I for insomnia was effective in reducing depressive and insomnia symptoms as well (z = −3.7126, p = 0.0002; RE Model = −0.8074 (95 % CI: 1.2336 to −0.3811); k = 5).

*(Palagini et al., Sleep Med, 2024)*

# Daridorexant significantly improved insomnia, mood, and anxiety symptoms

## Study characteristics

| | |
|---|---|
| Study design | Naturalistic observational, uncontrolled |
| Female (%) | 54 |
| Mean age (years ± SD) | 60.0 ± 13.6 |
| Observation period | 1 and 3 months |
| Patients | N = 66 |
| Daridorexant dose | 50 mg |
| Sedative hypnotic use disorder, n (%) | 24 (36.3) |
| Panic disorder (with anxiety), n (%) | 30 (45.4) |
| Unipolar/bipolar depression, n (%) | 32 (48.4) |




Analysis of variance; **P<0.001. N=66 at baseline and Month 1 only, at Month 3 N=60.
BDI, Beck Depression Inventory; DBAS, Dysfunctional Beliefs and Attitudes About Sleep Scale; ISI, Insomnia Severity Index; PSAS, Pre-Sleep Arousal Scale; SAS, Self-Rating Anxiety Scale; SD, standard deviation; SSI, Scale for Suicidal Ideation; YMRS, Young Mania Rating Scale.

(Palagini L et al, J Sleep Res. 2024)

International Journal of Clinical and Health Psychology 26 (2026) 100658

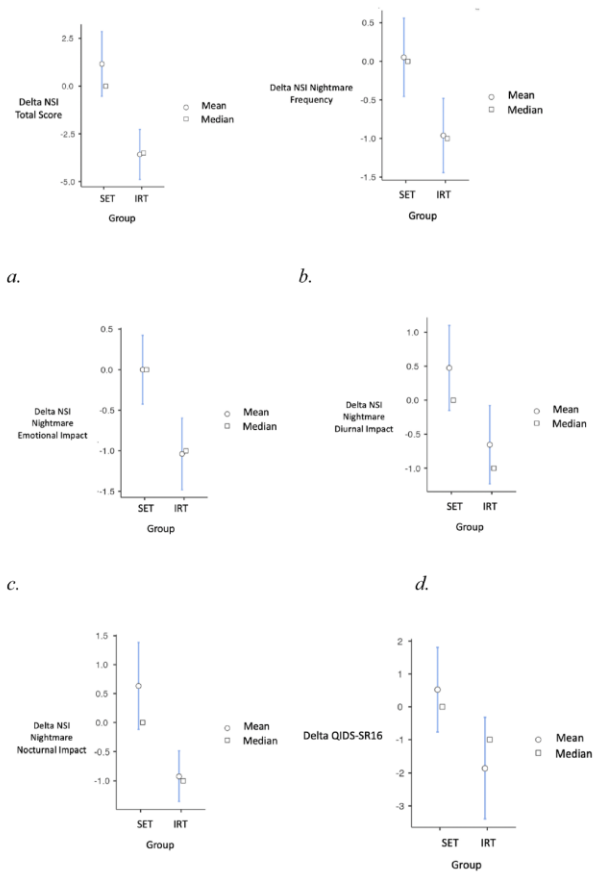
Contents lists available at ScienceDirect

International Journal of Clinical and Health Psychology

journal homepage: www.elsevier.es/ijchp

# Imagery Rehearsal Therapy (IRT) is associated with reduced nightmare severity and depressive, anxiety and suicidal symptoms in adults with Major Depressive Episode

Julia MARUANI [a,b,c,*], Nathan MARTINS [a,b,c], Emmanuelle CLERICI [c], Michel LEJOYEUX [a,b,c], Pierre A. GEOFFROY [a,b,c,*]




## Imagery Rehearsal Therapy (IRT) in Major Depressive Episode

**Adults with:**

- *Major Depressive Episode*
- *Nightmare Disorder*
- *High suicidal risk*

**Imagery Rehearsal Therapy (IRT)**

*4 weekly group sessions*

*Rescripting nightmares while awake*

**Sleep Education Therapy (SET)**
(waitlist control)

**Main Outcomes**

- **Nightmare severity**
  - Frequency
  - Emotional impact
  - Nocturnal impact
  - Daytime impact
- **Depressive symptoms**
- **Anxiety symptoms**
- **Suicidal ideation**

**Moderators:**

- *Treatment-resistant depression → greater emotional improvement*
- *Higher nightmare frequency → reduced response to IRT*

