De la prévalence aux réseaux de symptômes :

Mesures, modèles et complexité de la santé mentale étudiante

Les Mardis de la Sorbonne

« La santé mentale des étudiants : périmètre, réalités, perspectives »

Mardi 31 Mars 2026
9h30-12h

Yannick Morvan
Pr. Psychologie Clinique / Psychologue Clinicien

Université Paris Nanterre · Clipsyd · Observatoire National de la Vie Étudiante · cesp · Inserm

I. Un enjeu de société ?

II. Des problèmes des mesures

III. Exemple sur des données étudiantes

IV. Des problèmes avec les modèles et les théories

V. La complexité, une voie de progrès ?

VI. Retour sur les données étudiantes

Contexte International

- Poids des troubles psychiatriques en 30 ans : de la 13e à la 7e place *(GBD, 2019)*
- Augmentation de 25% de l'anxiété et de la dépression suite COVID *(OMS, 2022)*
- Commission du Lancet Psychiatry sur la santé mentale des jeunes :
  « *le plus mauvais accès aux soins sur l'ensemble de la durée de vie* »
- Etude sur 14 000 étudiants de 1ère année / 8 pays :
  31% de troubles psychiques avec **25%** de recours aux soins / 12 mois
  (Bruffaerts et al. 2019)
- Si un problème émotionnel survenait **50%** préfèrent « *gérer le problème tout seul* » ou « *en parler avec des amis ou des proches* » plutôt qu'à un professionnel de santé mentale *(Ebert et al. 2019)*

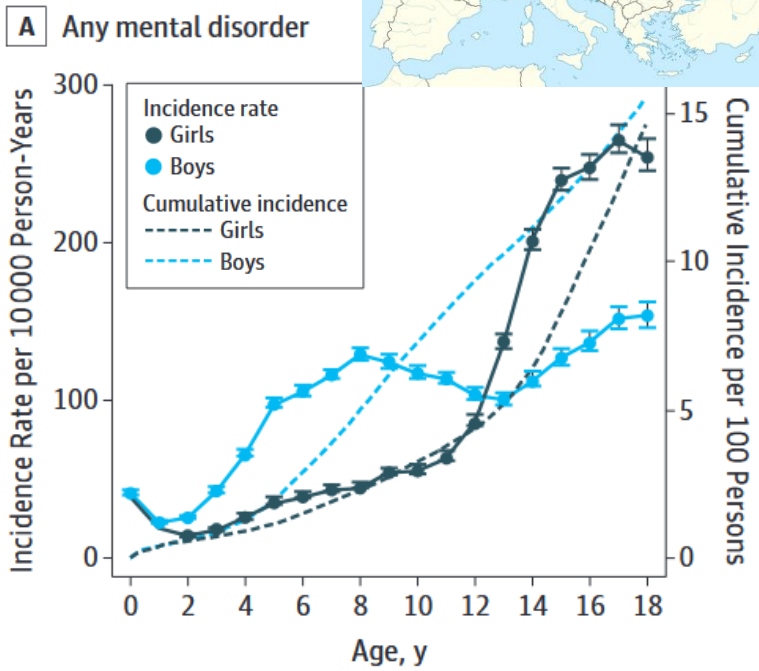
Contexte International

- Des troubles qui débutent tôt : 2/3 avant 24 ans

⇒ Influence sur les trajectoires de vies *(Solmi et al., 2021)*

- Des troubles fréquents : 15% / vie de la population à 18 ans (Danemark)

⇒ Mesure sur la population entière



Dalsgaard, et al (2019). Incidence Rates and Cumulative Incidences of the Full Spectrum of Diagnosed Mental Disorders in Childhood and Adolescence. *JAMA Psychiatry*, 1-10. https://doi.org/10.1001/jamapsychiatry.2019.3523

Contexte International

Thomas Insel
Neuroscientist and psychiatrist

How Suicide Quietly Morphed Into a Public Health Crisis

The New York Times

By Benedict Carey

La différence de prise en compte de la santé mentale par rapport aux autres champs de la santé publique et de la médecine est « *honteuse* »

Contrairement aux homicides ou aux accidents de la route, « *personne n'est tenu responsable, personne n'est en charge de prévenir ces morts, personne n'est viré* » si les chiffres du suicide augmentent.

« *c'est la qualité des soins et non la quantité qui compte* » et que « *nous avons besoin de plus d'accès, de meilleures mesures et d'une meilleure qualité des soins* ».

https://www.nytimes.com/2018/06/08/health/suicide-spade-bordain-cdc.html

Contexte Français

La dégradation de la santé mentale des jeunes (18-24 ans)

- Doublement des épisodes dépressifs sur les 12 derniers mois entre 2010, 2017 et 2021 (≈10%, 11,7 % → 20,8 %) et 21,5 % en 2024*
- De même pour la prévalence des idées suicidaires sur les 12 derniers mois chez les 18-24 ans (5,6 % → 9,4 %) *(Leon et al., 2024-2025)*

Population étudiante :

- Taux de détresse psychologique élevés, post-pandémie (Données OVE)
- Dépression 12 derniers mois entre 2016 et 2024 (14,8 % → 24,6 %**)
- Idéations Suicidaires 12 derniers mois (8,4 % → 16,1 %**)

**Données SPF*

***Données BSE24 en cours d'analyses*

https://www.santepubliquefrance.fr/maladies-et-traumatismes/sante-mentale/depression-et-anxiete/documents/rapport-synthese/episodes-depressifs-prevalence-et-recours-aux-soins.-barometre-de-sante-publique-france-resultats-de-l-edition-2024

Contexte Français

- Les troubles psychiatriques représentent près de 28 milliards d'euros de dépenses directes en 2023, soit autant que le cancer
  https://sante.gouv.fr/IMG/pdf/dp_sante_mentale_et_psychiatrie_-_3_mars_2023.pdf

- Coûts indirects (perte de productivité, impact sur les proches, désinsertion sociale) : on atteint près de 160 milliards d'euros par an, environ 7 % du PIB
  https://s3-eu-west-1.amazonaws.com/static.hospimedia.fr/documents/217166/7237/Cou%CC%82t_des_maladies_psychiatriques_en_France_2018_-_Laeticia_BLAMPAIN_-_13_oct_2021.pdf

- NB Argument sur le retour économique positif de la prévention *(McDaid et al. 2019)*

- Une évolution de la prise en compte de la santé mentale des jeunes depuis la COVID

I. Mesures

At Bergen Community College in Paramus, N.J., the demand for therapy has exploded. Bryan Anselm for The New York Times

Another Surge in the Virus Has Colleges Fearing a Mental Health Crisis

After almost two years of remote schooling, restricted gatherings and constant testing, many students are isolated and depressed. Omicron may make things worse.

Give this article

By Anemona Hartocollis

Dec. 22, 2021

2021

ÉLYSÉE Actualités Agenda Présidence Élysée Écrire au Président Lettre d'information

Échanges du Président Emmanuel Macron avec des étudiants du campus de l'université Paris-Saclay.

Publié le 21 janvier 2021

Fait partie du dossier : Liberté. Fraternité. Égalité des chances.

Depuis le campus de l'université Paris-Saclay, le Président de la République a échangé avec une dizaine d'étudiants issus de diverses filières.

Particulièrement éprouvés par les impacts de la crise de la COVID-19, les étudiants sont nombreux à avoir exprimé leur mal-être ces dernières semaines.

Les étudiants, une population particulièrement fragile psychiquement

Le Monde

MERCREDI 13 JANVIER 2021

DES PLATEAUX TÉLÉ aux matinales radio, le mal-être des jeunes a été largement documenté depuis le début de l'épidémie liée au coronavirus. Solitude exacerbée face à la persistance des cours à distance, précarité

sondés se sont sentis *« si découragés que rien ne pouvait leur remonter le moral »* et 50 % d'entre eux ont déclaré avoir souffert de solitude ou d'isolement pendant le confinement.

Lorsqu'il y a « mort sociale » d'une

soudaine à la question de l'autonomie. *« Leur vie n'est pas réglée, et ils font face à de multiples facteurs de vulnérabilisation,* souligne le psychologue clinicien Yannick Morvan, membre de l'OVE. *C'est toujours une période où l'on se*

peut faire déborder le vase, mais le vase était déjà rempli d'épisodes douloureux. *« Et nous n'avons pas tous la même contenance de vase »*, rappelle Charles-Edouard Notredame, psychiatre de l'enfant et de l'adolescent. De multiples

OBSERVATOIRE NATIONAL DE LA VIE ÉTUDIANTE

Recours aux soins

Recours aux soins en fonction de la détresse psychologique

Bases comparées : Enquête santé des étudiants (ESE16) et enquête pendant la Crise sanitaire (Crise21)

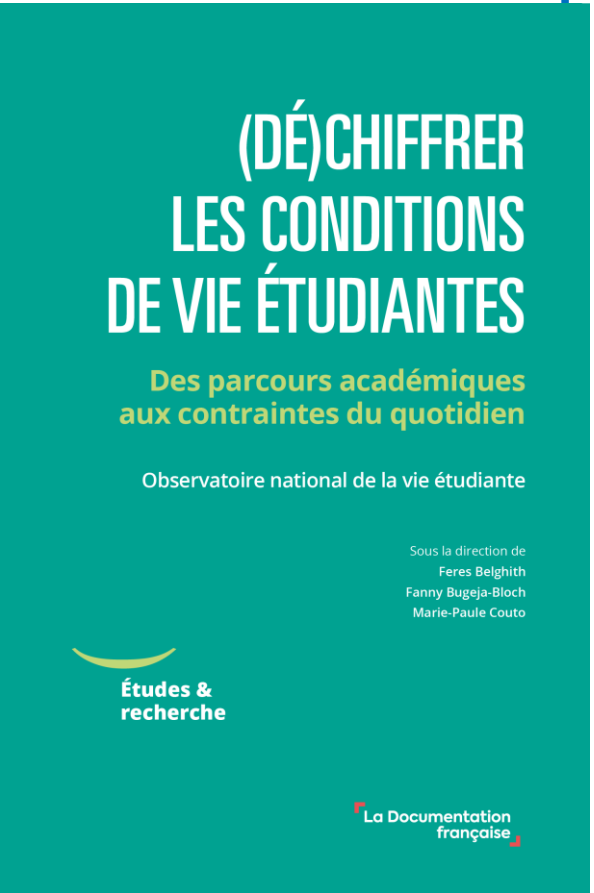
Recours pour raison psychologiques (12 derniers mois)	ESE (2016)			Crise sanitaire (2021)		
	Échantillon	MHI5-45	MHI5-Clinique	Échantillon	MHI5-45	MHI5-Clinique
Professionnels de santé[1]	**20,4%, (3 433)**	**37,5%, (1 388)**	**42,7%, (239)**	**23,6%, (1 136)**	**35,4%, (591)**	**43,6%, (150)**
Généraliste	12,1%, (2 032)	24,4%, (904)	28,5%, (160)	9,4%, (460)	16,6%, (281)	22,0%, (76)
Psychologue	6,4%, (1 085)	12,8%, (472)	16,5%, (92)	12,9%, (631)	19,9%, (337)	26,2%, (91)
Psychiatre	3,9%, (657)	8,3%, (308)	10,9%, (61)	5,4%, (262)	8,9%, (150)	11,3%, (39)
Services[2]	**14,4%, (2 436)**	**26,9%, (997)**	**31,1%, (175)**	**15,1%, (735)**	**26,0%, (438)**	**31,1%, (107)**
Services de santé, de médecine universitaire, BAPU	1,9%, (314)	3,9%, (145)	5,8%, (32)	3,7%, (178)	6,8%, (115)	7,9%, (27)
Chèque psy				1,6%, (77)	2,9%, (50)	5,3%, (18)
Ligne d'écoute	0,6%, (108)	1,3%, (49)	1,3%, (8)	1,6%, (77)	2,9%, (49)	4,5%, (15)

