

What is a sleep symptom?

A systematic analysis of generic self-reported screening questionnaires and of ICSD-3 and DSM-5 diagnostic criteria

J.-A. Micoulaud-Franchi¹, C. Gauld², R. Lopez³, V. Martin¹, P.-A. Geoffroy⁴, M. Montserrat¹, J. Coelho¹, S. Baillieux⁵, J.-L. Pepin⁵, P. Philip¹

1 - Université de Bordeaux, Bordeaux, France, 2 - Université de Lyon, Lyon, France, 3 - Université de Montpellier, Montpellier, France, 4 - Université de Paris, Paris, France, 5 - Université de Grenoble, Grenoble, France.

INTRODUCTION

Sleep disorders are defined based on **diagnostic criteria** presented in medical classifications.

However, no consensus has emerged nor on the exact **list of operational symptoms** that should be systematically investigated in the field of sleep medicine, nor on the organization of them and the relationship between symptoms.

METHODE

We propose:

- a **systematic analysis of sleep symptoms** that figure in a set of self-reported screening questionnaires adult populations, for multiple sleep disorders (generic questionnaires),
- a **specific exhaustive work on the general structure of the networks of symptoms of sleep disorders** as described in the following diagnostic manuals:
 - the third edition of the International Classification of Sleep Disorders (ICSD-3),
 - the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5).

The units of analysis (symptoms) were labelled from the item of generic and specific questionnaire and from the diagnostic criteria of the ICSD-3 and the DSM-5 using three rules ("Conservation", "Splitting", "Lumping").

The following analysis were performed:

- a **content overlap** (Jaccard Index) for symptoms extracted for generic questionnaires,
- a **network analysis** for symptoms extracted from diagnostic criteria of the ICSD-3 and the DSM-5.

RESULTS

12 self-reported multiple sleep disorder screening questionnaires in adults were investigated : SDQ: Sleep Disorder Questionnaire, ASQ: Auckland Sleep Questionnaire, HSDQ: Holland Sleep Disorders Questionnaire, SDS-CL-25: Sleep Disorder Symptom Checklist 25, PSQI: Pittsburgh Sleep Quality Index, ISDI: Iowa Sleep Disturbances Inventory, GSAQ: Global Sleep Assessment Questionnaire, SDS-CL-17: Sleep Disorder Symptom Checklist 17, SSC: Sleep Symptom Checklist, BNSQ: Basic Nordic Sleep Questionnaire, OSQ: Oviedo Sleep Questionnaire.

Figure 1 present the extracted symptoms and their frequency in all the questionnaires.

The mean overlap among questionnaires indicates heterogeneity (**Figure 2**).

The global measure of the sleep symptoms network shows that it can be considered as a small world in ICSD-3 and DSM-5 (**Figures 3 and 4**).

Daytime sleepiness and insomnia symptoms are the two most central sleep symptoms.

CONCLUSION

These results underline the need to standardize sleep symptom contents for sleep medicine in order to enhance the practicability, reliability, and validity of sleep disorder diagnoses.

Symptom network analysis provides a framework for better systematizing and organizing symptomatology in sleep medicine.

REFERENCES

Gauld C, Martin VP, Richaud A, Baillieux S, Vicente L, Perronat JL, Zreik I, Taillard J, Geoffroy PA, Lopez R, Micoulaud-Franchi JA. *Systematic Item Content and Overlap Analysis of Self-Reported Multiple Sleep Disorder Screening Questionnaires in Adults*. *J Clin Med*. 2023 Jan 20;12(3):852. doi: 10.3390/jcm12030852. PMID: 36769500; PMCID: PMC9918039.

Gauld C, Lopez R, Geoffroy PA, Morin CM, Guichard K, Giroux É, Dauvilliers Y, Dumas G, Philip P, Micoulaud-Franchi JA. *A systematic analysis of ICSD-3 diagnostic criteria and proposal for further structured iteration*. *Sleep Med Rev*. 2021 Aug;58:101439. doi: 10.1016/j.smrv.2021.101439. Epub 2021 Jan 26. PMID: 33596531.