*Centre Chronos – Hôpital Bichat (Paris)*

*Non-randomized controlled study | n = 53*

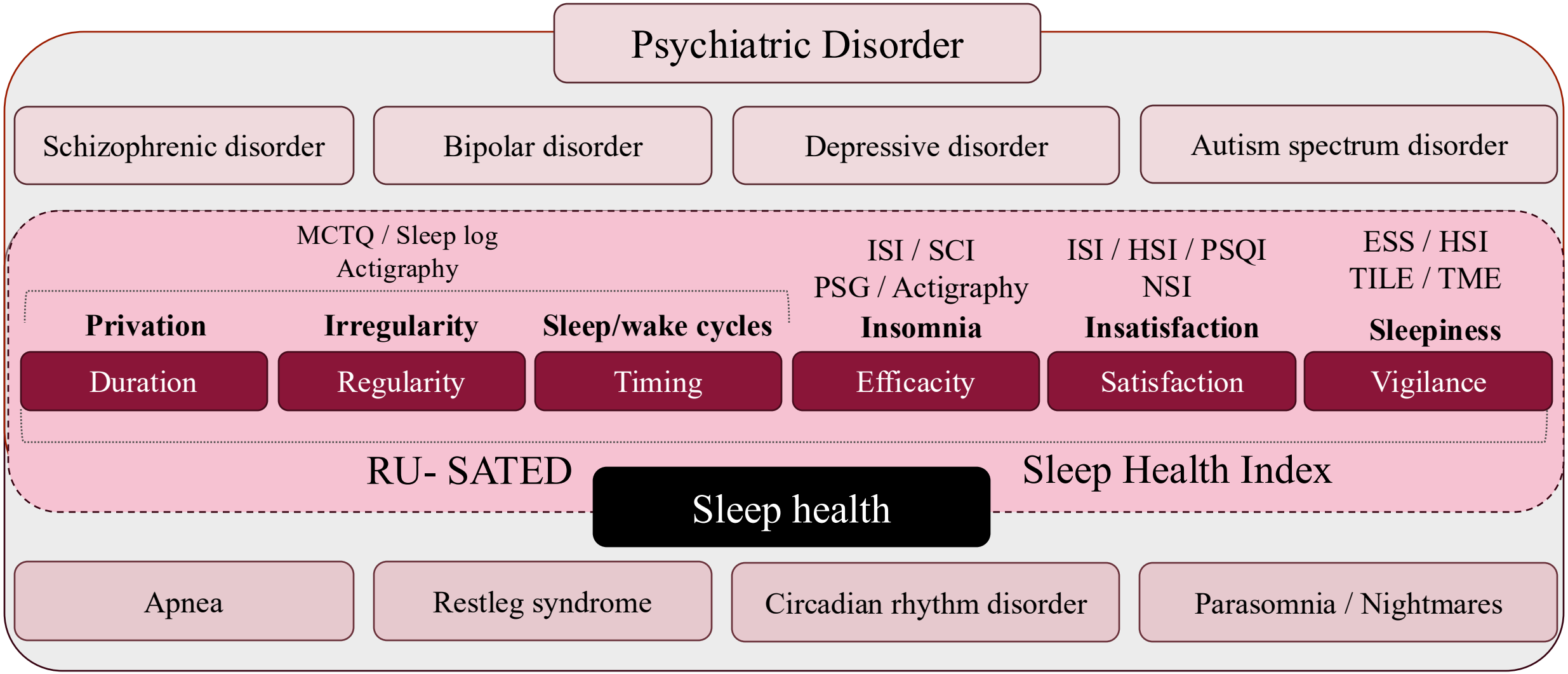
# Ongoing projects with a transdiagnostic approach in FACE Cohorts



- Sleep disturbances and subscores PSQI accross BS, CZ, TRD and relations with clinical and biological factors
- Better characterize daytime symptoms and sleepiness in SZ, BD and TRD, and the impact on psychiatric (including suicide) and non-psychiatric disorders (including metabolic alterations)
- Links between cognitive alterations and sleep disturbances (night and daytime symptoms including sleepiness)
- Anhedonia and Sleep
- Study longitudinal sleep trajectories and links with psychiatric progressions (trajectories, crosslag)
- Psychotropics impact on sleep and psychiatric symptoms

# Sleep as a transdiagnostic marker and intervention target in psychiatric health

Julien Coelho, Ludovic Samalin, Antoine Yrondi, Anton Iftimovici, Pierre Philip, Jean-Arthur Micoulaud-Franchi