[1] un psychiatre, un psychologue, un médecin généraliste ou spécialiste, un thérapeute, un.e infirmier.e

[2] d'un hôpital, d'une association, d'un centre, d'une ligne téléphonique, d'un site internet ou autre service

Facon-Barillot et al. (2023)

Recours aux professionnels de santé mentale



Recours dans l'année au *Psychologue ou Psychiatre* & Détresse Psychologique :

Jamais (MHI5-45) : 67%

Jamais (MHI5-Clinique) : 57%

Inquiétant !

NB Recours possibles pour des motifs autres que la détresse psychologique (notamment chez le *Généraliste*)

Dépression dans l'année & recours dans l'année pour motif de santé mentale** :

- 22% à un psychiatre
- 34% à un généraliste
- 38% à un psychologue

***Données BSE24 en cours d'analyses*

I. Un enjeu de société ?

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Mesure & Santé mentale…

imgur.com/gallery/GptT6FZ

Définition de la santé mentale

A) La santé mentale c'est quoi ?

1. L'absence de troubles psychiques ?

⇒ ≈ 400 troubles recensés (https://fr.wikipedia.org/wiki/Liste_des_troubles_mentaux)

⇒ les enquêtes risquent d'être longues…

2. La définition de l'OMS de la santé ?

⇒ « un état de complet bien-être physique, mental et social »
(https://www.has-sante.fr/upload/docs/application/pdf/2018-03/presentation_generale_rbpp_sante_mineurs_jeunes_majeurs.pdf)

⇒ santé mentale = pas de trouble + bien être

⇒ les enquêtes risquent d'être encore plus longues…

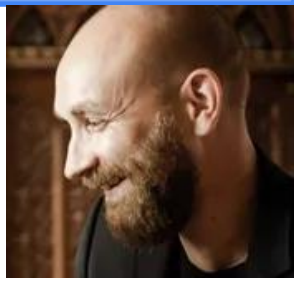
Définition de la santé mentale

A) La santé mentale c'est quoi ?

- Limites des définitions traditionnelles (OMS) → Définition de Galderisi et al. (2015) :

« *État dynamique d'équilibre interne permettant à l'individu d'utiliser ses capacités en harmonie avec les valeurs universelles de la société.* »

- Enjeux : dépasser la vision du « bien-être » pour inclure la résilience et l'adaptation → **ASPECT DYNAMIQUE !**



Quelques problèmes…

Journal of Affective Disorders 208 (2017) 191–197

Contents lists available at ScienceDirect

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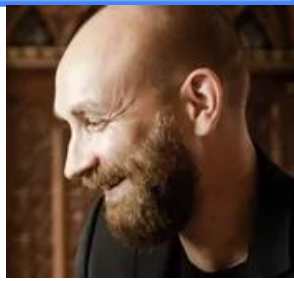
Research paper

The 52 symptoms of major depression: Lack of content overlap among seven common depression scales

Eiko I. Fried

University of Amsterdam, Department of Psychology, Nieuwe Achtergracht 129-B, room G0.28, 1001NK Amsterdam, The Netherlands

Combien d'outils de mesures ont été recensés pour la Dépression ?



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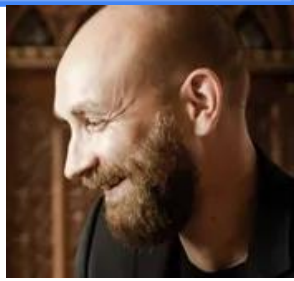

Trop de thermomètres ≠ ?

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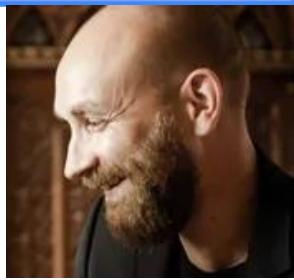
Pour les 7 échelles les plus utilisées

⇒ 125 questions / **52 symptômes ≠**

% de symptômes en commun ?



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12% de symptômes en commun

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Des mesures de la dépression en France

Etudiants / jeunes adultes (15-24) (non exhaustif)

Etude	Année	N=	%rep	%prev	Période	Echelle	Seuil
OVE	2016	18 875	19%	**15%**	12 mois	CIDI-SF	NA (algo)
Whatelet et al.	2020	69 054	4%	**16%**	4 sem	BDI13	>15
Essadek & Rabeyron	2020	8 004	13%	**43%**	2 sem	PHQ9	≥10
CONFINS (Macalli et al.)	2020 (17/03-11/05)	1 487	NA (Suivi)	36%	2 sem	PHQ9	10 (≥?)
CONFINS* (Macalli et al.)	2020 (17/05-27/10)	516	NA (Suivi)	27%	2 sem	PHQ9	10 (≥?)
CONFINS* (Macalli et al.)	2020-21 (28/10-25/01/21)	454	NA (Suivi)	**54%**	2 sem	PHQ9	10 (≥?)
EPICOV (jeunes 15-24)	2020	1 982	38% (pop total)	22%	2 sem	PHQ9	NA (algo)
FONDAMENTAL (jeunes 18-24)	2020	356	NA (panel)	21%	2 sem	PHQ9	>15
UPJV MPU	2020	3 139	10%	33%	Actu	HAD-D	>10
RENNES	2020	784	18%	23%	4 sem	HAD-D	>10

* Etude longitudinale, inclusions ouvertes

-- Pré, 1er & 2nd confinement

Quelques problèmes…

7 études 9 résultats (1 étude longitudinale)

1. **Mesures: 3 outils ≠ & seuils ≠ (même outil)**
   ≈ 5-6 mesures ≠ & 3 périodes ≠ (Actu / 15j / 1 mois)

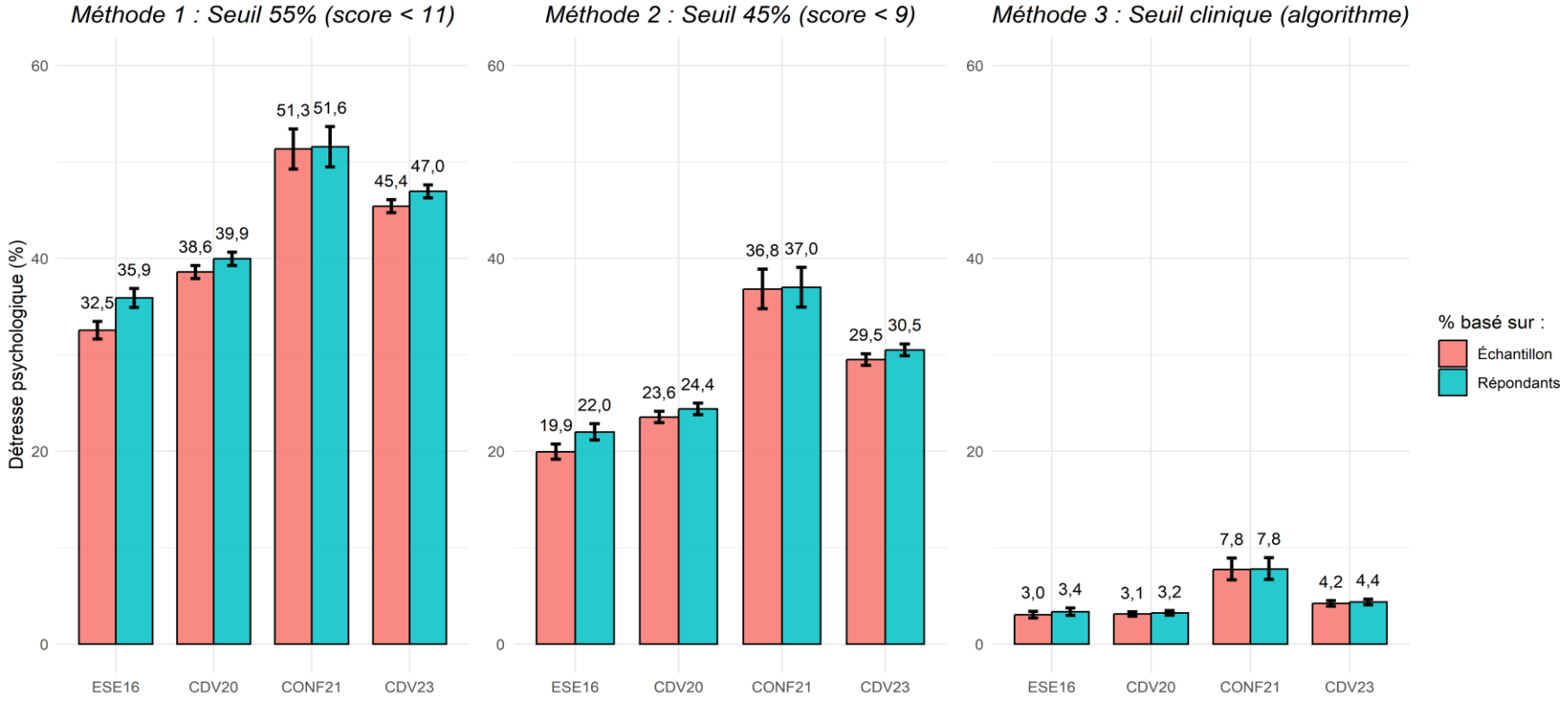
(NB il existe aussi des mesures sur 6 mois, 1 an, la vie entière)

2. **Echantillons : 69 054 à 356 personnes**
   (avec des méthodes ≠ de recrutement)

3. **%Répondants: 4 à 38% (lorsque l'info est donnée…)**

⇒ **% Dépression : 16 à 54%**

Détresse Psychologique des Etudiants (MHI-5)