Gauld C, Lopez R, Morin C, Geoffroy PA, Maquet J, Desvergnès P, McGonigal A, Dauvilliers Y, Philip P, Dumas G, Micoulaud-Franchi JA. *Symptom network analysis of the sleep disorders diagnostic criteria based on the clinical text of the ICSD-3*. *J Sleep Res*. 2022 Feb;31(1):e13435. doi: 10.1111/jsr.13435. Epub 2021 Jul 16. PMID: 34269498.

Gauld C, Lopez R, Morin CM, Maquet J, McGonigal A, Geoffroy PA, Fakra E, Philip P, Dumas G, Micoulaud-Franchi JA. *Why do sleep disorders belong to mental disorder classifications? A network analysis of the "Sleep-Wake Disorders" section of the DSM-5*. *J Psychiatr Res*. 2021 Oct;142:153-159. doi: 10.1016/j.jpsychires.2021.07.050. Epub 2021 Aug 1. PMID: 34359009.

CONTACT

Sleep Medicine Unit, University Hospital of Bordeaux, Place Amélie Raba-Leon, 33 076 Bordeaux, France; UMR CNRS 6033 SANPSY, University Hospital of Bordeaux, 33 076 Bordeaux, France.
Electronic address: jean-arthur.micoulaud-franchi@u-bordeaux.fr.



Figure 1. Number of symptoms identified in the 12 selected self-reported multiple sleep disorder screening questionnaires in adults organized from the most frequent to the least frequent for all categories of sleep symptoms.

