Depression: What (if anything) is it, and what are its evolutionary origins?

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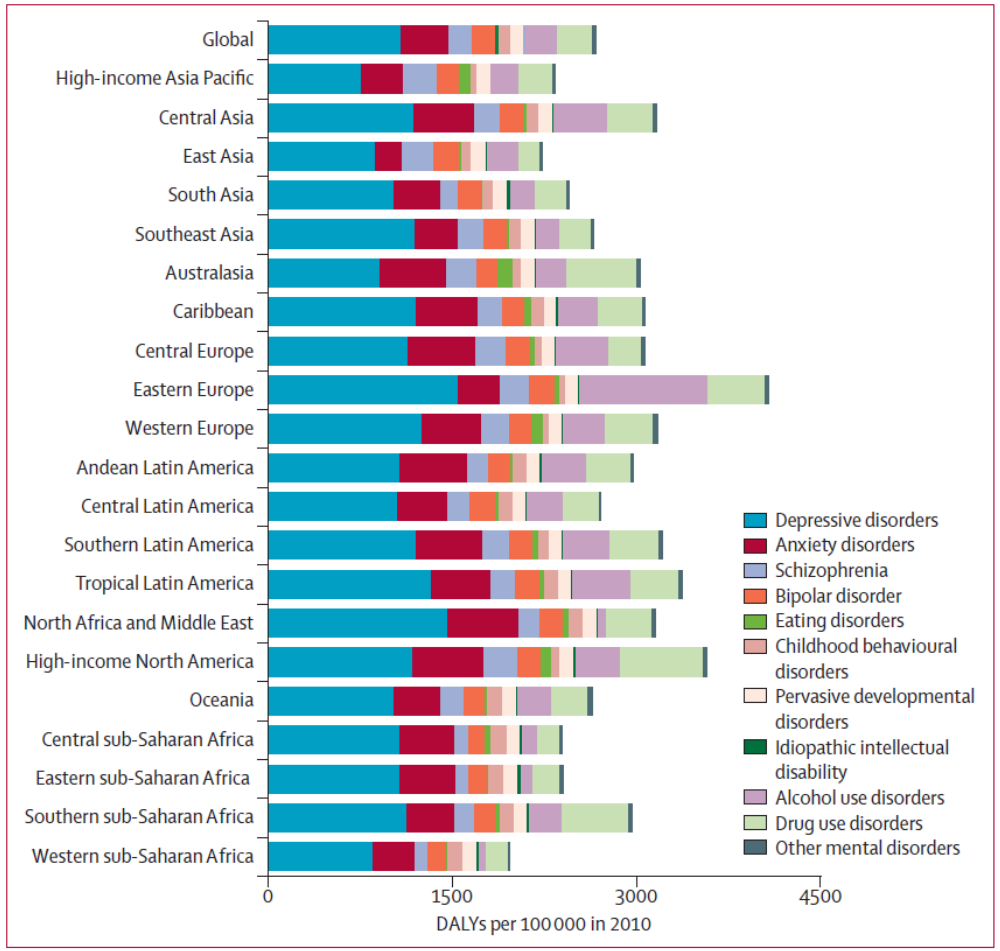

Figure 4: **Rates of disability-adjusted life years (DALYs) per 100 000 individuals for mental and substance use disorders in 2010, by region**

Whiteford, H A et al. (2013). *Lancet* 382: 1575-86.