# CONCLUSION

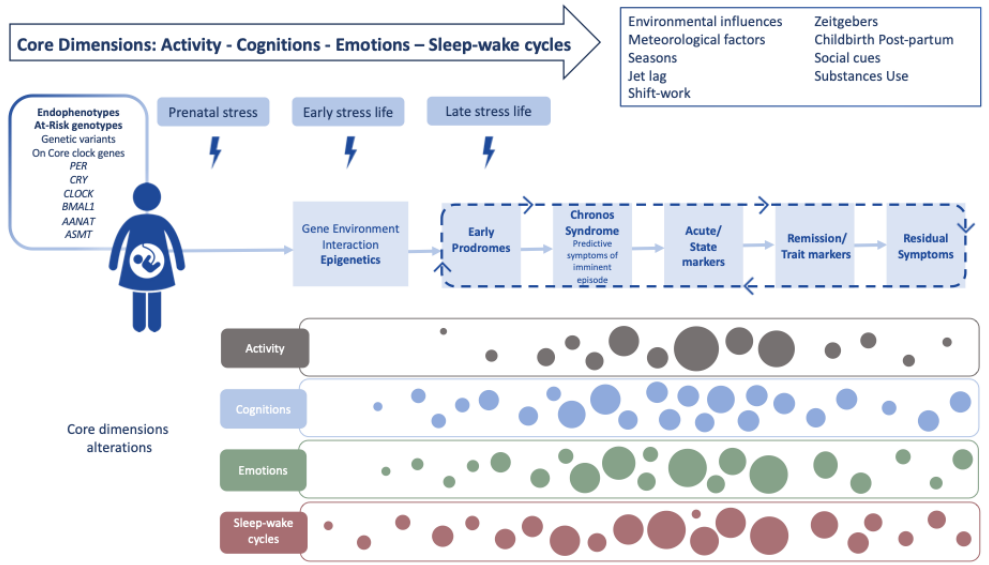
- **Alterations in sleep–wake cycles are present across all phases of mood disorders**: prodromes, transitions (**Chronos syndrome**), remission, recurrences, and progression → **a core dimension**