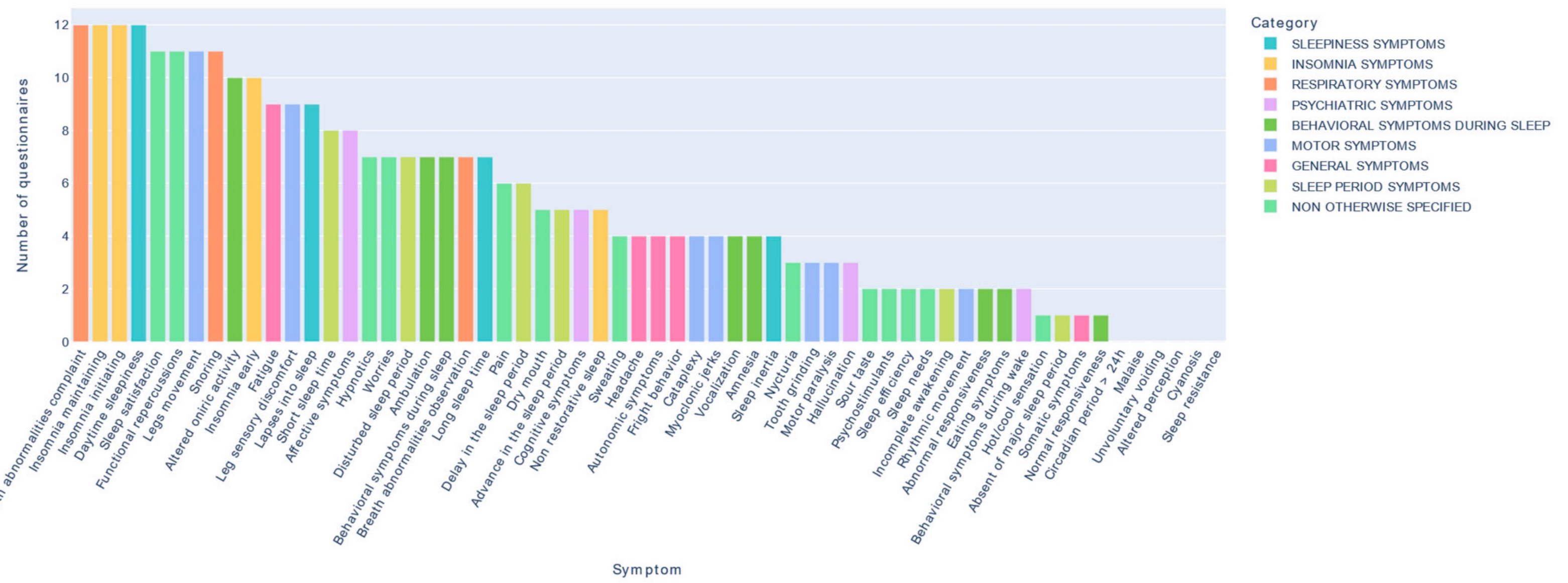
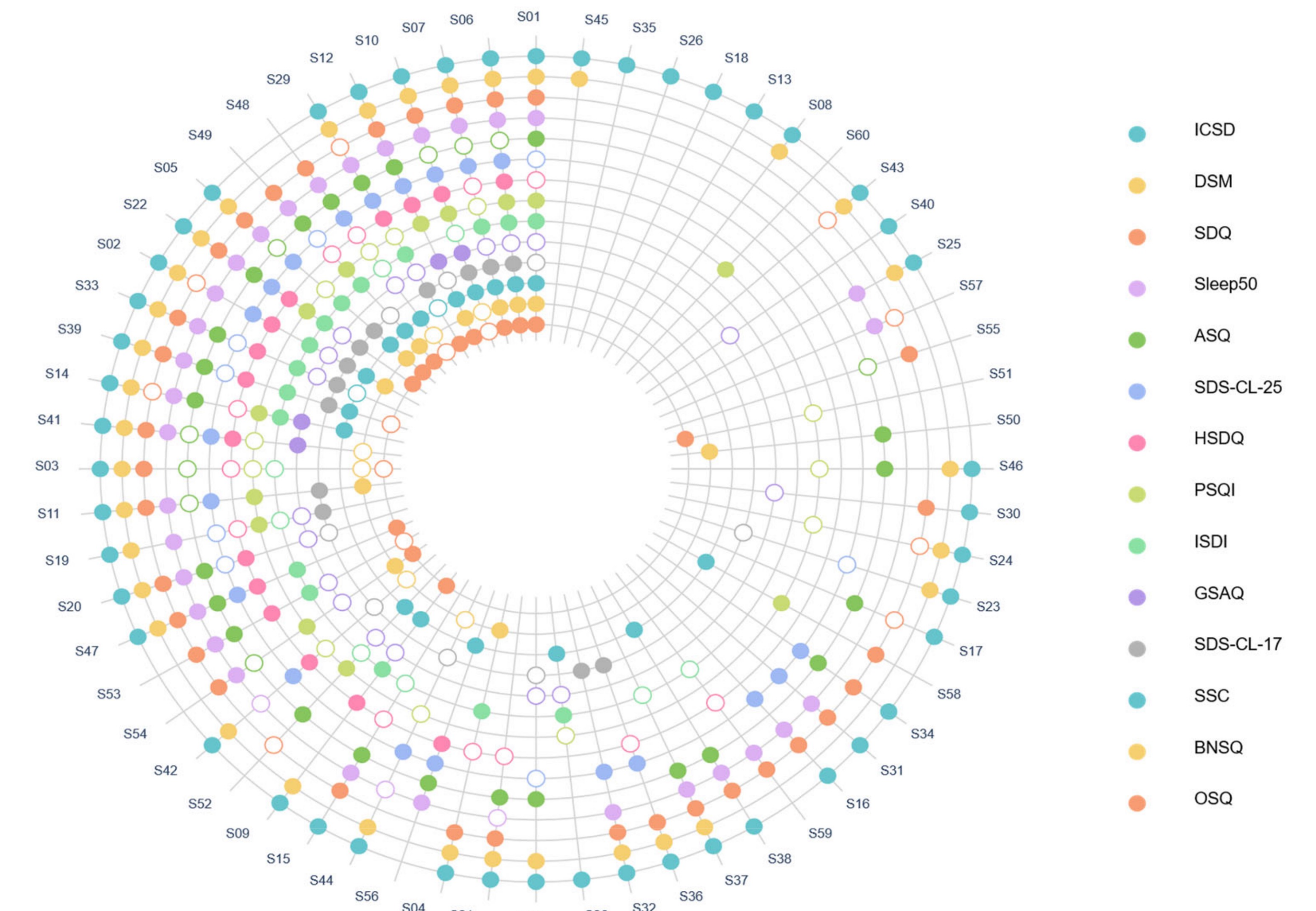


Figure 2. Content overlap of sleep symptoms in the 12 selected self-reported multiple sleep disorder screening questionnaires.



