

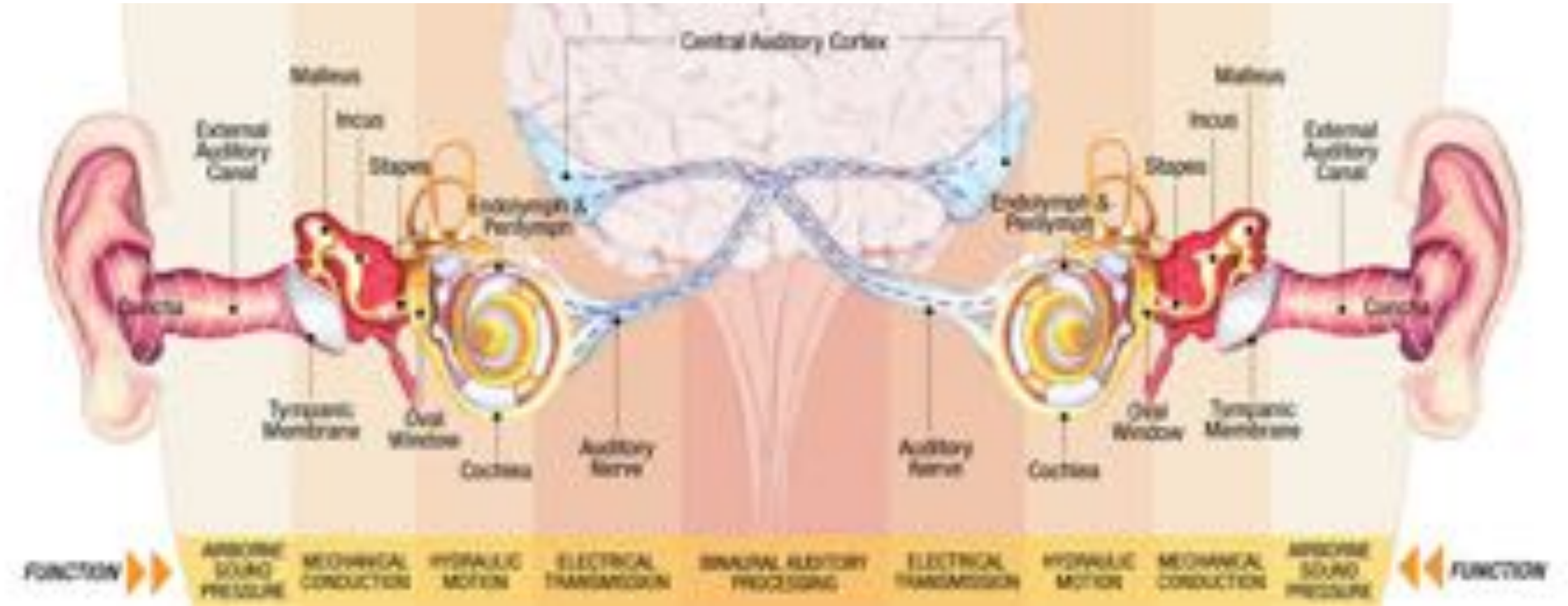


**GHENT
UNIVERSITY**

GELUID EN GEZONDHEID

Prof. Dr. ir. Dick Botteldooren

DE OREN EN DAARTUSSEN



sluit je oren

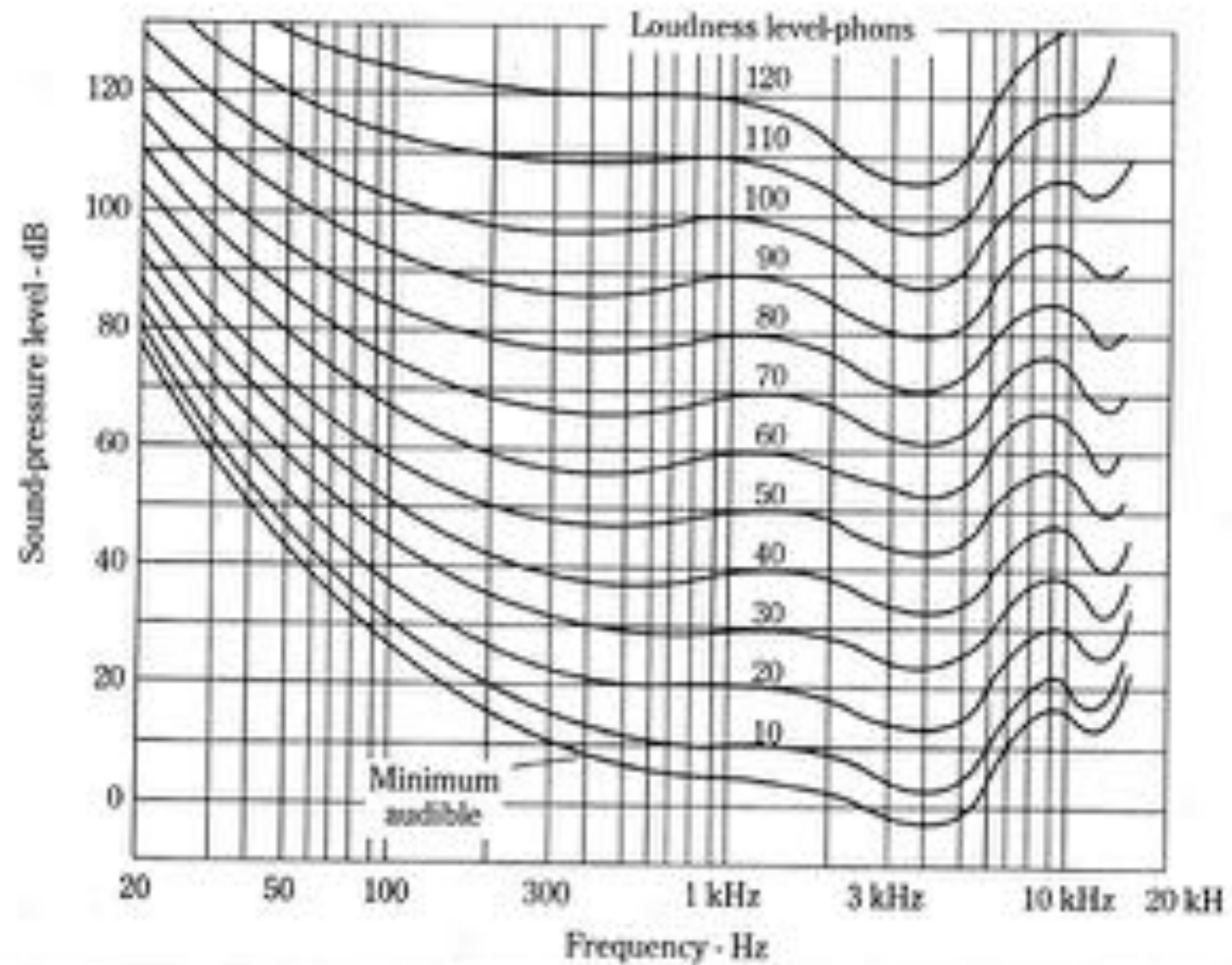