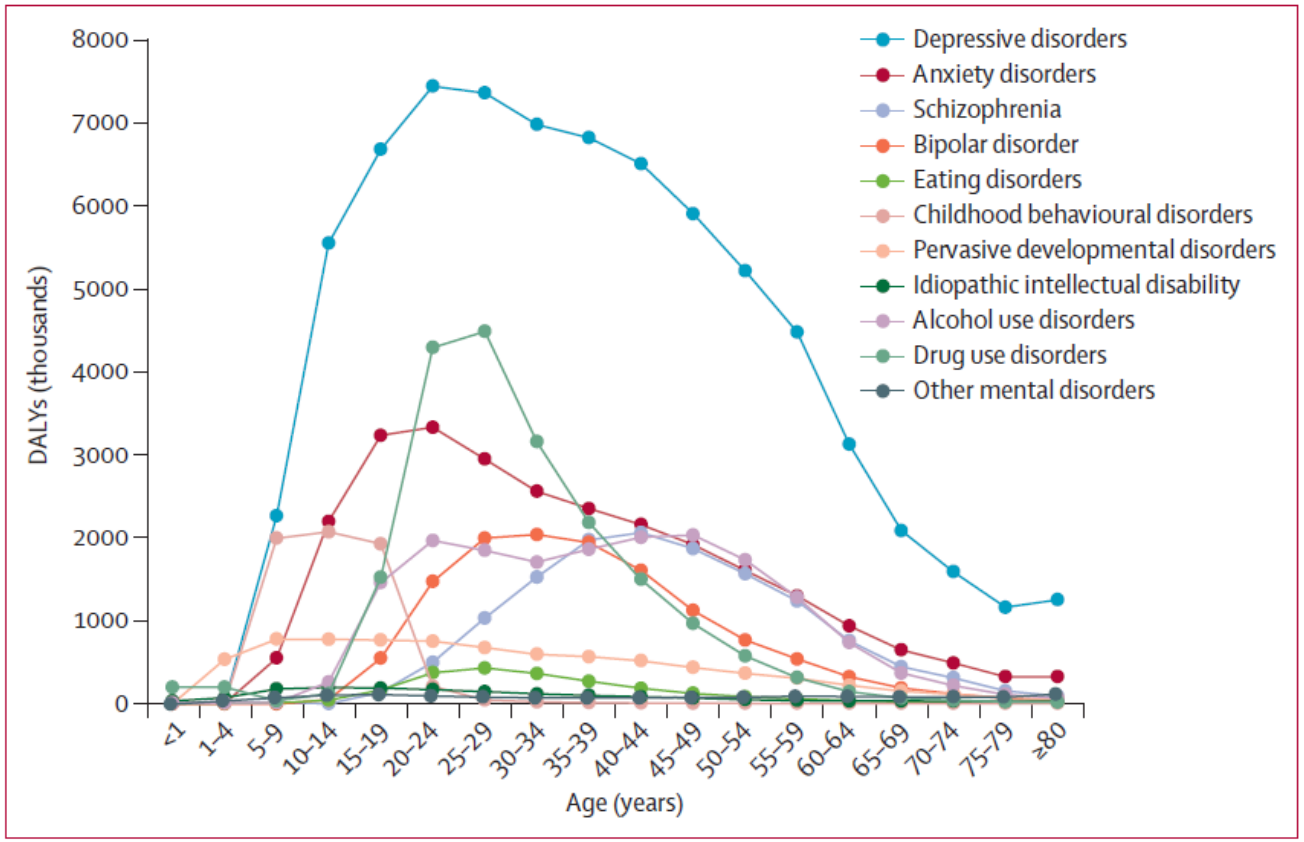

Figure 3: Disability-adjusted life years (DALYs) for each mental and substance use disorder in 2010, by age

Whiteford, H A et al. (2013). *Lancet* 382: 1575-86.

DSM-V diagnostic criteria for major depression

- Depressed mood
- Anhedonia
- Appetite or weight changes (+ or -)
- Sleep changes (+ or -)
- Psychomotor retardation or agitation (+ or -)
- Fatigue or loss of energy
- Loss of concentration
- Feelings of worthlessness or excessive guilt
- Suicidal ideation

Evolutionary explanations for depression
Saving energy
Sickness behaviour
Managing risk-taking in adverse circumstances
Learning
Problem solving rumination
Disengagement from goals
Signalling and care eliciting

The issues about these are (a) their multiplicity; (b) people who experience bad circumstances and become depressed should have higher fitness than people who experience the same bad circumstances and are resilient

Depression / low mood distinction

Harmful dysfunction of (adaptive) low mood system

- Genetic mutation
- Neurobiological malfunction
- Developmental dysregulation

Problems with the depression / low mood distinction

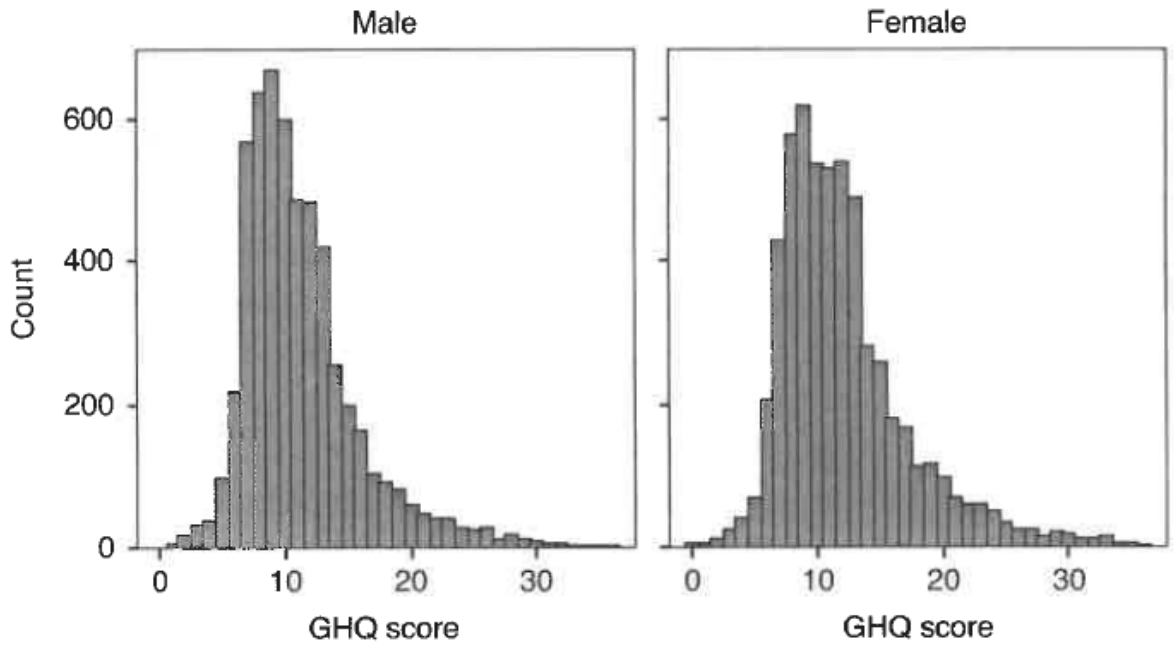

Fig. 7.1 Distribution of scores on a self-report measure of affective symptoms (the short form of the General Health Questionnaire; higher scores indicate more symptoms reported; "count" means the number of individuals in the sample with that symptom score), by 11,281 British 42-year-olds from the National Child Development Study cohort.