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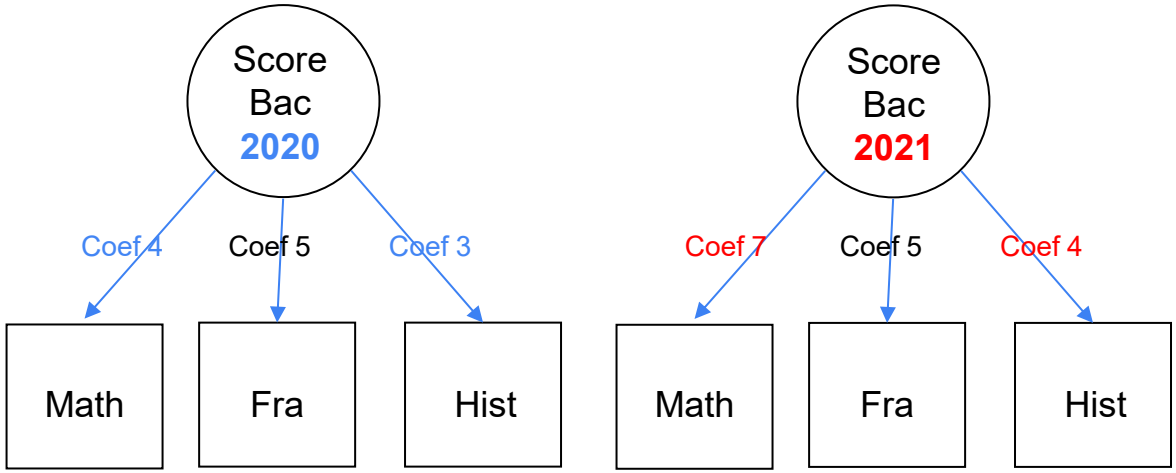
Facon-Barillot, Romo & Morvan (2025)

Invariance de Mesure ?



Si le poids des réponses change
alors les notes (scores) ne sont pas comparables !!!

(NB cet exemple est une simplification grossière)

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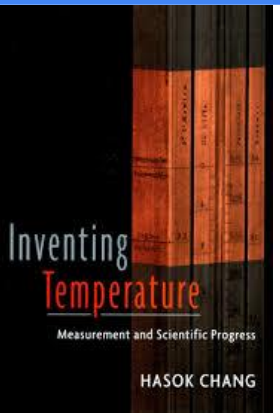


Des mesures à la théorie

Theory & Psychology

Article

Heating up the measurement debate: What psychologists can learn from the history of physics

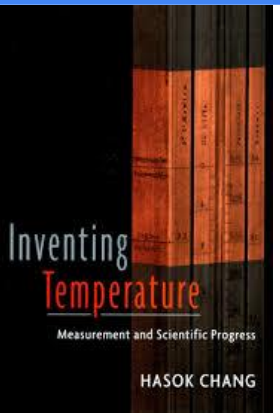
Theory & Psychology
2016, Vol. 26(1) 27–43

DOI: 10.1177/0959354315617253
tap.sagepub.com
SAGE

Laura F. Bringmann
University of Leuven

Markus I. Eronen*
University of Leuven

"A *bien des égards,* ***la situation de la pratique de la recherche en psychologie ressemble à celle de la mesure de la température à la fin du XVIIIe siècle et au début du XIXe siècle*** *: l'accent est mis sur des critères tels que la fiabilité et l'invariance, ainsi que sur des études corrélationnelles et purement empiriques, au détriment de la construction de théories ou de la spéculation théorique.*"



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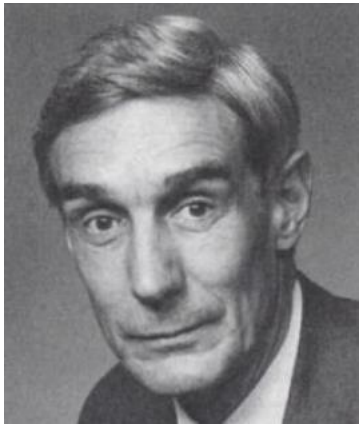
Une illusion confortable ?

« Although ubiquitous in both medical and lay discourse, the term "disease" has no unambiguous, generally accepted definition. However, as Scadding (25) pointed out, most of those using this term "allow themselves the comfortable delusion that everyone knows what it means." »

La plupart de ceux qui utilisent le terme de maladie s'autorisent l'illusion confortable que tout le monde comprend de quoi il s'agit.

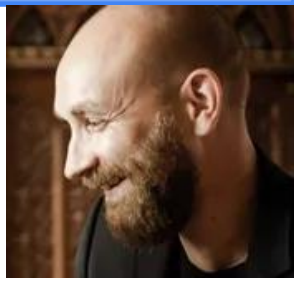


Kendell, R., & Jablensky, A. (2003). Distinguishing between the validity and utility of psychiatric diagnoses. *Am J Psychiatry, 160*(1), 4-12.

Nosographie : les classifications diagnostiques sont utiles ! (et j'insiste sur l'utilité) Mais…

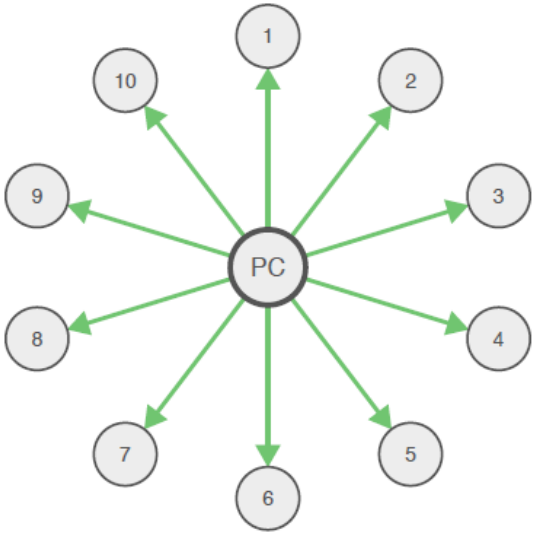
HEALTH PSYCHOLOGY REVIEW, 2017
VOL. 11, NO. 2, 130–134
http://dx.doi.org/10.1080/17437199.2017.1306718

Que mesurons-nous ?



What are psychological constructs? On the nature and statistical modelling of emotions, intelligence, personality traits and mental disorders

Eiko I. Fried



Reflective Model

Modèle (Bio-médical ?) de la cause commune

Exemple : la neurosyphilis

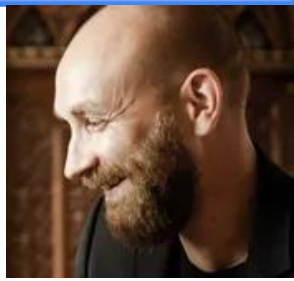
⇒ Bactérie *Treponema pallidum* dans le cerveau des patients

⇒ Explique les symptômes divers (délire et démences, troubles moteurs, labilité émotionnelle)

⇒ Un traitement par pénicilline (qui agit sur la cause commune)

⇒ Les symptômes n'interagissent pas et sont uniquement reliés par la cause commune

Que mesurons-nous ?



https://www.youtube.com/watch?v=DZf8VHM1pHI

TABLE 1. Historical Origins of the Symptomatic Criteria for Major Depression: Criteria Proposed 1950–1980

	Study Authors or Criteria Set, Year			
Stone and Burris (15), 1950	**Cassidy et al. (11), 1957**	**Feighner et al. (1), 1972**	**Research Diagnostic Criteria, 1975**	**DSM-III Criteria, 1980**
Feeling depressed	Depressed mood	Dysphoric mood	Dysphoric mood	Dysphoric mood
Sleeplessness	Insomnia	Sleep difficulty (insomnia or hypersomnia)	Sleep difficulty or sleeping too much	Insomnia or hypersomnia
Appetite loss	Anorexia	Poor appetite or weight loss	Poor appetite or weight loss; or increased appetite and weight gain	Poor appetite or weight loss; or increased appetite and weight gain
Weight loss	Weight loss			
Agitation	Wringing hands, pacing	Agitation or retardation	Psychomotor agitation or retardation	Psychomotor agitation or retardation
Self-deprecation		Self-reproach, guilt	Self-reproach or guilt	Worthlessness, self-reproach or guilt
Psychomotor retardation	Slowed thinking			
	Loss of concentration	Diminished ability to think or concentrate	Diminished ability to think or concentrate	Diminished ability to think or concentrate
Suicidal thoughts	Suicidal ideation	Thoughts of death, suicide	Thoughts of death or suicide	Thoughts of death or suicidal ideation
	Constipation			
	Fatigue	Loss of energy	Loss of energy, fatigue	Loss of energy, fatigue
	Decreased sex interest	Loss of interest or decreased sex drive	Loss of interest or pleasure	Loss of interest or pleasure

Pourquoi toujours

5 symptômes parmi 9

comme critère seuil dans le DSM-5-TR

En 2023 ?

Kendler, K. S., Muñoz, R. A., & Murphy, G. (2010). The Development of the Feighner Criteria : A Historical Perspective. *American Journal of Psychiatry*, *167*(2), 134-142. https://doi.org/10.1176/appi.ajp.2009.09081155

Que cherchons nous ?

Que cherchons nous ?

Thomas Insel
Neuroscientist and psychiatrist

"*I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders, and when I look back on that, I realize that while I think I succeeded in getting lots of really cool papers published by cool scientists at fairly large cost − I think $20 billion − I don't think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people who have mental illness.*"

https://www.madinamerica.com/2021/07/medical-sociologist-details-failures-american-psychiatry/

Cuthbert (2014)

RDoC
Research Domain Criteria Initiative

The RDoC Matrix*

	Unit of Analysis							
	Gene	**Molecules**	**Cells**	**Circuits**	**Physiology**	**Behavior**	**Self-Report**	**Paradigms**
***Domain** (Construct)*								
Negative Valence Systems								
Acute threat								
Potential threat								
Sustained threat								
Loss								
Frustrative nonreward								
Positive Valence Systems								
Approach motivation								
Initial responsiveness to reward								
Sustained responsiveness to reward								
Reward learning								
Habit								
Cognitive Systems								
Attention								
Perception								
Declarative memory								
Language behavior								
Cognitive control								
Working memory								
Systems for Social Processes								
Affiliation and attachment								
Social communication								
Perception and understanding of self								
Perception and understanding of others								
Arousal and Regulatory Systems								
Arousal								
Circadian rhythms								
Sleep and wakefulness								

* See: http://www.nimh.nih.gov/research-priorities/rdoc/nimh-research-domain-criteria-rdoc.shtml#toc_matrix

Que cherchons nous ?