- | | | | | |
|--|--|--|---|--|
| Sleepiness Symptoms
S01 Daytime sleepiness
S02 Lapses into sleep
S03 Long Sleep Time
S04 Sleep Inertia | Insomnia Symptoms
S05 Insomnia - early
S06 Insomnia - initiating
S07 Insomnia - maintaining
S08 Sleep resistance
S09 Non restorative sleep | Respiratory Symptoms
S10 Breath abnormalities complaint
S11 Breath abnormalities observation
S12 Snoring
S13 Cyanosis | Psychiatric Symptoms
S14 Affective symptoms
S15 Cognitive symptoms
S16 Hallucinations
S17 Behavioral symptoms during wake
S18 Altered perception | Non otherwise specified
S48 Functional repercussions
S49 Sleep satisfaction
S50 Sleep needs
S51 Sleep efficiency
S52 Pain
S53 Worries |
| Behavioral symptoms during sleep
S19 Behavioral symptoms during sleep
S20 Ambulation
S21 Amnesia
S22 Altered orotic activity
S23 Eating symptoms
S24 Abnormal responsiveness
S25 Normal responsiveness
S26 Unvoluntary voiding
S27 Vocalizations - sleep | Motor Symptoms
S28 Myoclonic jerks
S29 Legs movement
S30 Rhythmic movement
S31 Motor paralysis
S32 Cataplexy
S33 Leg sensory discomfort
S34 Tooth grinding | General Symptoms
S35 Malaise
S36 Fright behavior
S37 Autonomic symptoms
S38 Headache
S39 Fatigue
S40 Somatic symptoms | Sleep period Symptoms
S41 Short Sleep time
S42 Delay period
S43 Absence of major sleep period
S44 Advance period
S45 Circadian period > 24h
S46 Incomplete awakening
S47 Disturbed sleep period | S54 Hypnotics
S55 Psycho-stimulants
S56 Dry mouth
S57 Sour taste
S58 Nycturia
S59 Swallowing
S60 Hot cool sensation |

Figure 3. Symptom network of ICSD-3.