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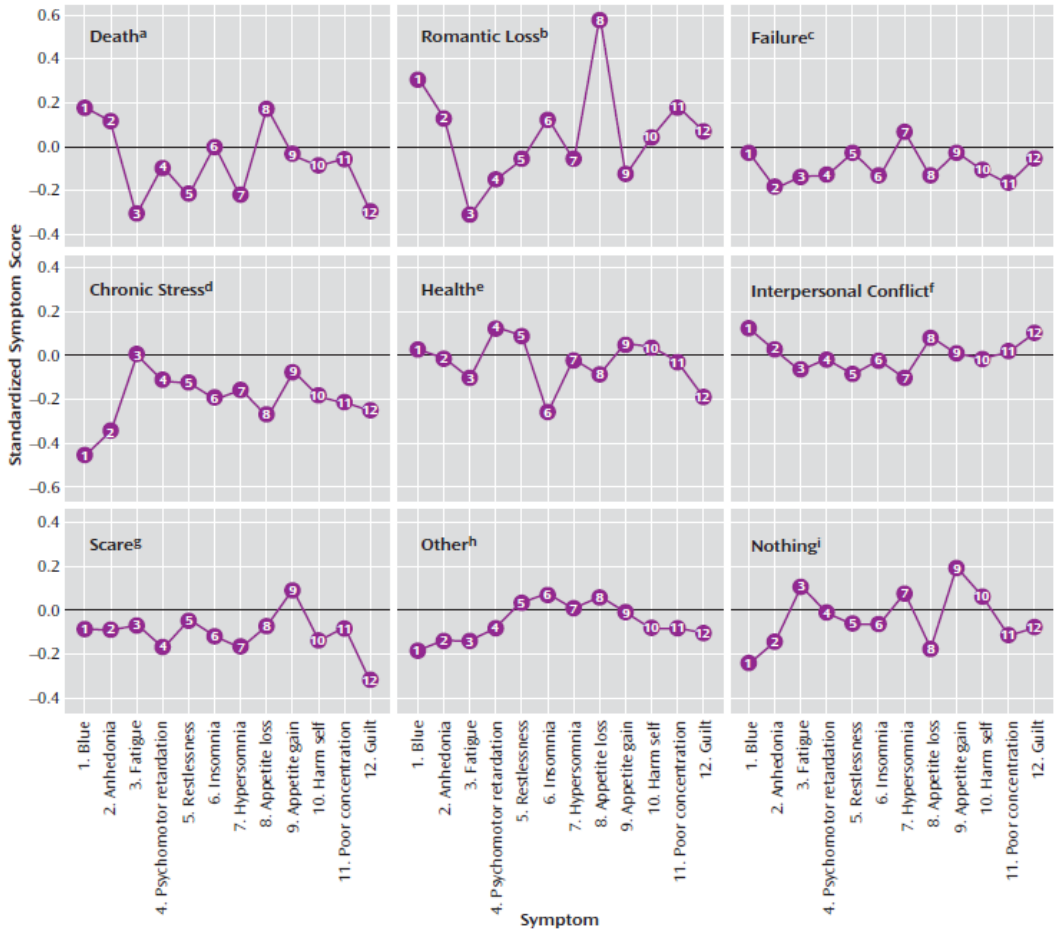
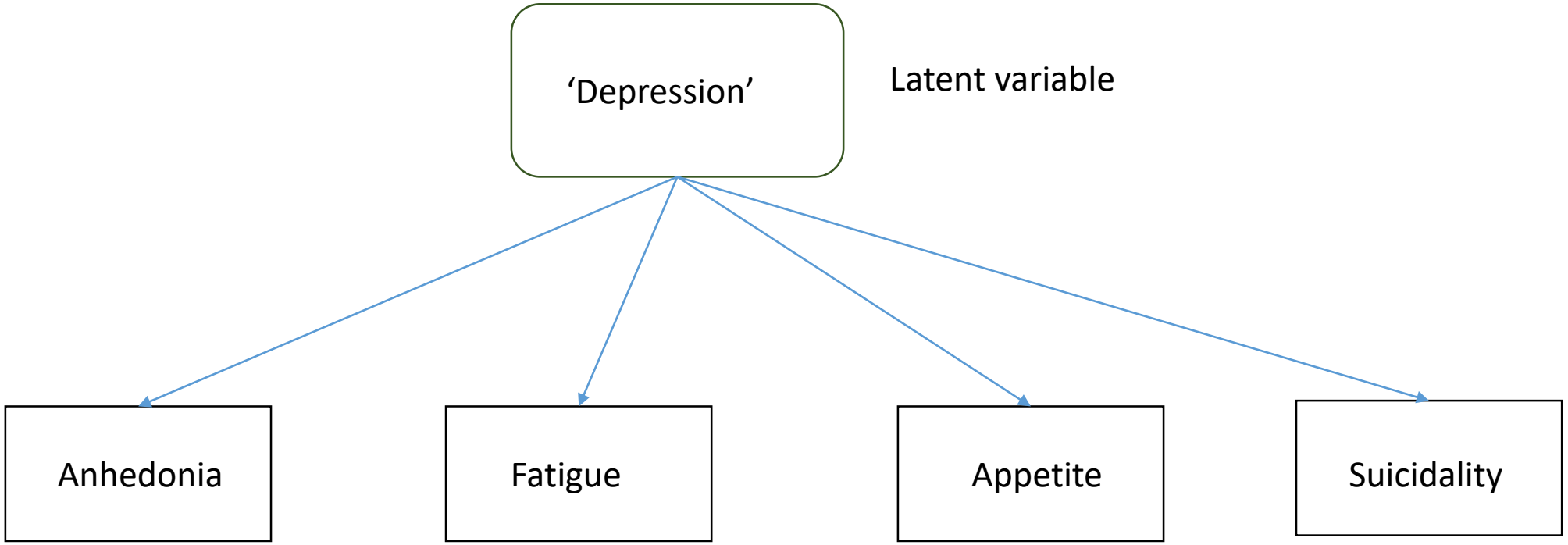
Heterogeneity