American psychiatry in the new millennium: a critical appraisal

Andrew Scull

Sociology and Science Studies, University of California, San Diego, USA

Psychological Medicine

"*The ambitious plan to shift from a 'tick the boxes' approach to diagnosis to a system rooted in a biological understanding of mental illness quickly foundered because the necessary etiological understanding of the various forms of serious mental disorder simply did not exist.*"

"*Genes, it seems, are not fate, and the thousands of alleles that contribute a small additional risk of illness do not operate 'in a simple deterministic manner.' Developmental and environmental factors must play a crucial role in whether the 'nudge' of these alleles manifests itself in mental disorder, which suggests that the over-emphasis on the biology of mental disorder has been a strategic mistake.*" https://www.madinamerica.com/2021/07/medical-sociologist-details-failures-american-psychiatry/

Scull, A. (2021). American psychiatry in the new millennium : A critical appraisal. *Psychological Medicine*, 1-9. https://doi.org/10.1017/S0033291721001975

Qu'est-ce qu'un trouble ?

- Les diagnostics sont des construits utiles pas des entités naturelles
- Ils tracent des frontières artificielles dans un continuum

(ex. découper un arc-en-ciel en 6 couleurs nettes)

- Trouble = **des Clusters à Propriétés Homéostatiques (équilibre)**
- Un groupe de difficultés (bio, psycho, sociales) qui s'entretiennent entre elles
  (ex. : stress → insomnie → fatigue → manque d'activité → anxiété…)

Du coup, on constate :

- **Des profils très différents** sous un même diagnostic *(deux personnes souffrant de « dépression » peuvent ne partager presque aucun symptôme en commun)*
- **Beaucoup de troubles qui se chevauchent** *(comorbidité anxiété/dépression + comorbidité Tb.Dys/TDAH/Tb.Perso)*
- **Des limites floues** *(où s'arrête la tristesse, où commence la dépression, nous avons tous des problèmes d'attention mais où commence le TDA/H)*

Fried, E. I. (2026). Mental Disorders as Homeostatic Property Clusters : A Narrative Review. *JAMA Psychiatry*. https://doi.org/10.1001/jamapsychiatry.2026.0073

Quelques problèmes…
avec les mêmes ingrédients….

The 341 737 ways of qualifying for the melancholic specifier

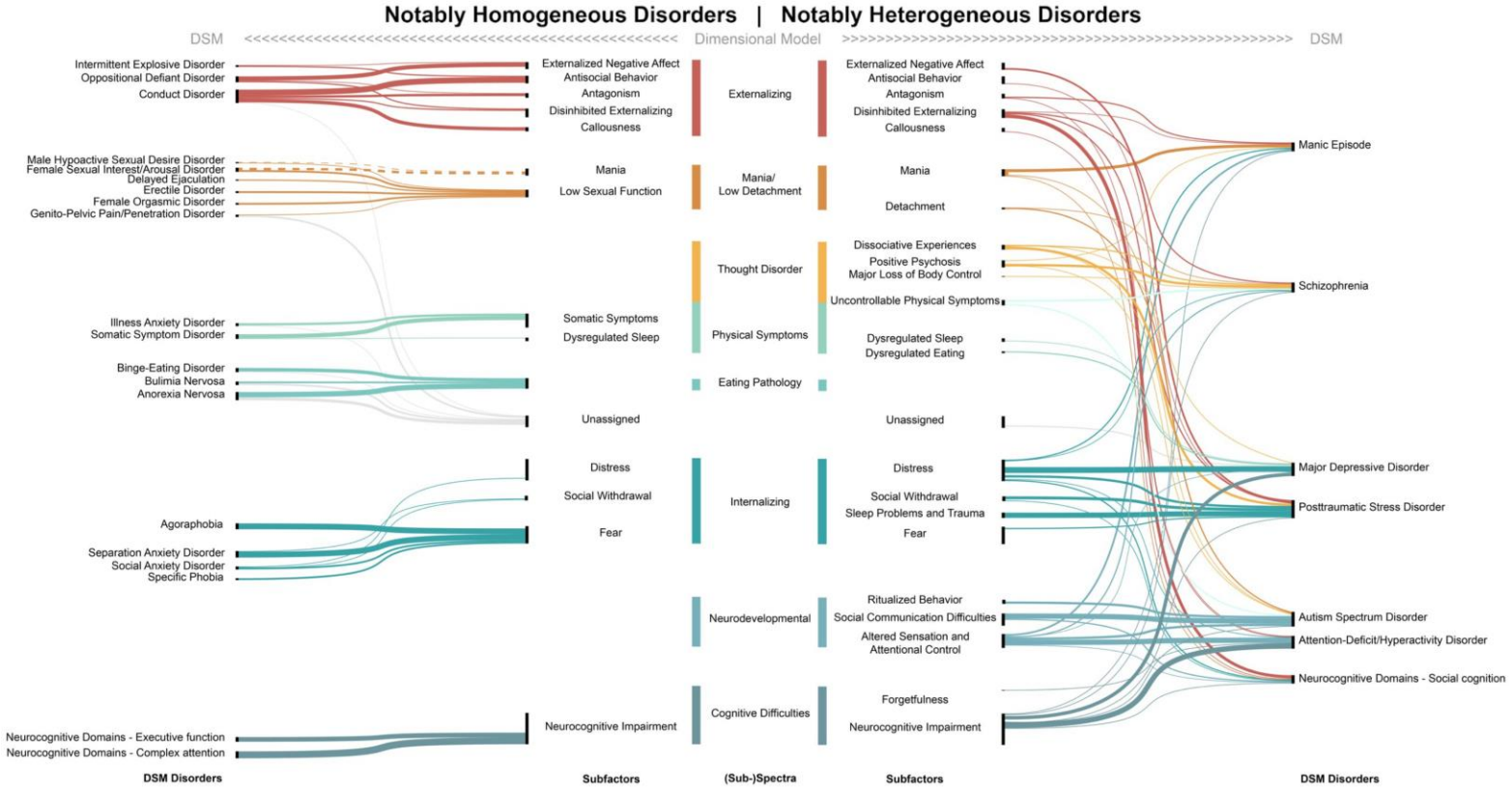
Eiko I Fried • Frederik Coomans • Lorenzo Lorenzo-Luaces

Published: June, 2020 • DOI: https://doi.org/10.1016/S2215-0366(20)30169-3

There is considerable symptom heterogeneity in major depressive disorder. Here, we show that melancholia, which is a specifier for major depressive disorder in the DSM-5 and is meant to identify a more homogeneous subgrouping of individuals, features over ten times more heterogeneity than does major depressive disorder.

There are over 280 ways to measure depression, which capture considerably different symptom content, with seven common scales measuring over 50 disparate symptoms. The DSM-5 criteria for major depressive disorder require a person to have at least five of nine symptoms, at least one of which has to be either sad mood or anhedonia. All symptom criteria, apart from sad mood, are compounds that contain "or" in the description, such as loss of interest or pleasure, allowing for qualitatively different ways to qualify for the same criterion. If the subsymptoms are ignored, 227 unique ways exist to qualify for major depressive disorder (appendix). Considering important qualitative differences for six of the compounds, such as loss of interest or pleasure and hypersomnia or insomnia, leads to 10 377 unique symptom profiles. Although this exercise is only mathematical, empirical work has shown that many of these profiles can be seen in patients with depression. For instance, we identified 1030 unique profiles in 3703 patients with depression from the STAR*D study,[1] 83·9% (864 of 1030) of which were reported in five or fewer participants.

Quelques problèmes…
avec les mêmes ingrédients….



Forbes et al. (2023). *Reconstructing Psychopathology : A data-driven reorganization of the symptoms in DSM-5*. OSF. https://doi.org/10.31234/osf.io/7um9a

Ergodicité : du groupe à l'individu (et l'inverse)

Oui, il faut des études sur des populations et des essais contrôlés et randomisés…mais

Érgodicité = hypothèse que les résultats de groupe décrivent bien les processus individuels (et inversement)

- En psychologie : rarement satisfaite — homogénéité entre individus et stationnarité dans le temps sont deux conditions difficiles à remplir.
- **Conséquence :** les statistiques inter-individuelles (prévalences, moyennes de groupe) ne décrivent pas bien ce qui se passe chez un individu donné.
- En 2024 : dans **88 %** des publications de psychologie scientifique, cette hypothèse est supposée vraie sans être testée.

Pourquoi les prévalences varient-elles autant selon les études ? Peut-être pas seulement à cause des outils — mais parce que les "moyennes de groupe" masquent des trajectoires individuelles très hétérogènes.

88 %

des études supposent l'ergodicité sans la tester

Speelman et al. (2024). Most Psychological Researchers Assume Their Samples Are Ergodic. Collabra: Psychology.

I. Un enjeu de société ?

II. Des problèmes des mesures

III. Exemple sur des données étudiantes

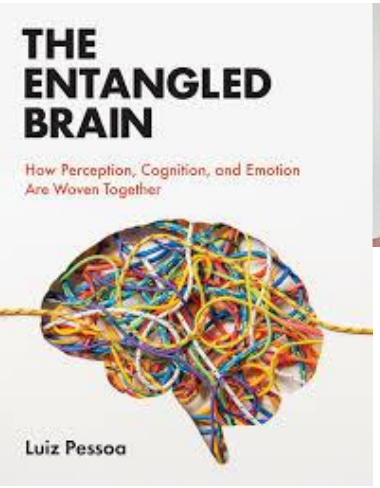
IV. Des problèmes avec les modèles et les théories

V. La complexité, une voie de progrès ?

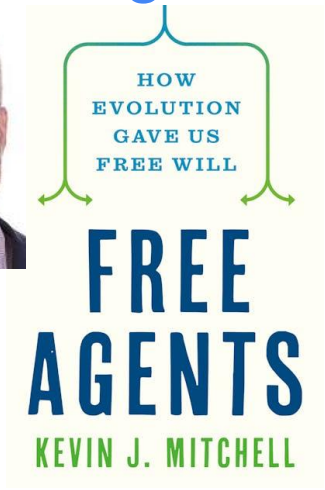
VI. Retour sur les données étudiantes

Que cherchons nous ?

Oui il faut de la recherche en biologie, génétique & imagerie !