gepercipieerde veiligheid

INHOUD

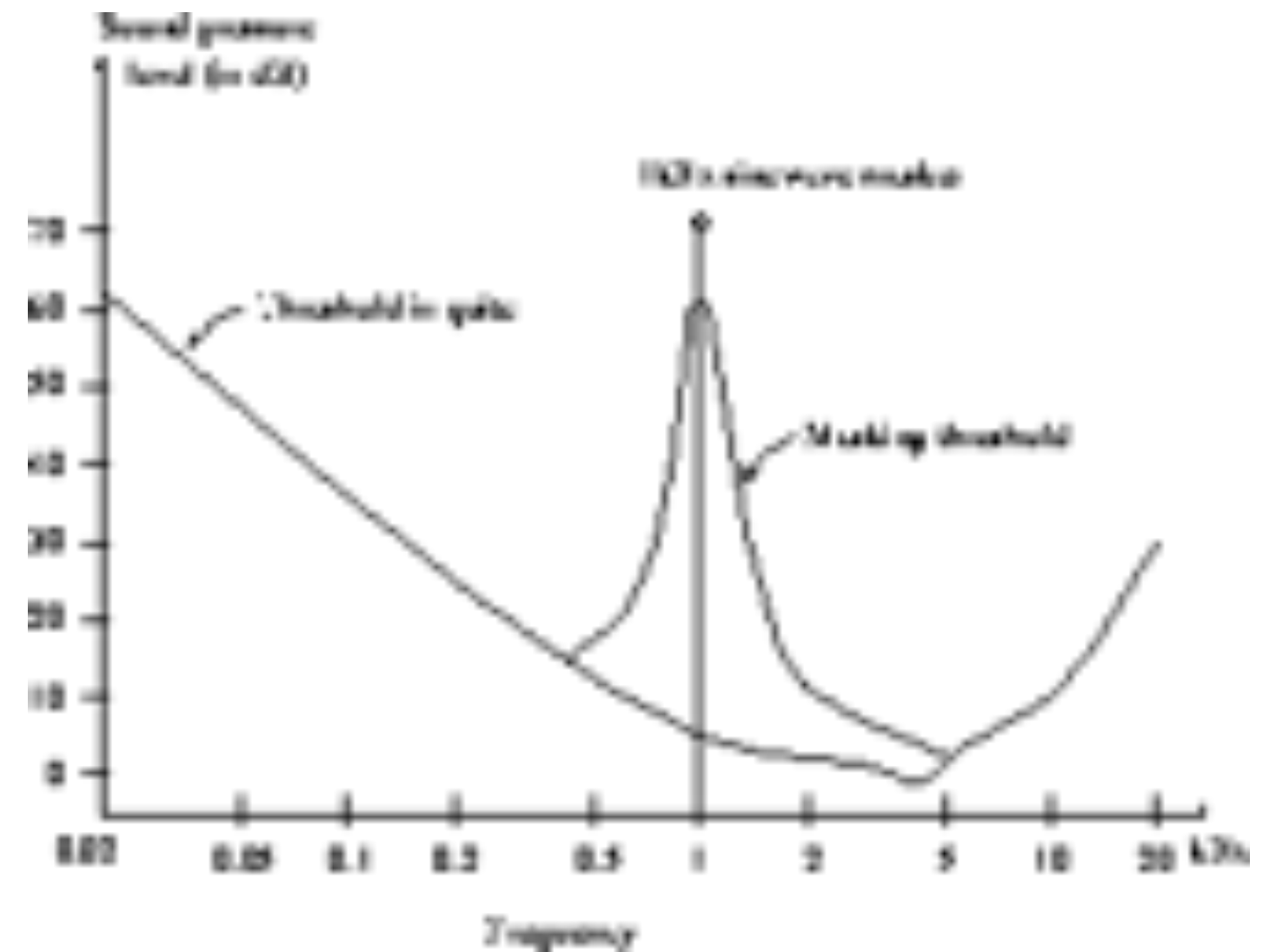
- Wat kunnen we horen
- Wat horen we
- Autonome respons
- Lange-termijn adaptatie
- Cardiovasculair
- Mentaal
- Speciale geluidsbronnen