FIGURE 1. Profiles of Average Depressive Symptom Levels for the Nine Adverse Life Event Categories From the Between-Persons Sample (N=3,137)

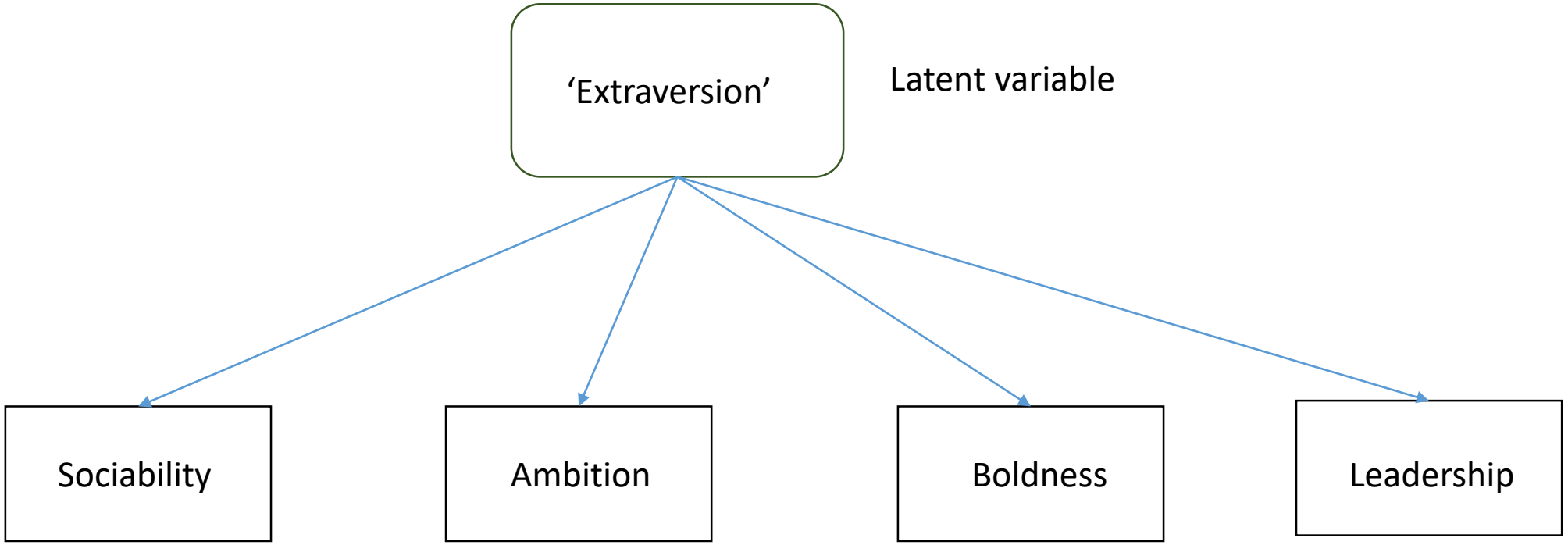


Keller, M. C., Neale, M. C., & Kendler, K. S. (2007). Association of different adverse life events with distinct patterns of depressive symptoms. *American Journal of Psychiatry*, *164*, 1521–1529.