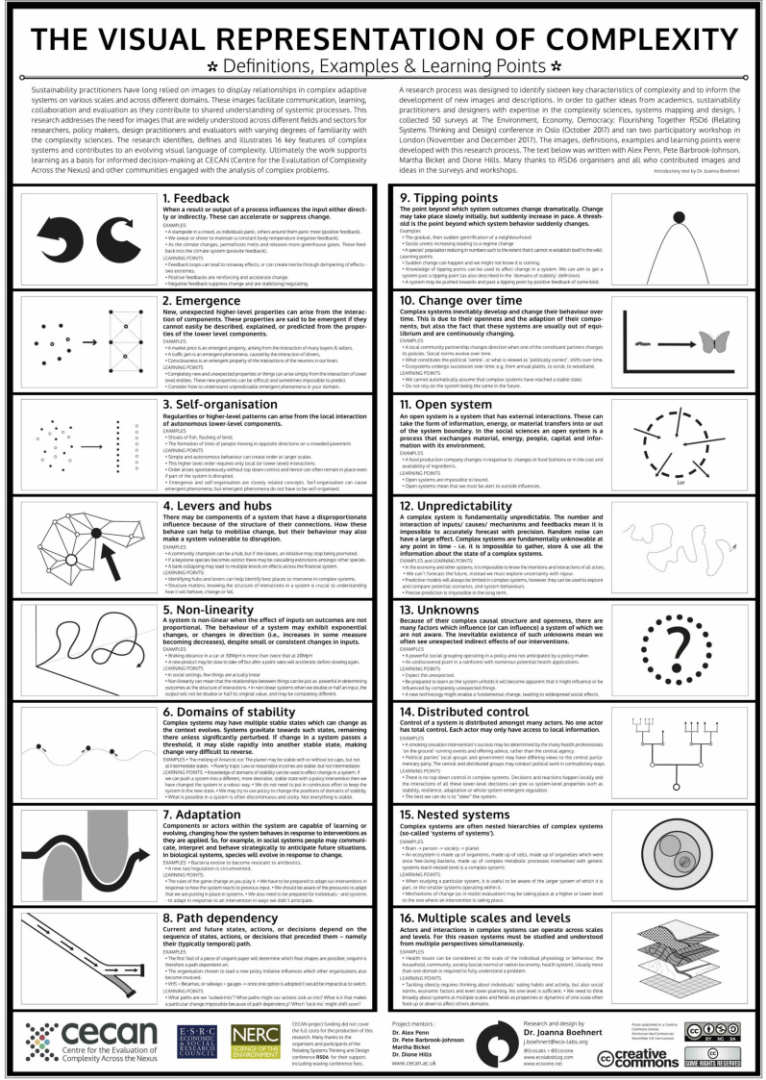


Mais…



Brain disorders? Not really: Why network structures block reductionism in psychopathology research

Borsboom, D., Cramer, A. O. J. J., & Kalis, A. (2019). Brain disorders ? Not really : Why network structures block reductionism in psychopathology research. *Behavioral and Brain Sciences*, *42*(February). https://doi.org/10.1017/S0140525X17002266



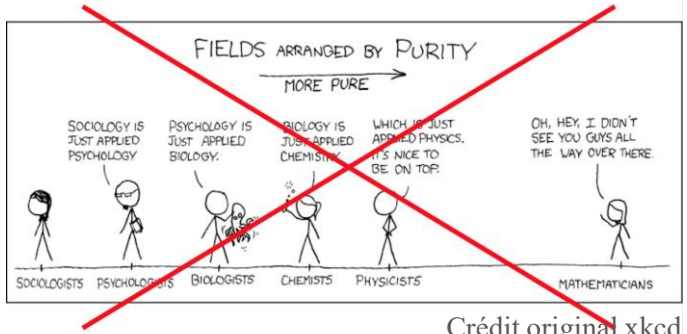
Anderson, P. W. (1972). More Is Different : Broken symmetry and the nature of the hierarchical structure of science. *Science*, *177*(4047), 393-396. https://doi.org/10.1126/science.177.4047.393

Complexité ?

Des propriétés pertinentes pour la psychologie ?

- Attracteurs
- Hystérèse
- Auto-organisation
- Dynamiques non linéaires et bifurcations
- Émergences et réalisations multiples

→ Difficultés des modèles constructionnistes et réductionnistes



Morvan (2024)

Crédit original xkcd

Every level of reality emerges, unpredictably, from the one below it.

"More is Different"

https://www.cecan.ac.uk/news/the-visual-representation-of-complexity/

THE VISUAL REPRESENTATION OF COMPLEX

⭑ Definitions, Examples & Learning Points ⭑

Sustainability practitioners have long relied on images to display relationships in complex adaptive systems on various scales and across different domains. These images facilitate communication, learning, collaboration and evaluation as they contribute to shared understanding of systemic processes. This research addresses the need for images that are widely understood across different fields and sectors for researchers, policy makers, design practitioners and evaluators with varying degrees of familiarity with the complexity sciences. The research identifies, defines and illustrates 16 key features of complex systems and contributes to an evolving visual language of complexity. Ultimately the work supports learning as a basis for informed decision-making at CECAN (Centre for the Evalutation of Complexity Across the Nexus) and other communities engaged with the analysis of complex problems.

A research process was designed to identify sixteen key characteristics of complexity
development of new images and descriptions. In order to gather ideas from acade
practitioners and designers with expertise in the complexity sciences, systems mapp
collected 50 surveys at The Environment, Economy, Democracy: Flourishing Togeth
Systems Thinking and Design) conference in Oslo (October 2017) and ran two particip
London (November and December 2017). The images, definitions, examples and lea
developed with this research process. The text below was written with Alex Penn, Pete
Martha Bicket and Dione Hills. Many thanks to RSD6 organisers and all who contri
ideas in the surveys and workshops.

Introductory

1. Feedback

When a result or output of a process influences the input either directly or indirectly. These can accelerate or suppress change.

EXAMPLES
- A rumour spreads in a crowd, as individuals panic; others around them panic more (positive feedback).
- We sweat or shiver to maintain a constant body temperature (negative feedback).
- Human behaviour changes, permafrost melts and releases more greenhouse gases. These feed back into the climate system (positive feedback).

LEARNING POINTS
- Feedback loops can lead to runaway effects, or can create inertia through dampening of effects two extremes.
- Positive feedbacks are reinforcing and accelerate change.
- Negative feedback suppress change and are stabilising/regulating.

2. Emergence

New, unexpected higher-level properties can arise from the interaction of components. These properties are said to be emergent if they cannot easily be described, explained, or predicted from the properties of the lower level components.

EXAMPLES
- A market price is an emergent property, arising from the interaction of many buyers & sellers.
- A traffic jam is an emergent phenomena, caused by the interaction of drivers.
- Consciousness is an emergent property of the interactions of the neurons in our brain.

LEARNING POINTS
- Completely new and unexpected properties or things can arise simply from the interaction of lower level entities. These new properties can be difficult, and sometimes impossible to predict.
- Consider how to understand unpredictable emergent phenomena in your domain.

3. Self-organisation

Regularities or higher-level patterns can arise from the local interaction of autonomous lower-level components.

EXAMPLES
- Shoals of fish, flocking of birds
- The formation of lines of people moving in opposite directions on a crowded pavement

LEARNING POINTS
- Simple and autonomous behaviour can create order at larger scales.
- This higher level, order requires only local (or lower level) interactions.
- Order arises spontaneously without top down control and hence can often remain in place even if part of the system is disrupted.
- If emergence and self-organisation are closely related concepts. Self-organisation can cause emergent phenomena, but emergent phenomena do not have to be self-organised.

4. Levers and hubs

There may be components of a system that have a disproportionate influence because of the structure of their connections. How these behave can help to mobilise change, but their behaviour may also make a system vulnerable to disruption.

EXAMPLES
- A community champion can be a hub, but if she leaves, an initiative may stop being promoted.
- If a keystone species becomes extinct there may be cascading extinctions amongst other species.
- Removing a hub may lead to multiple knock-on effects across the financial system.

LEARNING POINTS
- Identifying hubs and levers can help identify best places to intervene in complex systems.
- 'Structure matters; knowing the structure of interactions in a system is crucial to understanding how it will behave, change or fail.

5. Non-linearity

A system is non-linear when the effect of inputs on outcomes are not proportionate. The behaviour of a system may exhibit exponential changes, or changes in direction (i.e., increases in some measure becoming decreases), despite small or consistent changes in inputs.

EXAMPLES
- Braking distance in a car at 30mph is more than twice that at 20mph!
- A new product may be slow to take off but after a point sales will accelerate, before slowing again.

LEARNING POINTS
- In social settings, few things are actually linear
- Non-linearity can mean that the relationships between things can be just as powerful in determining outcomes as the structure of interactions. • In non-linear systems when we double or half an input, the output will not be double or half its original value, and may be completely different.

6. Domains of stability

Complex systems may have multiple stable states which can change as the context evolves. Systems gravitate towards such states, remaining there unless significantly perturbed. If change in a system passes a threshold, it may slide rapidly into another stable state, making change very difficult to reverse.

EXAMPLES • The melting of Antarctic ice: The planet may be stable with or without ice caps, but not at intermediate states. • Rivers/ traps: can have multiple stable states but not intermediates

LEARNING POINTS • Knowledge of domains of stability can be used to effect change in a system. If we can push a system into a different, more desirable, stable state with a policy intervention then we have changed the system in a robust way. • We do not need to put in continuous effort to keep the system in the new state. • We may also try to use policy to change the locations of thresholds of stability. • What is possible in a system is often discontinuous and sticky. Not everything is stable.

7. Adaptation

Components or actors within the system are capable of learning or evolving, changing how the system behaves in response to interventions as they are applied. So, for example, in social systems people may communicate, interpret and behave strategically to anticipate future situations. In biological systems, species will evolve in response to change.

EXAMPLES • Bacteria evolve to become resistant to antibiotics
- A new bacteriagulation is circumvented.

LEARNING POINTS
- The 'rules of the game' change as you play it. • We have to be prepared to adapt our interventions in response to how the system reacts to previous input. • We should be aware of the pressures to adapt that we are putting in place in systems. • We also need to be prepared for individuals - and systems - to adapt in response to an intervention in ways we didn't anticipate.

8. Path dependency

Current and future states, actions, or decisions depend on the sequence of states, actions or decisions that preceded them – namely their (typically temporal) path.

EXAMPLES
- The first fold of a piece of origami paper will determine which final shapes are possible; origami is therefore a path dependent art.
- The organisation chosen to lead a new policy initiative influences which other organisations also become involved.
- VHS > Betamax, or railways > gauges > once one option is adopted it would be impractical to switch.

LEARNING POINTS
- What paths are we "locked into"? What paths might our actions lock us into? What is it that makes a particular change impossible because of path dependency? When "lock-ins" might shift over?

9. Tipping points

The point beyond which system outcomes change dramatically. Change may take place slowly initially, but suddenly increase in pace. A threshold is the point beyond which system behavior suddenly changes.

EXAMPLES
- The gradual, then sudden gentrification of a neighborhood.
- Social unrest increasing leading to a regime change
- A species' population reducing in numbers such to the extent that it cannot re-establish itself in the wild.

Learning points
- Sudden change can happen and we might not know it is coming.
- Knowledge of tipping points can be used to affect change in a system. We can aim to get a system past a tipping point (as also described in the 'domains of stability' definition).
- A system may be pushed towards and past a tipping point by positive feedback of some kind.

10. Change over time

Complex systems inevitably develop and change their behaviour over time. This is due to their openness and the adaption of their components, but also the fact that these systems are usually out of equilibrium and are continuously changing.