- **Characterizing this "sleep dimension"**

→ **enables truly personalized treatment approaches**

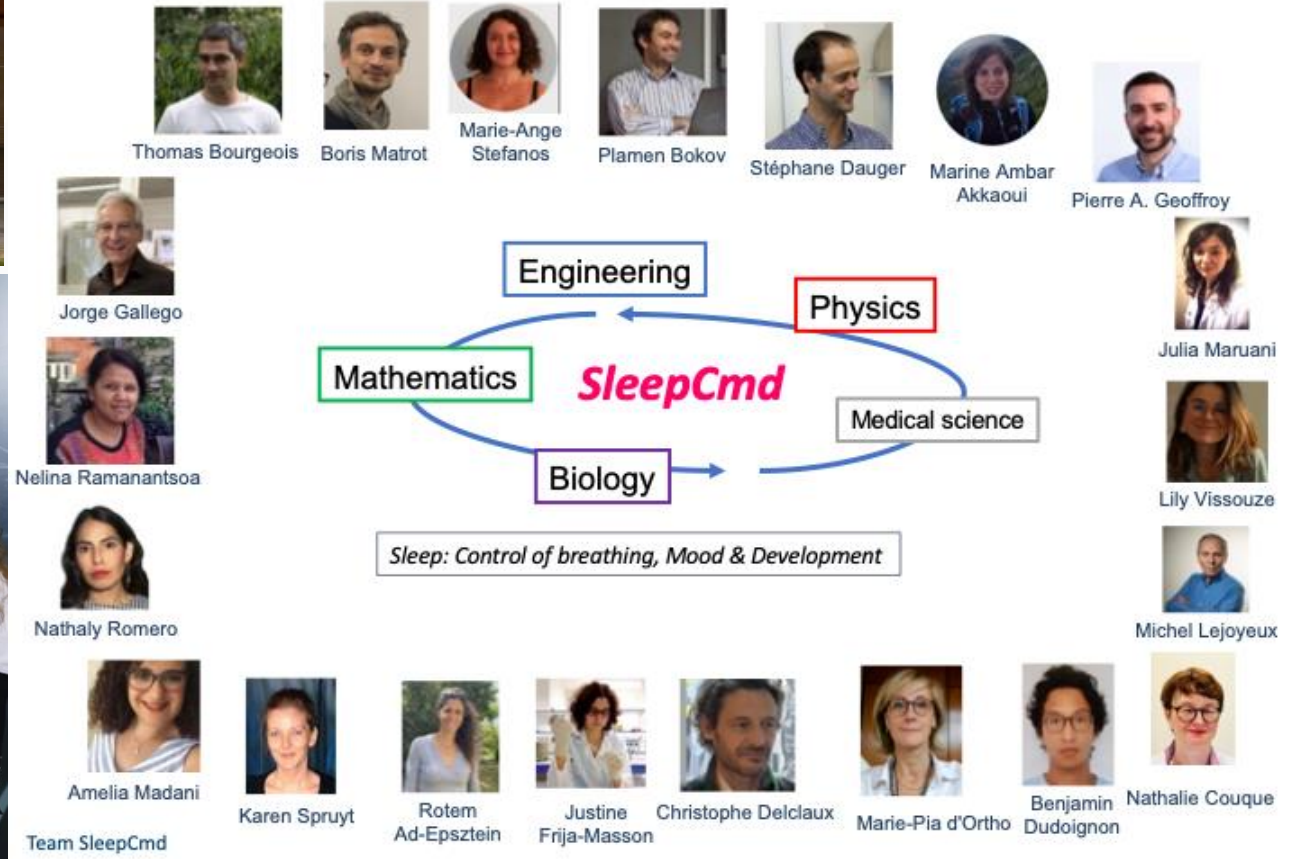
- **Targeting sleep**

→ **offers an opportunity for early intervention and relapse prevention**




*(Geoffroy PA & Maruani J, Biological Psychiatry, 2025)*

# Remerciements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# Factors associated with insomnia symptoms: A cross-sectional study during a Covid-19 fully restrictive lockdown

Nausicaa Christodoulou[1,2] | Léa Bertrand[2] | Laura Palagini[3] | Justine Frija-Masson[1,4,5] | Marie-Pia d'Ortho[1,4,5] | Michel Lejoyeux[1,2,6] | Dieter Riemann[7] | Julia Maruani[2,4] | Pierre A. Geoffroy[2,4,6,8]

J Sleep Res, 2022

| Variable | *p* | B | Odds ratio | 95 C.I. Lower | 95 C.I. Upper |
|---|---|---|---|---|---|
| (a) Variables included in the final BSLR model | | | | | |
| Older age | 0.06 | 0.14 | 1.15 | 0.99 | 1.33 |
| Female | 0.10 | 0.23 | 1.26 | 0.96 | 1.65 |
| Housing size $m^2$ (>100 $m^2$) | 0.03 | −0.264 | 0.77 | 0.60 | 0.98 |
| Sleeping in a noisy environment | 0.07 | −0.46 | 1.60 | 0.96 | 2.62 |
| Less regularity of sleep schedules | 0.00 | −0.22 | 1.25 | 1.18 | 1.32 |
| Longer screen exposure in the morning | 0.04 | 0.12 | 1.13 | 1.00 | 1.27 |
| Longer strong light exposure in the evening | 0.04 | 0.16 | 1.17 | 1.00 | 1.37 |
| HAD-anxiety scores | 0.00 | 0.22 | 1.24 | 1.19 | 1.29 |
| HAD-depression scores | 0.00 | 0.14 | 1.15 | 1.10 | 1.20 |

| Observed | Predicted: No insomnia | Predicted: Insomnia | % Correctly classified |
|---|---|---|---|
| (b) Classification table and summary statistics | | | |
| No insomnia | 614 | 187 | 76.77% |
| Insomnia | 230 | 589 | 71.92% |

*Note*: % of all participants correctly classified 74.26% – Chi-square = 533.534, df = 9; $p < 0.005$.

**TABLE 4** Backward stepwise logistic regression (BSLR) showing (a) the best combination of variables for correctly classifying study participants as insomniac or non-insomniac and (b) the overall classification rate by group

# Habitual sleep duration and health

Habitual sleep duration, if decreased <7 h or increased >8 h:

- ↑ mortality in the general population
  *(Cappuccio et al., Sleep, 2010)*
- ↑ diabetes, stroke, coronary artery disease, and myocardial infarction
  *(Nuyujukian et al., Sleep health, 2019 ; Yin et al., J Am Heart Assoc, 2017)*
- ↑ obesity (decreased sleep duration)
  *(Li et al., J Paediatr Child Health, 2017)*

# Sleep and mental health

## Habitual sleep duration and 12-month prevalences of Psyxchiatric disorders

Cohort representative of the US general population
(N = 36,309)