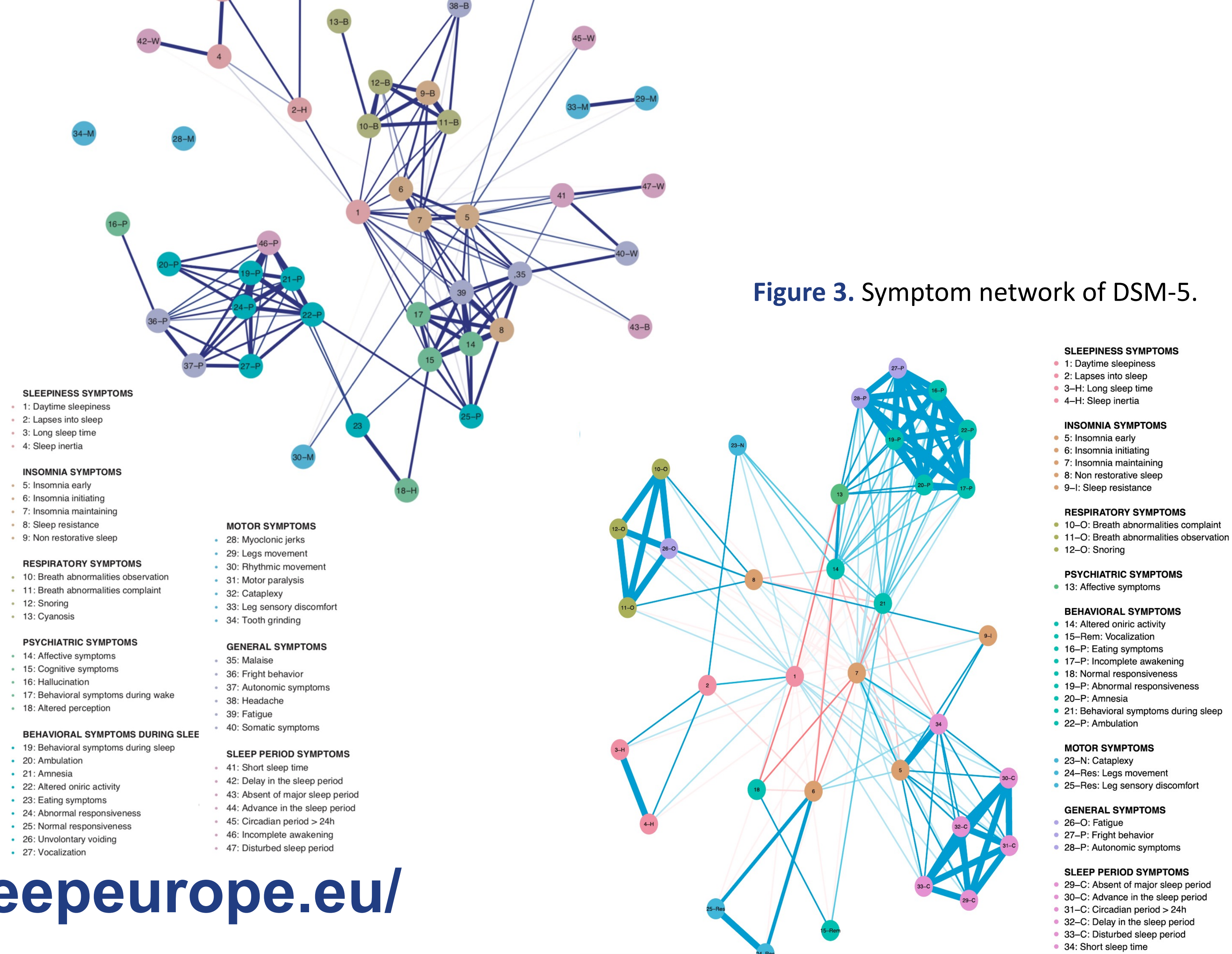


Figure 3. Symptom network of DSM-5.

- | | | | | | | | | |
|---|---|--|--|---|--|--|--|---|
| SLEEPINESS SYMPTOMS
1: Daytime sleepiness
2: Lapses into sleep
3: Long sleep time
4: Sleep inertia | INSOMNIA SYMPTOMS
5: Insomnia early
6: Insomnia initiating
7: Insomnia maintaining
8: Sleep resistance
9: Non restorative sleep | RESPIRATORY SYMPTOMS
10: Breath abnormalities observation
11: Breath abnormalities complaint
12: Snoring
13: Cyanosis | PSYCHIATRIC SYMPTOMS
14: Affective symptoms
15: Cognitive symptoms
16: Hallucinations
17: Behavioral symptoms during wake
18: Altered perception
19: Behavioral symptoms during sleep | BEHAVIORAL SYMPTOMS DURING SLEEP
20: Ambulation
21: Amnesia
22: Altered orotic activity
23: Eating symptoms
24: Abnormal responsiveness
25: Normal responsiveness
26: Unvoluntary voiding
27: Vocalization | MOTOR SYMPTOMS
28: Myoclonic jerks
29: Legs movement
30: Rhythmic movement
31: Motor paralysis
32: Cataplexy
33: Leg sensory discomfort
34: Tooth grinding | GENERAL SYMPTOMS
35: Malaise
36: Fright behavior
37: Autonomic symptoms
38: Headache
39: Fatigue
40: Somatic symptoms | SLEEP PERIOD SYMPTOMS
41: Short sleep time
42: Delay in the sleep period
43: Absent of major sleep period
44: Advance in the sleep period
45: Circadian period > 24h
46: Incomplete awakening
47: Disturbed sleep period | NON OTHERWISE SPECIFIED
48: Functional repercussions
49: Sleep satisfaction
50: Sleep needs
51: Sleep efficiency
52: Pain
53: Worries
54: Hypnotics
55: Psycho-stimulants
56: Dry mouth
57: Sour taste
58: Nycturia
59: Swallowing
60: Hot cool sensation |
|---|---|--|--|---|--|--|--|---|