EXAMPLES
- A local community partnership changes direction when one of the constituent partners changes its policies. Social norms evolve over time.
- What constitutes the political 'centre', or what is viewed as 'politically correct', shifts over time.
- Ecosystems undergo succession over time e.g. from annual plants, to scrub, to woodland.

LEARNING POINTS
- We cannot automatically assume that complex systems have reached a stable state.
- Do not rely on the system being the same in the future.

11. Open system

An open system is a system that has external interactions. These can take the form of information, energy, or material transfers into or out of the system boundary. In the social sciences an open system is a process that exchanges material, energy, people, capital and information with its environment.

EXAMPLES
- A food production company changes in response to changes in food fashions or in the cost and availability of ingredients.

LEARNING POINTS
- Open systems are impossible to bound.
- Open systems mean that we must be alert to outside influences.

12. Unpredictability

A complex system is fundamentally unpredictable. The number and interaction of inputs/ causes/ mechanisms and feedbacks mean it is impossible to accurately forecast with precision. Random noise can have a large effect. Complex systems are fundamentally unknowable at any point in time - i.e. it is impossible to gather, store & use all the information about the state of a complex system.

EXAMPLES (S) and LEARNING POINTS
- The weather is unpredictable. It is impossible to know the intentions and interactions of all actors.
- We can't 'know as' the future. Instead we must explore uncertainty with rigour.
- Predictive models will always be limited in complex systems, however they can be used to explore and compare potential scenarios, and system behaviours.
- Precise prediction is impossible in the long term.

13. Unknowns

Because of their complex causal structure and openness, there are many factors which influence (or can influence) a system of which we are not aware. The inevitable existence of such unknowns mean we often see unexpected indirect effects of our interventions.

EXAMPLES
- A powerful social grouping operating in a policy area not anticipated by a policy maker.
- An undiscovered plant in a rainforest with numerous potential health applications.

LEARNING POINTS
- Expect the unexpected.
- Be prepared to learn as the system unfolds.It will become apparent that it might influence or be influenced by completely unexpected things.
- A new technology might enable or fundamentally change, leading to widespread social effects.

14. Distributed control

Control of a system is distributed amongst many actors. No one actor has total control. Each actor may only have access to local information.

EXAMPLES
- A smoking cessation intervention's success may be determined by the many health professionals 'on the ground' running events and offering advice, rather than the central agency.
- 'Political parties' local groups and government may have differing views to the central parties' plenary party. The central and distributed groups may conduct political work in contradictory ways.

LEARNING POINTS
- There is no top-down control in complex systems. Decisions and reactions happen locally and the interactions of all these lower-level decisions can give us system-level properties such as self-organisation, resilience, and the ability to adapt to system emergent regulation.
- The best we can do is to "steer" the system.

15. Nested systems

Complex systems are often nested hierarchies of complex systems (so-called 'systems of systems').

EXAMPLES
- Brain > person > society > planet
- An ecosystem is made up of organisms. Made up of cells, made up of organelles which were once free living bacteria. Made up of complex metabolic processes interwoven with genetic systems each nested level is a complex system).

LEARNING POINTS
- When studying a particular system, it is useful to be aware of the larger system of which it is part, or the smaller systems operating within it.
- Mechanisms of change (as in realist evaluation) may be taking place at a higher or lower level to the one where an intervention is taking place.

16. Multiple scales and levels

Actors and interactions in complex systems can operate across scales and levels. For this reason systems must be studied and understood from multiple perspectives simultaneously.

EXAMPLES
- Health issues can be considered at the scale of the individual physiology or behaviour, the household, community, society (social norms) or nation (economy, health system). Usually more than one domain is required to fully understand a problem.

LEARNING POINTS
- Tackling obesity requires thinking about individuals' eating habits and activity, but also social norms, economic factors and even town planning. No one level is sufficient. • We need to think broadly about systems at multiple scales and fields as properties or dynamics of one scale often feed up or down to affect other's domains.

cecan Centre for the Evaluation of Complexity Across the Nexus

ESRC ECONOMIC AND SOCIAL RESEARCH COUNCIL

NERC NATURAL ENVIRONMENT RESEARCH COUNCIL

CECAN project funding did not cover the full costs for the production of this research. Many thanks to the organisers and participants of the Relating Systems Thinking and Design conference RSD6 for their support, including waiving conference fees.

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www.ecocene.org

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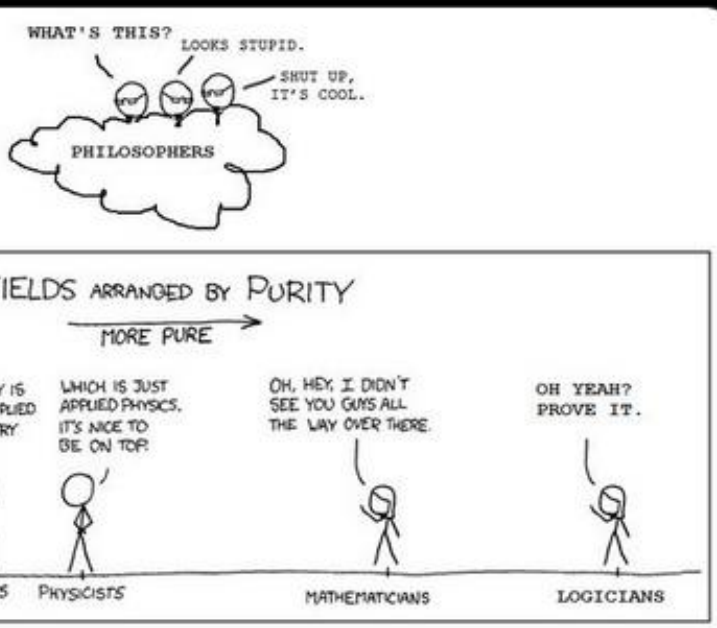
fve
@harmonica_men

NOT TO SCALE !!

#socialmedia #psychology #biology #chemistry #physics #mathematics & #Philosophy



9:36 PM · 27 sept. 2017

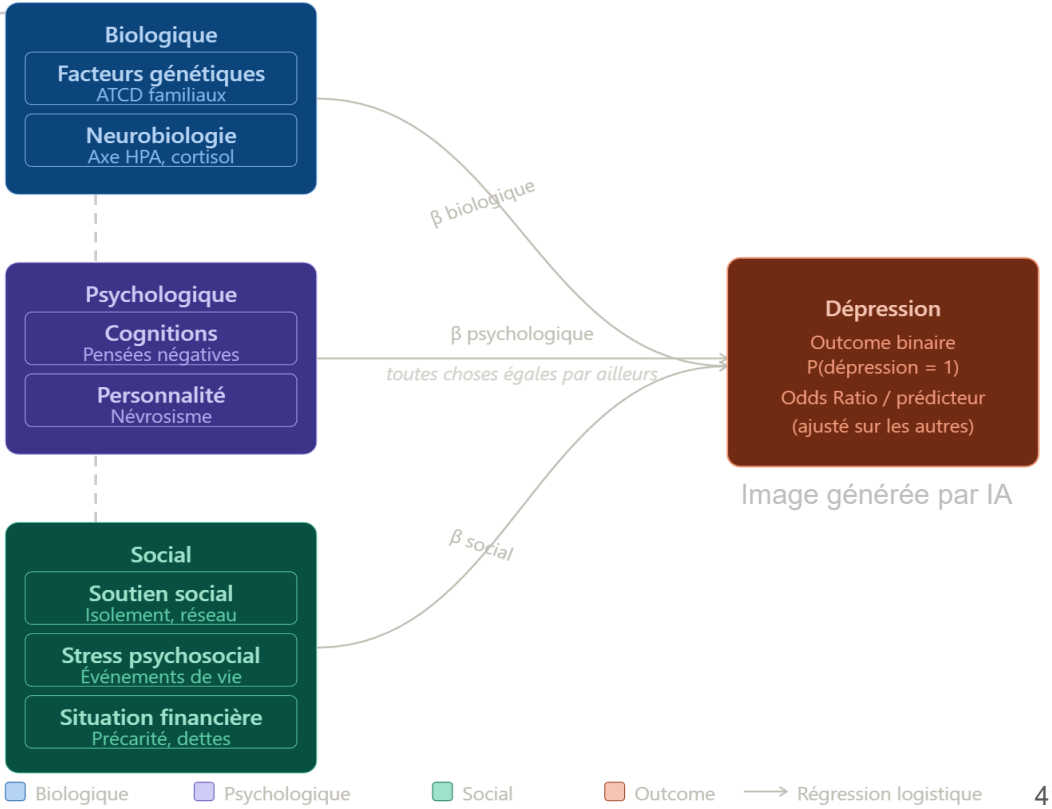
Quelles est notre théorie ?
Un système dynamique, pas une addition de facteurs

Modèle classique

Bio + Psycho + Social = juxtaposition de facteurs indépendants

Chaque niveau "cause" le trouble séparément

⟶ Vision statique et réductionniste



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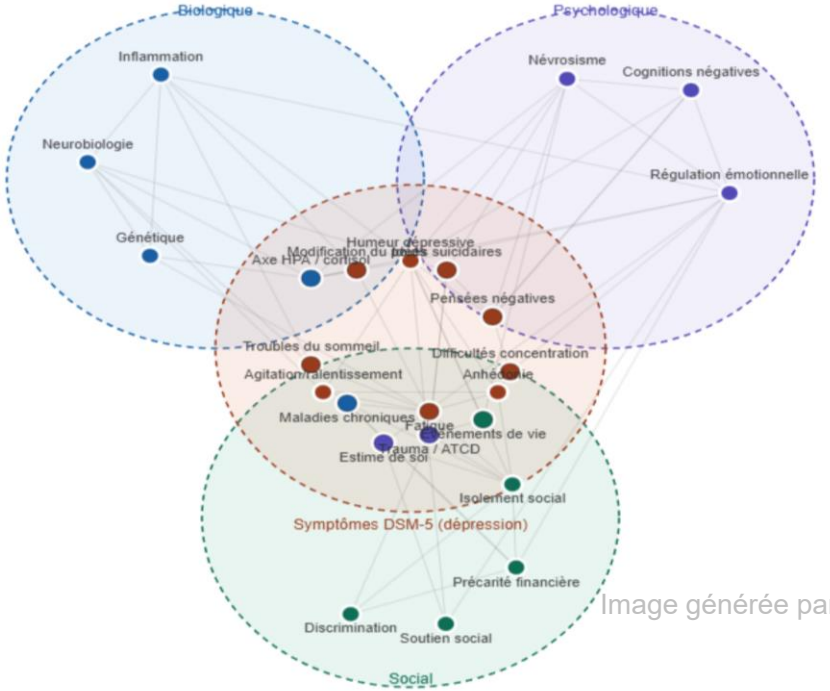