WAT KUNNEN WE HOREN

Gevoeligheid voor zuivere tonen, foon



Maskeren



+

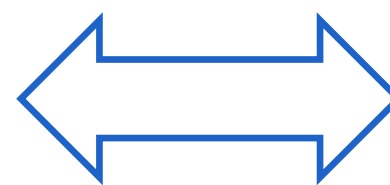
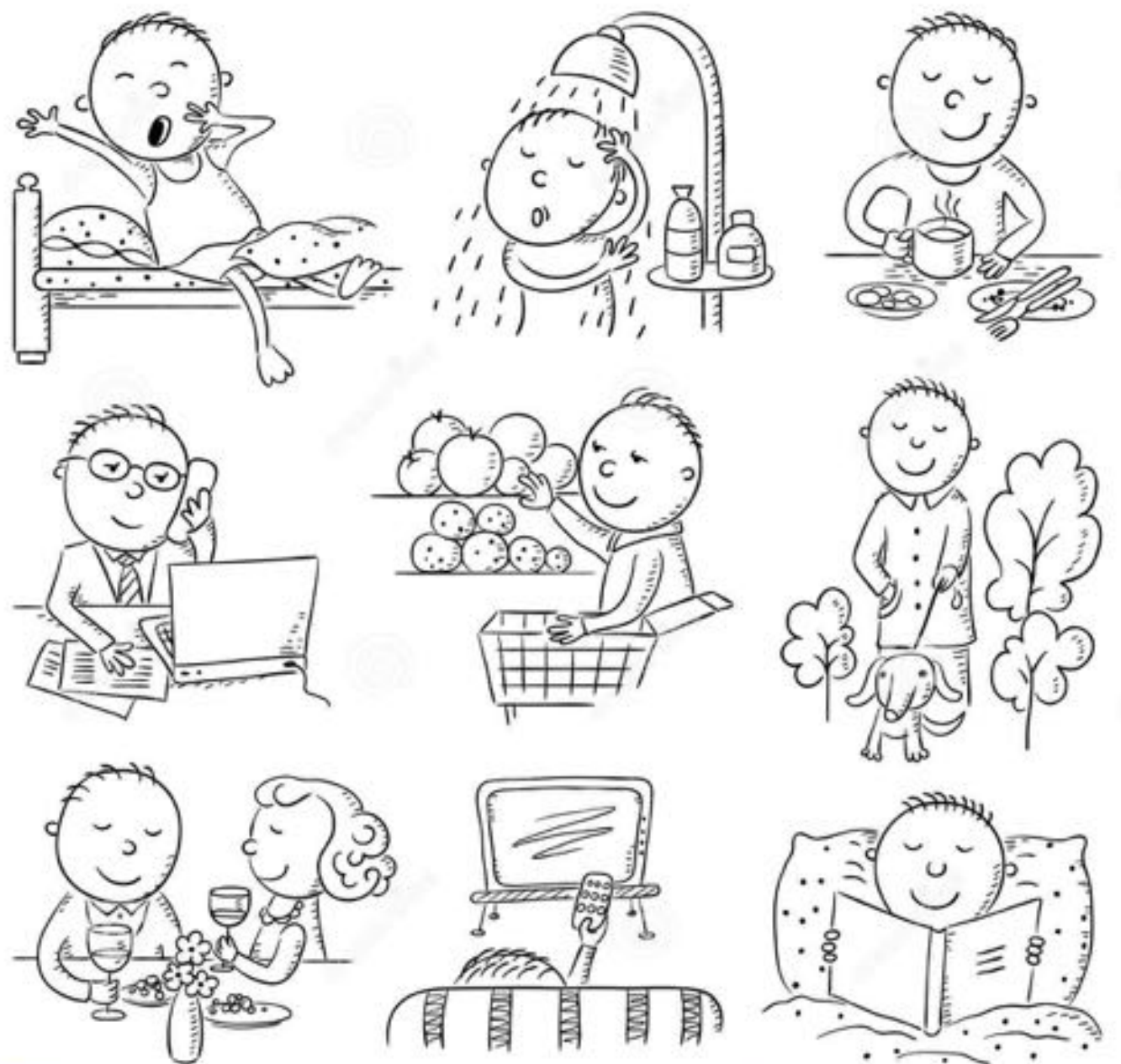
=