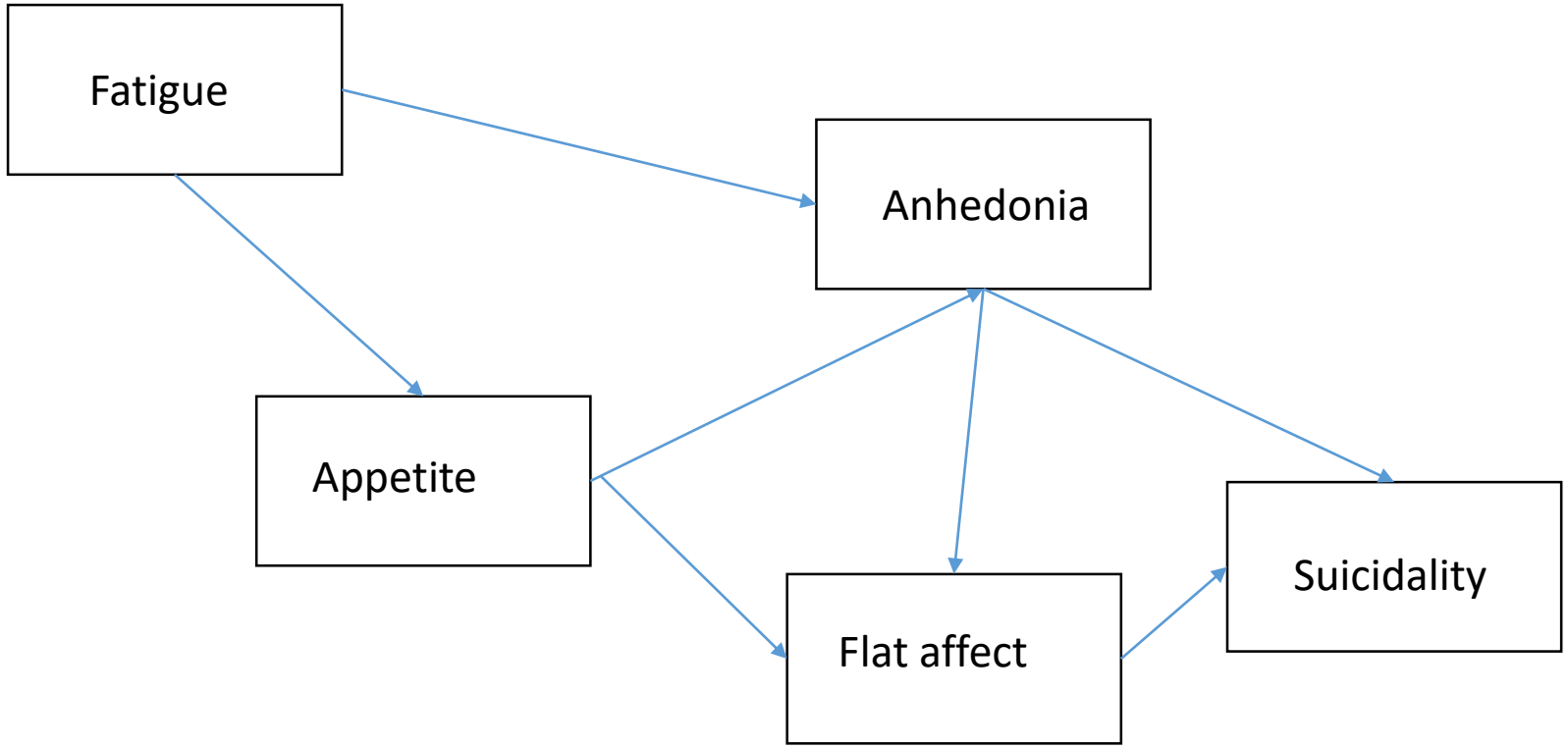
Depression as a latent variable



Latent variables in psychology



‘Symptomics’ approach



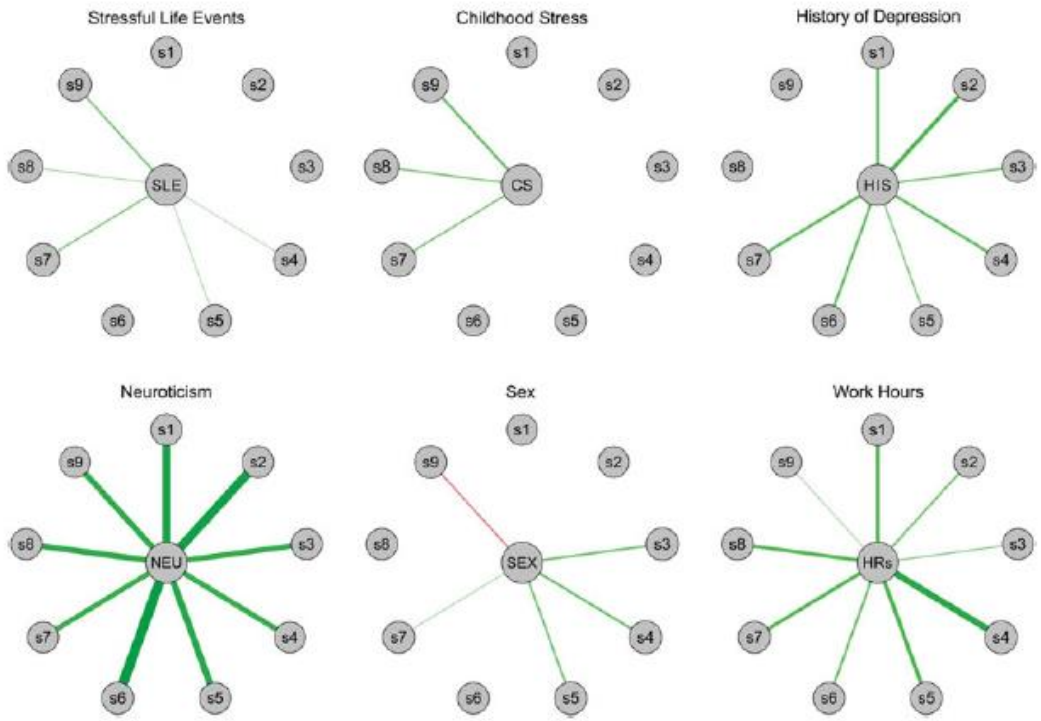
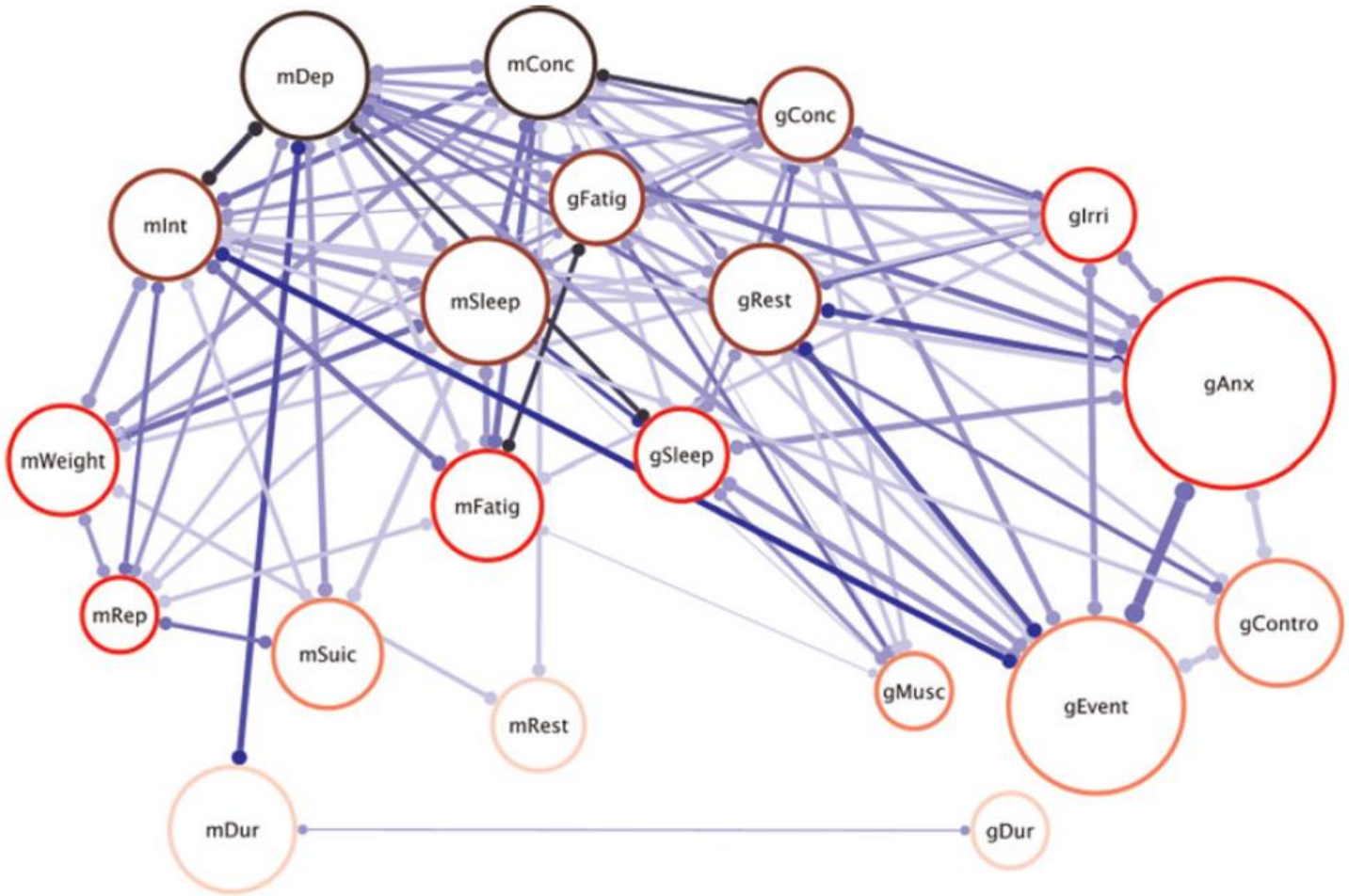


Fig. 2. Standardized regression coefficients of six risk factors on changes of nine depression symptoms during residency, as estimated by the heterogeneity model. Thickness of lines indicates strength of regression weights. Green lines represent positive regression weights, red lines negative ones; sex was coded 0=male, 1=female. s1, interest; s2, depressed; s3, sleep; s4, fatigue; s5, appetite; s6, self-blame; s7, concentration; s8, psychomotor; s9, suicide.