Image générée par IA

Modèle dynamique

(Robinaugh et al., 2025)

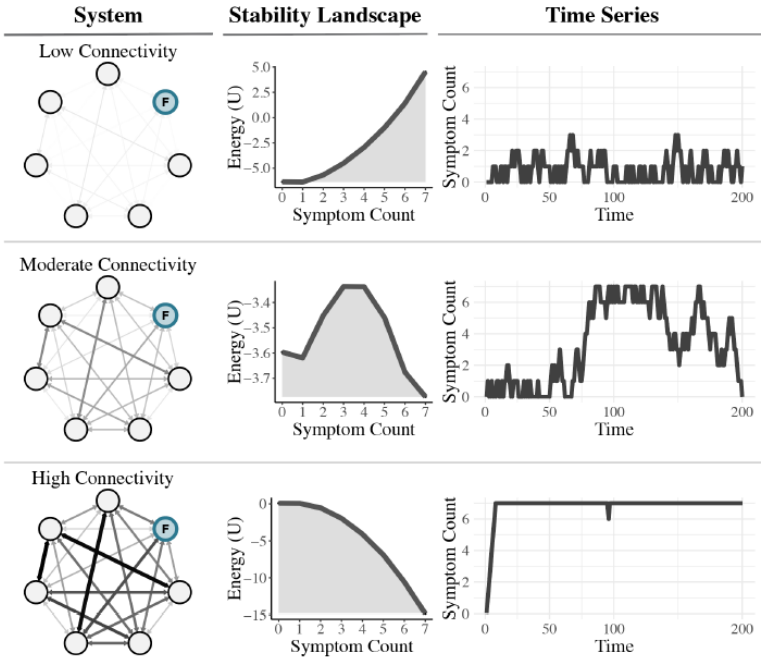
- Interactions et boucles de rétroaction entre élements et entre niveaux
- Ex. : fatigue → moins d'activité → humeur basse → plus de fatigue
- États stables (attracteurs) : état sain ↔ état dépressif
- Points de bascule selon la connectivité du réseau de symptômes

«Plutôt que de chercher "ce qu'est" un trouble, comprendre comment des facteurs interagissent pour produire des états stables»

Biologique Psychologique Social Symptômes DSM-5 (dépression)

Robinaugh, D., Blanken, T. F., Bridger, E. K., Casamento-Moran, A., de Ron, J., Henry, T. R., Hoekstra, R. H. A., Stratis, G., van de Leemput, I. A., van Nes, E., Wang, S. B., Wheatley, T., & Fried, E. I. (2025). *The Future of the Biopsychosocial Model : Toward a Transdisciplinary Systems Science of Mental Health* (Fy23g_v1). PsyArXiv. https://doi.org/10.31234/osf.io/fy23g_v1

Quelles est notre théorie ?
Un système dynamique, pas une addition de facteurs



Modèle dynamique

(Robinaugh et al., 2025)

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«Plutôt que de chercher "ce qu'est" un trouble, comprendre comment des facteurs interagissent pour produire des états stables»

Robinaugh, D., Blanken, T. F., Bridger, E. K., Casamento-Moran, A., de Ron, J., Henry, T. R., Hoekstra, R. H. A., Stratis, G., van de Leemput, I. A., van Nes, E., Wang, S. B., Wheatley, T., & Fried, E. I. (2025). *The Future of the Biopsychosocial Model : Toward a Transdisciplinary Systems Science of Mental Health* (Fy23g_v1). PsyArXiv. https://doi.org/10.31234/osf.io/fy23g_v1

Quelles est notre théorie ?

Les troubles émergent à partir des propriétés du système ?

THE LANCET
Psychiatry

COMMENT | VOLUME 8, ISSUE 12, P1022-1024, DECEMBER 01, 2021

Trapped: rigidity in psychiatric disorders

Michelle N Servaas • Robert A Schoevers • Laura F Bringmann • Marie-José var

Published: December, 2021 • DOI: https://doi.org/10.1016/S2215-0366(21)00353-9

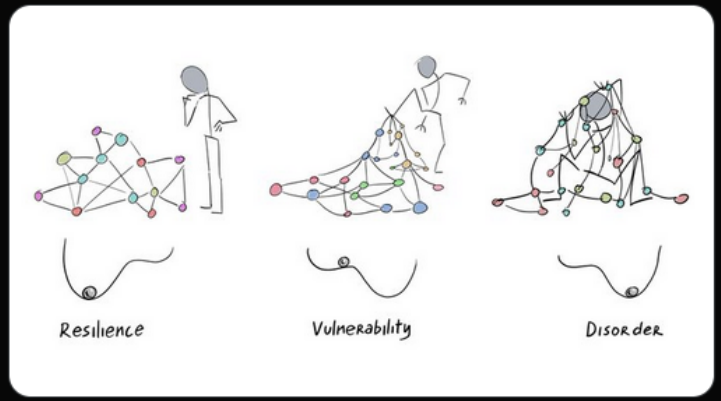
References

Article Info

In the past decades, it has been shown to b
underlying their development and recovery
that previous research was mostly perform
psychological or biological), typically on th
course of illness, we propose to adopt a tra
rigidity in psychiatric patients.

Denny Borsboom @BorsboomDenny · 29 sept. 2021

Inspired by @Margarita_KP, who drew some great illustrations of psychometric models (osf.io/czxht/), I drew a minimal comic of the network theory of psychopathology (onlinelibrary.wiley.com/doi/full/10.10...).



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Denny Borsboom @BorsboomDenny · 30 sept. 2021

PS in response to some questions: of course anyone can use these drawings, feel free to do so!

I. Un enjeu de société ?

II. Des problèmes des mesures

III. Exemple sur des données étudiantes

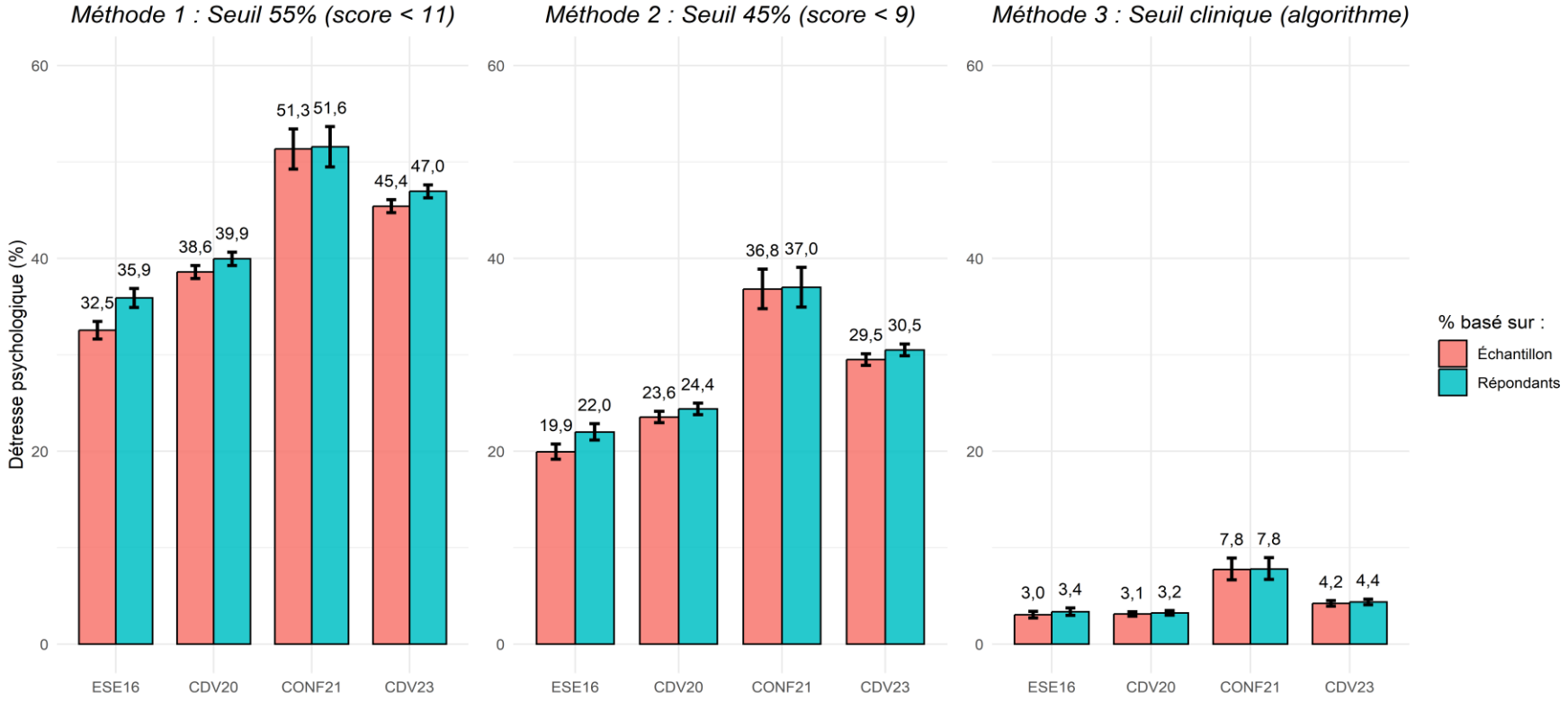
IV. Des problèmes avec les modèles et les théories

V. La complexité, une voie de progrès ?

VI. Retour sur les données étudiantes

Quentin Facon-Barillot
Docteur - Paris Nanterre
soutenance le 27/11 !!!