Luidheid (ISO 532)

WAT HOREN WE

Activiteiten bepalen aandacht voor omgeving

Omgevingsgeluiden trekken aandacht

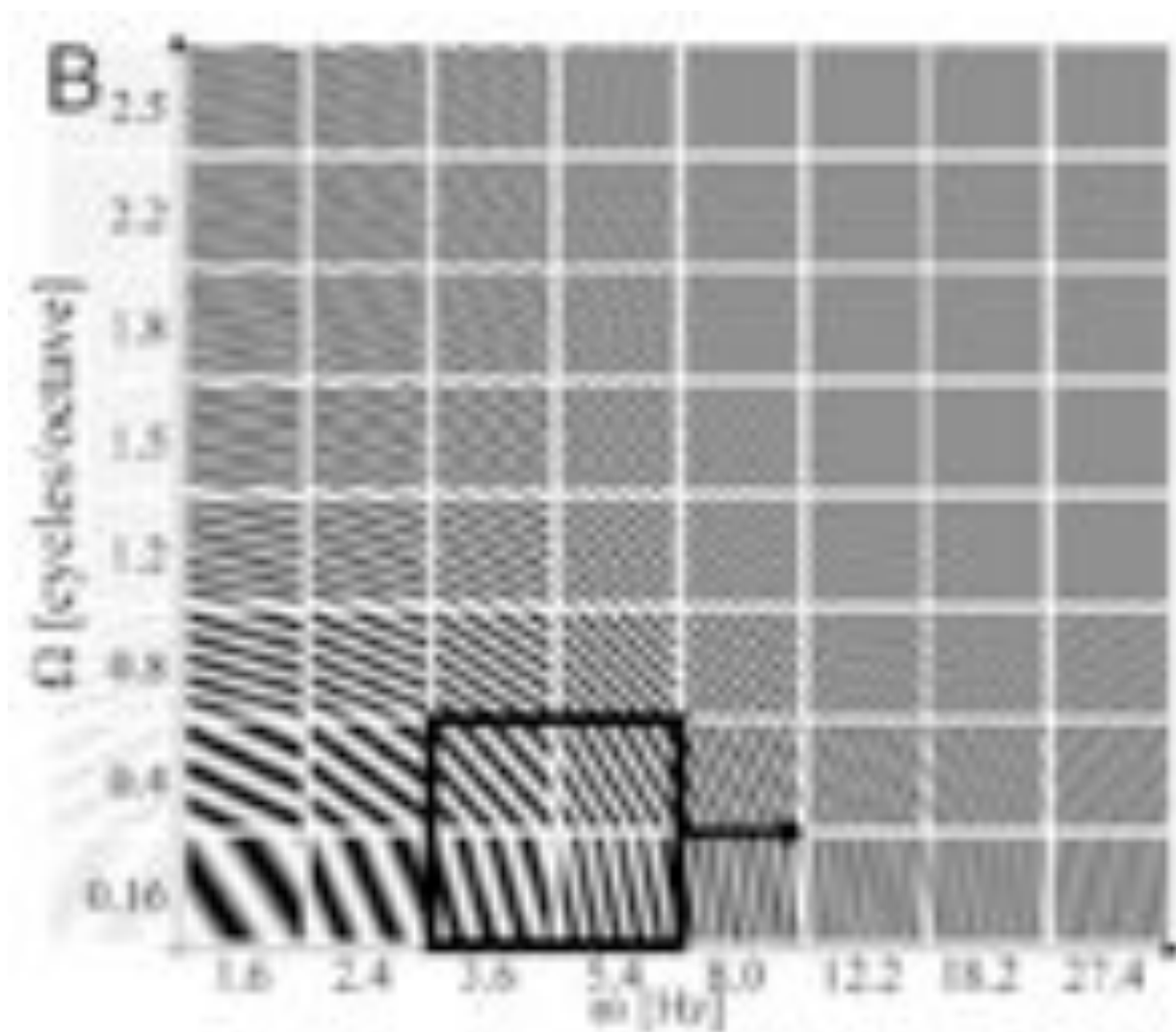


attention
& gating

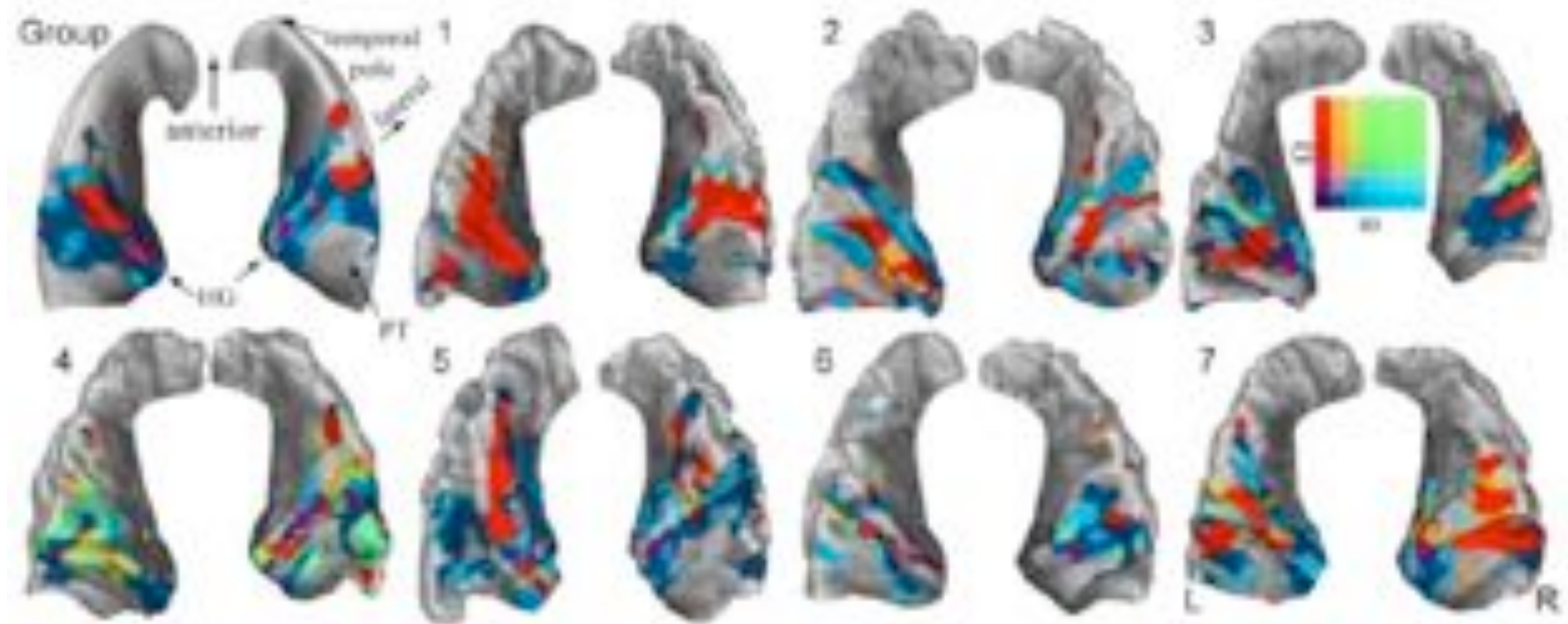


Luidheid
Opvallendheid
- Fluctuaties
- Tonen
- Informatie

WAT HOREN WE