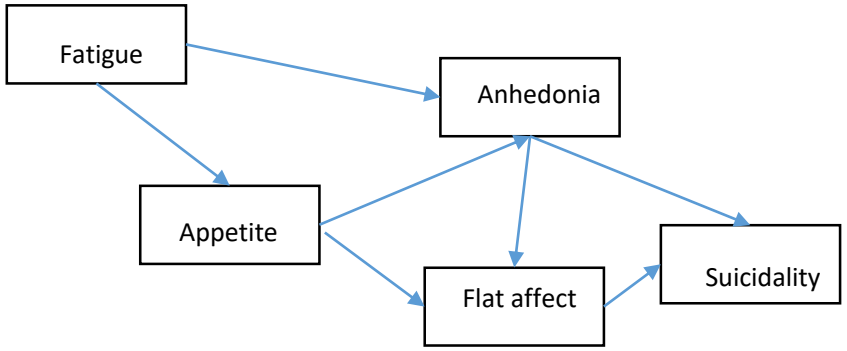
Fried, E. I., Nesse, R. M., Zivin, K., Guille, C., & Sen, S. (2014). Depression is more than the sum score of its parts: Individual DSM symptoms have different risk factors. *Psychological Medicine*, *44*, 2067–2076.

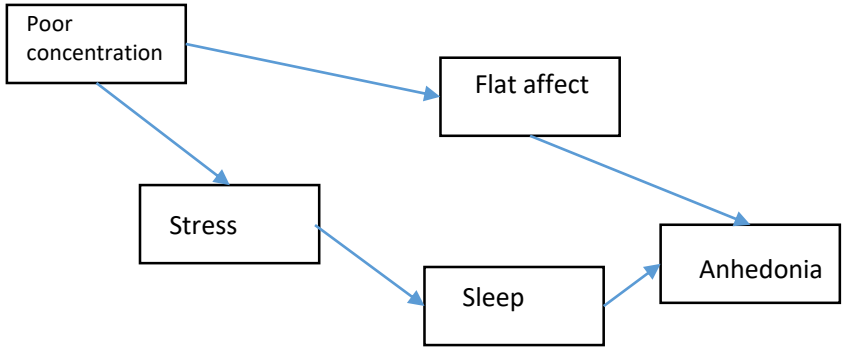
Network model of major depression and generalized anxiety disorder symptoms



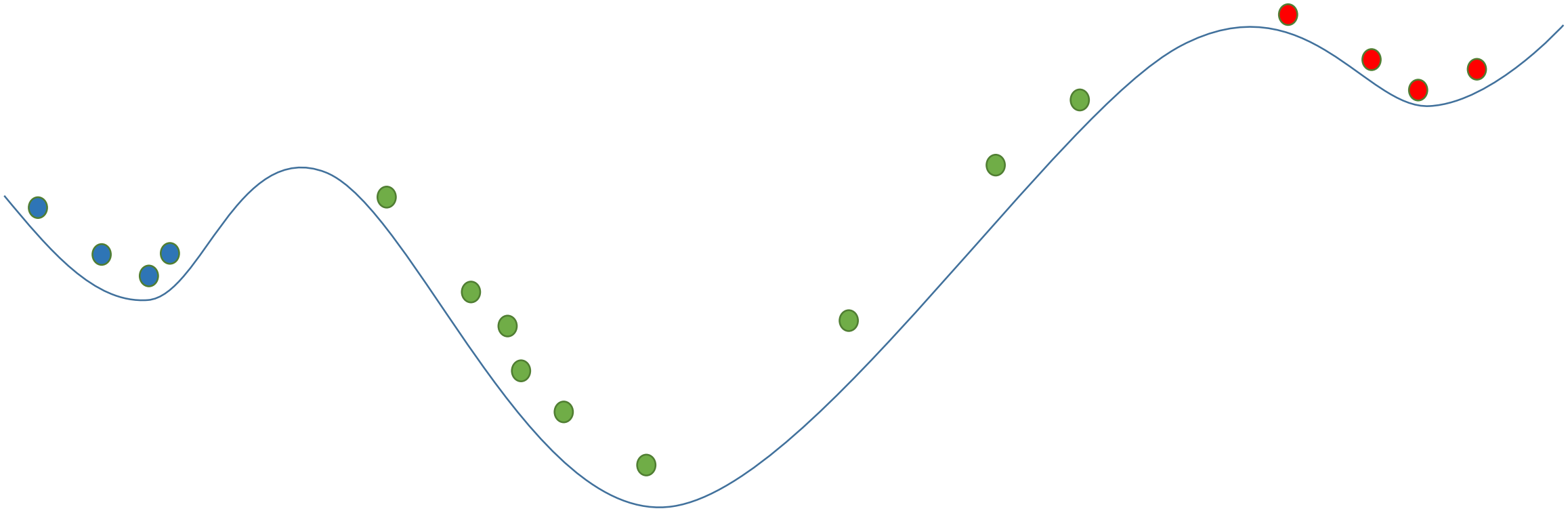
Cramer AOJ, Waldrop LJ, van der Maas HLJ, Borsboom D. 2010 Comorbidity: A network perspective. *Behav. Brain Sci.* **33**, 160–161.