**Prevalence of psychiatric disorder**
<5H/night = 55%
7-8h = 28%
>9h = 48%

**Prevalence of mood disorder**
<5H/night = 23%
7-8h = 9%
>9h = 15%

**Prevalence of suicide attempt**
<5H/night = 11%
7-8h = 3%
>9h = 7%

Geoffroy PA et al,
J Psy Res, 2019

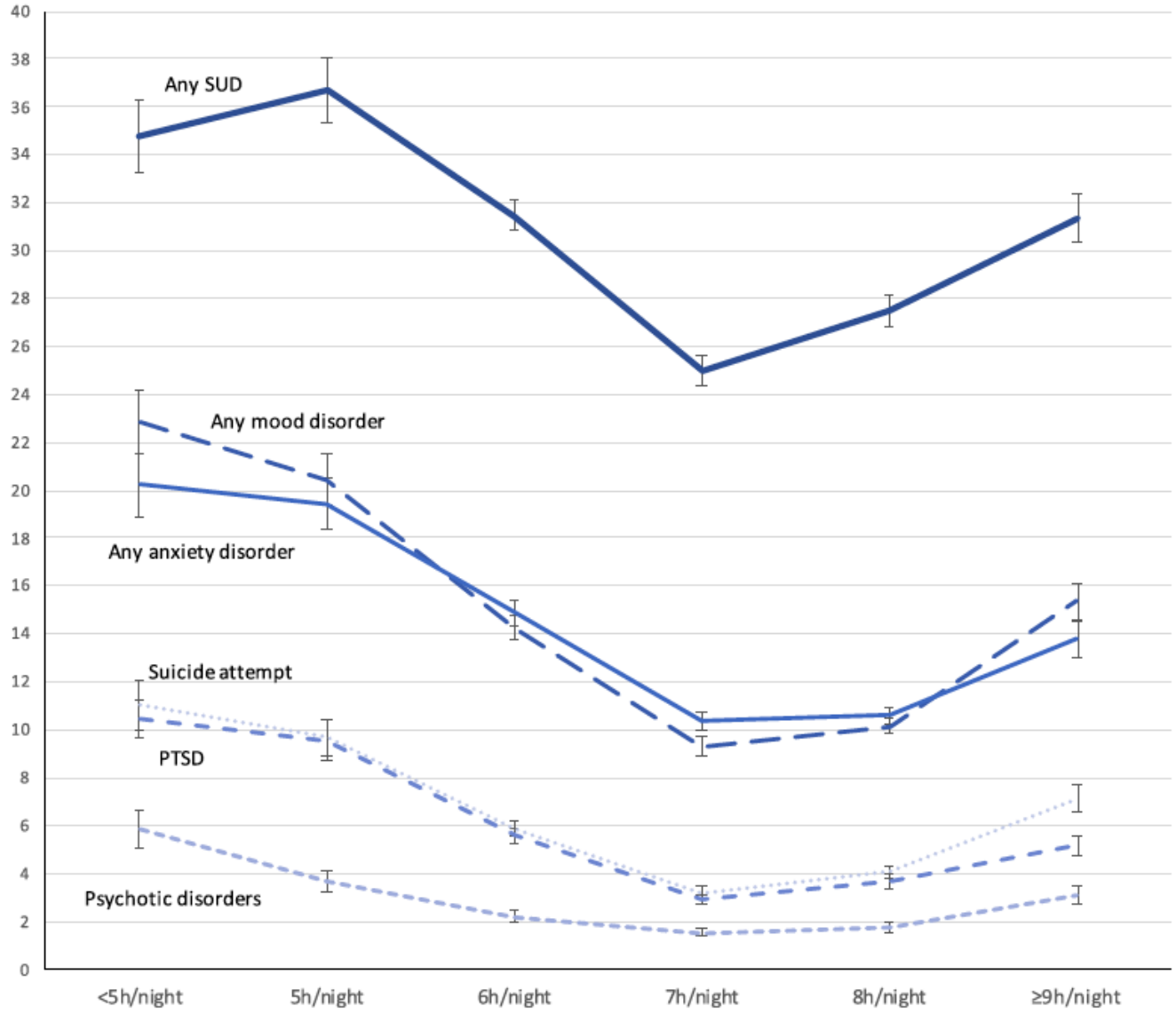


**Fig. 1. The 12-month prevalences of psychiatric and substance use disorders depending on the habitual sleep duration**
PTSD: Post-Traumatic Stress Disorder; SUD: Substance Use Disorder
"Any SUD" included alcohol use disorder, tobacco use disorder, and drug use disorder (cannabis, club drugs, cocaine, amphetamine, hallucinogen, heroin, opioid, sedative, tranquillizer, solvent or inhalant). "Any mood disorder" included major depressive disorder, bipolar disorder type I or II. "Any anxiety disorder included panic disorder, social phobia, specific phobia, generalized disorder. Psychotic disorder included schizophrenia or a psychotic illness or episode in the past 12 months. PTSD and suicide attempt were categories by their own.