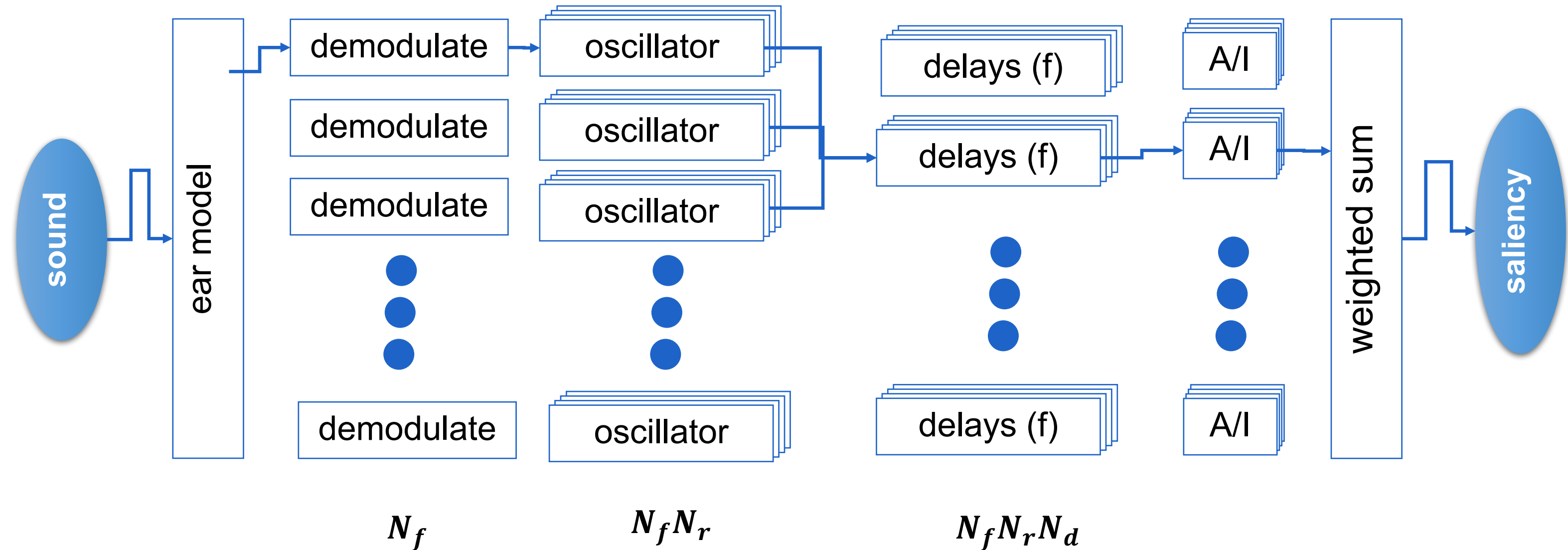
fMRI study
Heschl's gyrus



Schönwiesner, M., & Zatorre, R. J. (2009). Spectro-temporal modulation transfer function of single voxels in the human auditory cortex measured with high-resolution fMRI. *Proceedings of the National Academy of Sciences*, 106(34), 14611-14616.