Détresse Psychologique des Etudiants (MHI-5)



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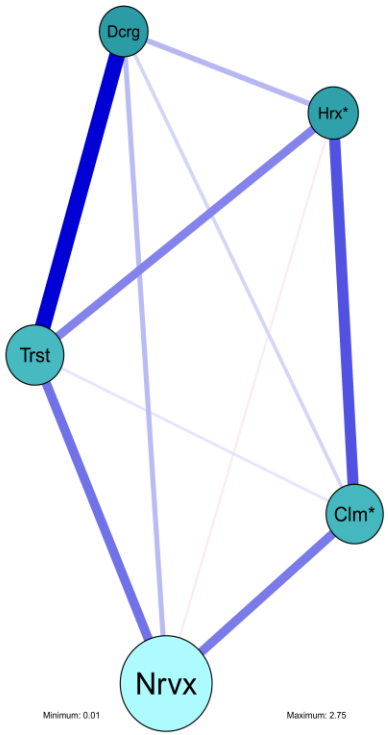
Réseau de symptômes

ESE16



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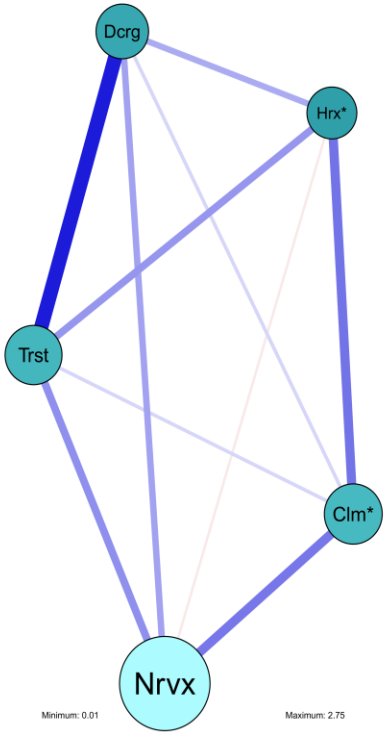
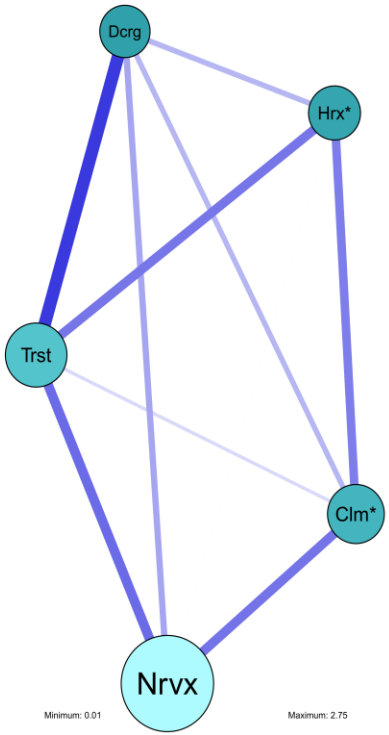


CONF21



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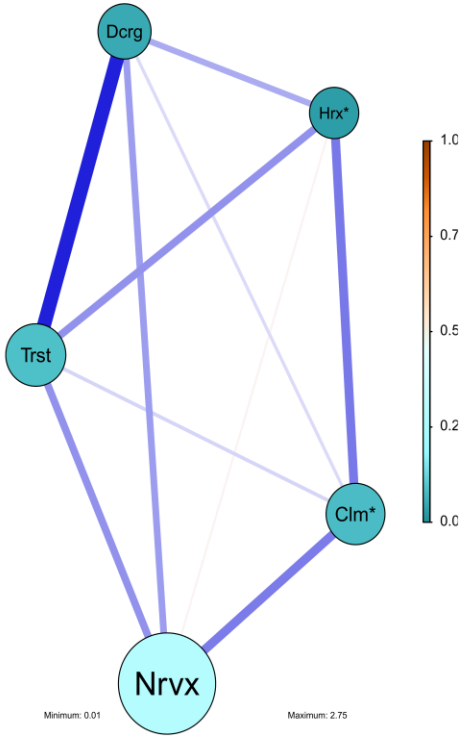

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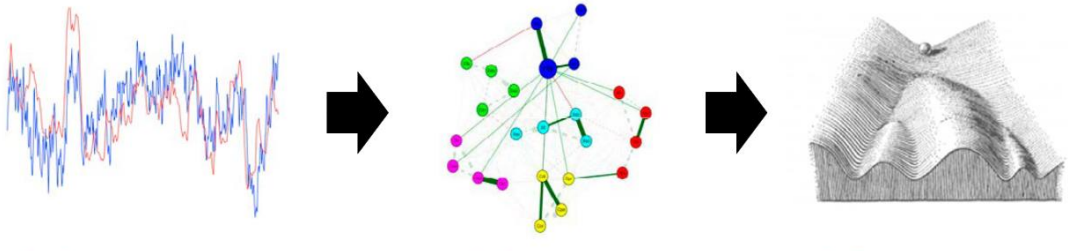
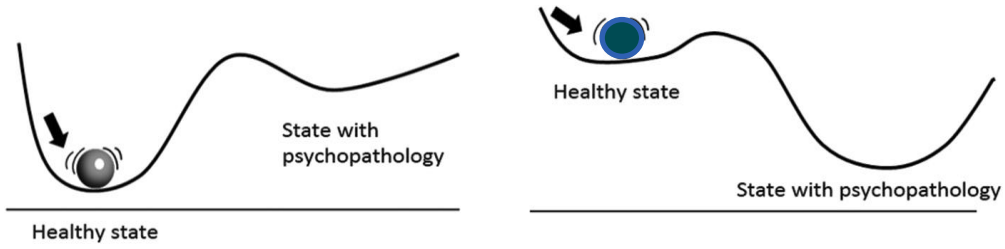
Approche en réseau



https://www.nwo.nl/sites/nwo/files/documents/Paper%2BGrip%2Bon%2BComplexity.pdf



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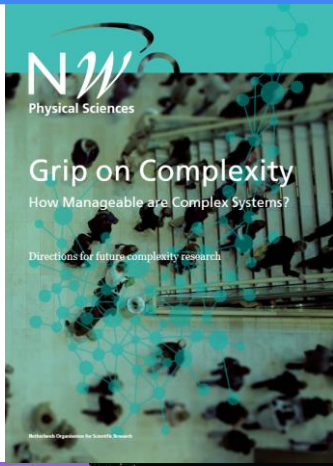
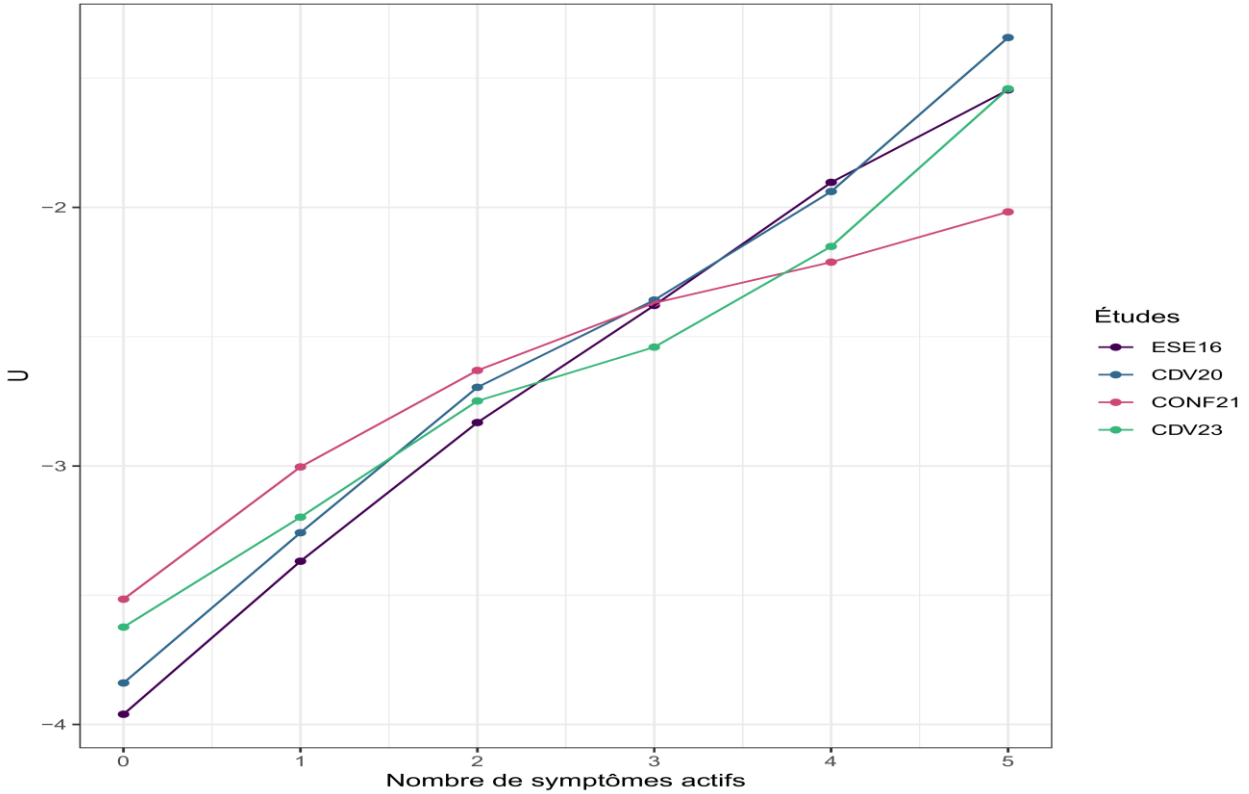


Bassins d'attraction (Ising)



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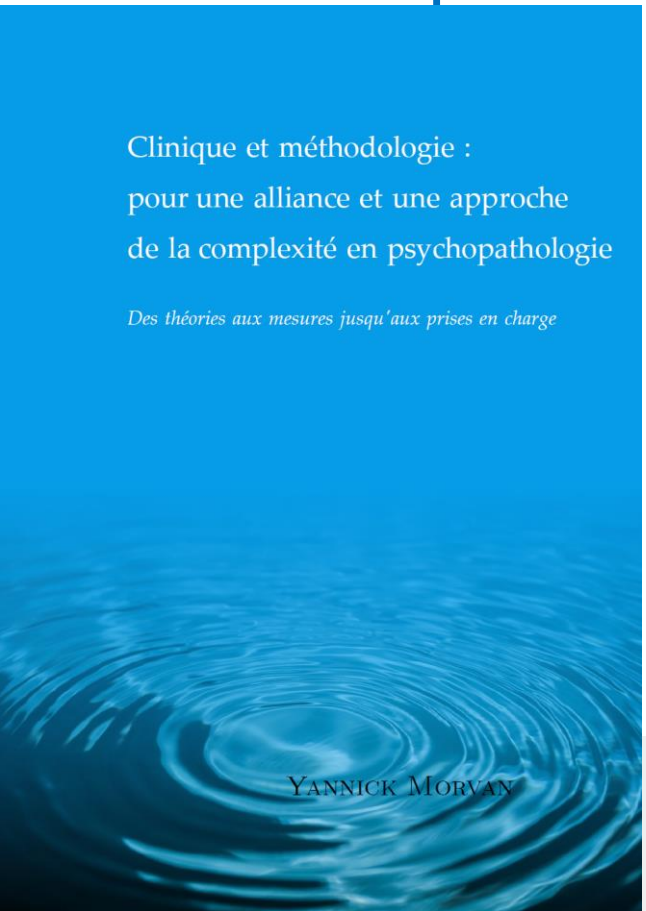
Pour aller plus loin (en français et gratuitement)



Voir les chapitres 8 à 11

Morvan, Y. (2024). *Clinique et méthodologie : Pour une alliance et une approche de la complexité en psychopathologie. Des théories aux mesures jusqu'aux prises en charge*.
https://hal.science/tel-04551836v1
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Merci !

& Merci aux fantastiques collaborateurs !
+ et chercheurs qui nous inspirent !!!

https://www.artstation.com/artwork/KWPrB