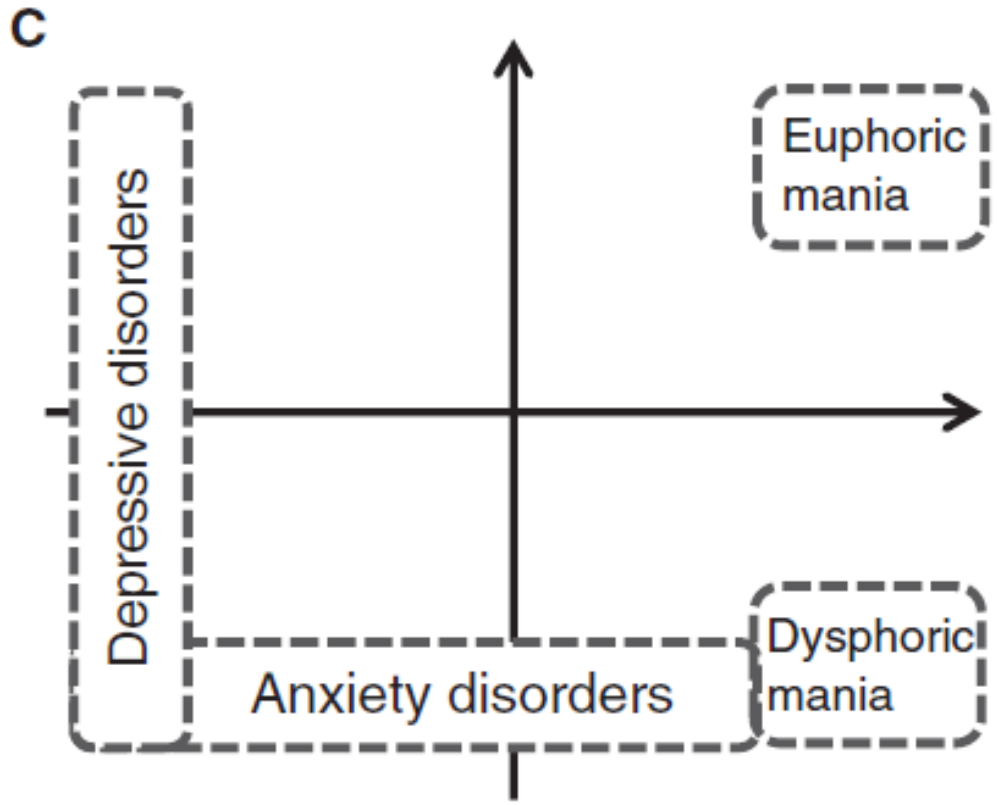
Symptomics approach: Different individuals have not just different symptom profiles, but different causal networks





Symptom networks as dynamical systems





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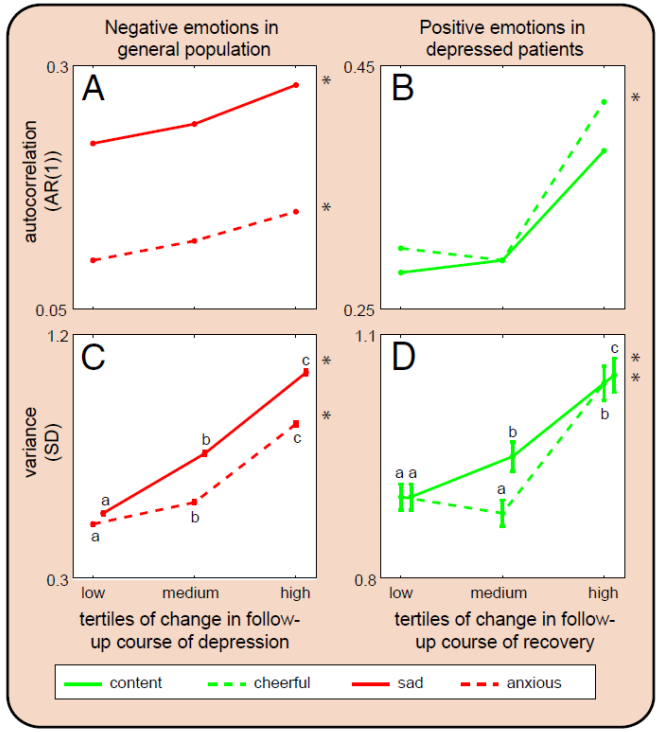

Tuerlinckx F *et al.* 2013 Critical slowing down as early warning for the onset and termination of depression. *Proc. Natl. Acad. Sci.* **111**, 87–92.

Symptomic approach and evolutionary explanation

- The entities in need of evolutionary explanations are not ‘depression’ or even ‘low mood’ but (i) individual symptoms (fatigue, vigilance, etc.); and (ii) common causal linkages between symptoms
- By and large these have animal counterparts and already have sensible explanations
- Much ‘depression’ and ‘anxiety’ represents the normal functioning of this network in the face of adverse environments; and it’s ultimately a homeostatic network in most cases
- ‘Disorder’ in the system arises idiopathically, due to genetic risk, or because the contemporary environment does not contain certain regularities that the system evolved to expect

Evolution: Medicine or public health?

- Poverty
- Social isolation
- Physical inactivity
- Food insecurity
- Poor working conditions/ lack of job control
- Shift work