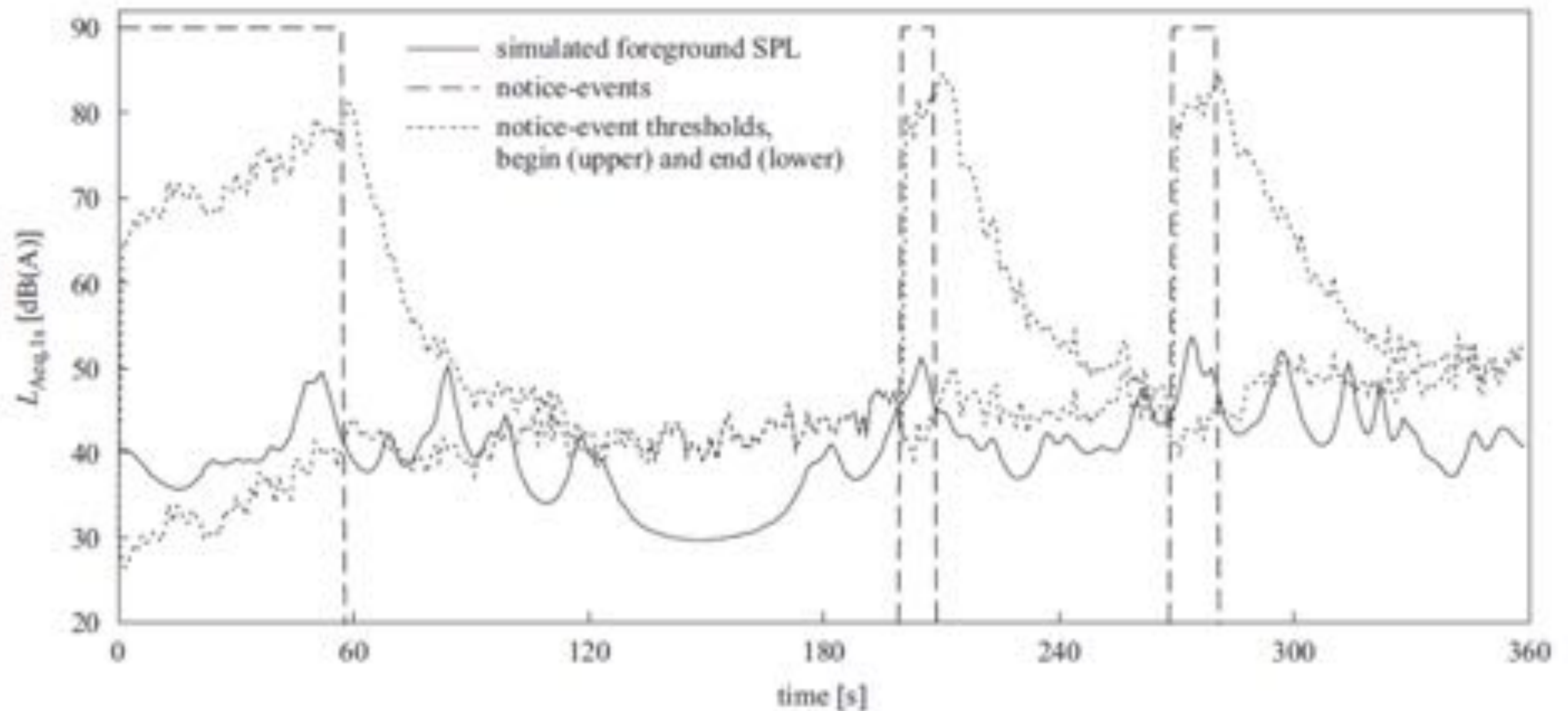
WAT HOREN WE

- Computacioneel model voor opvallendheid



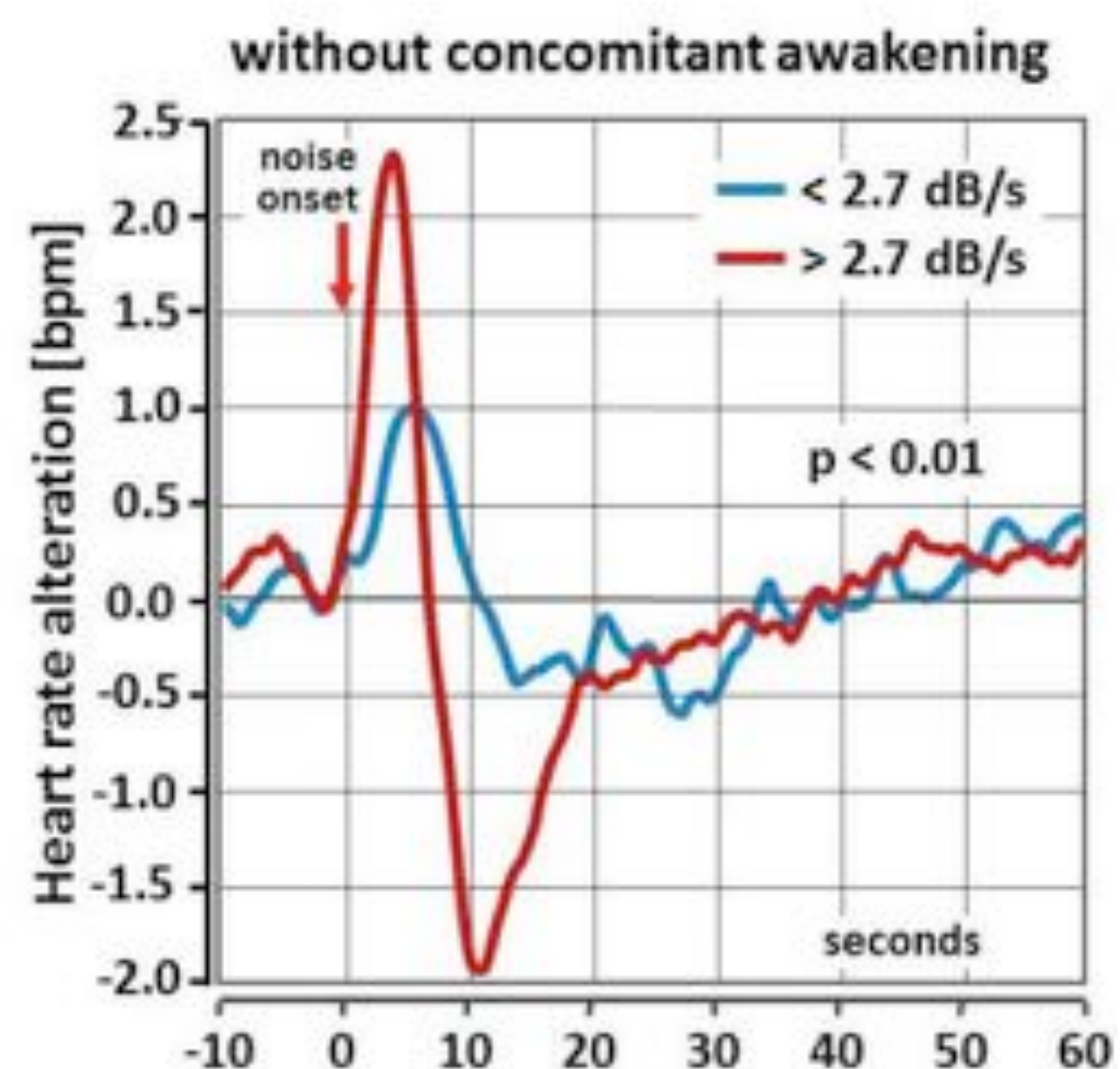
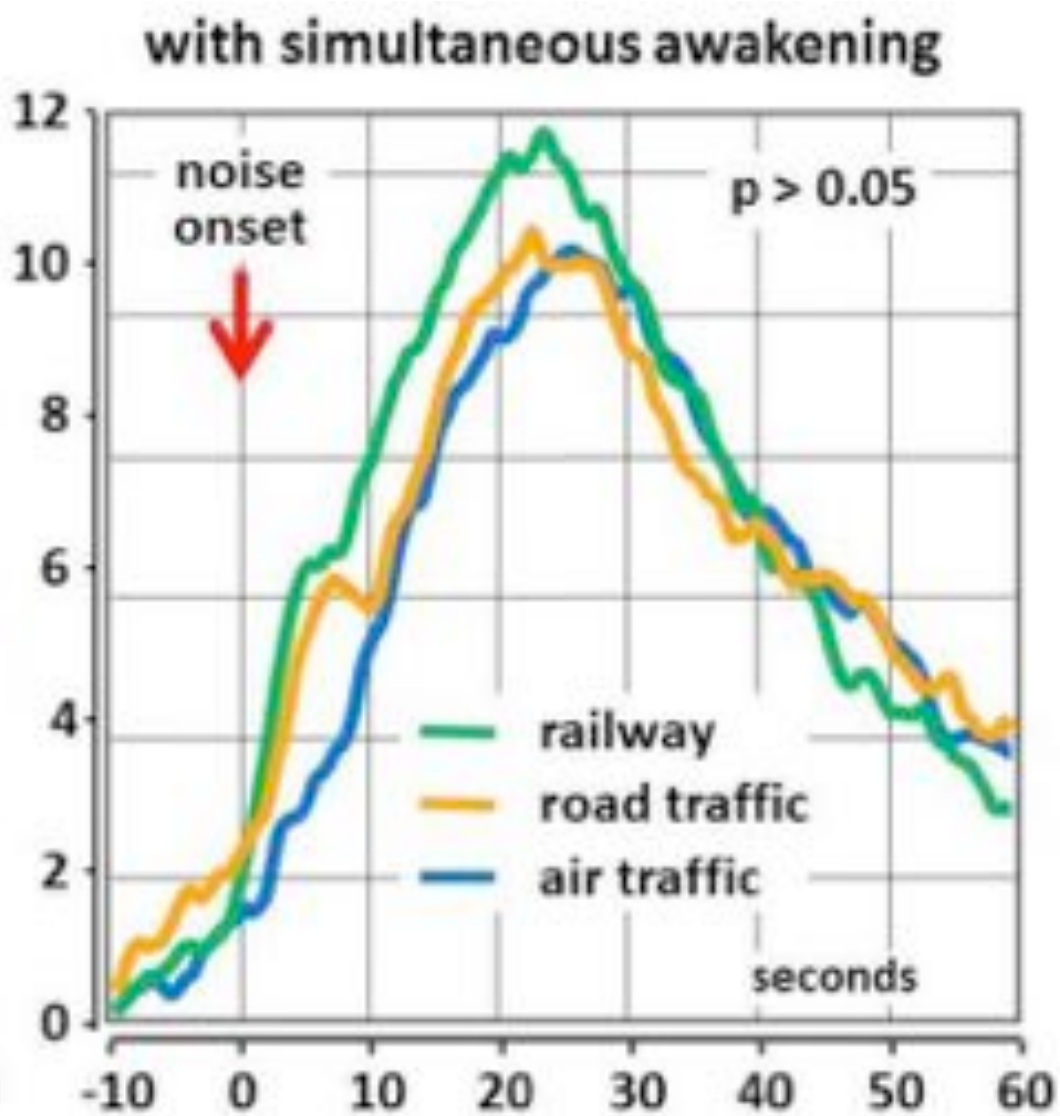
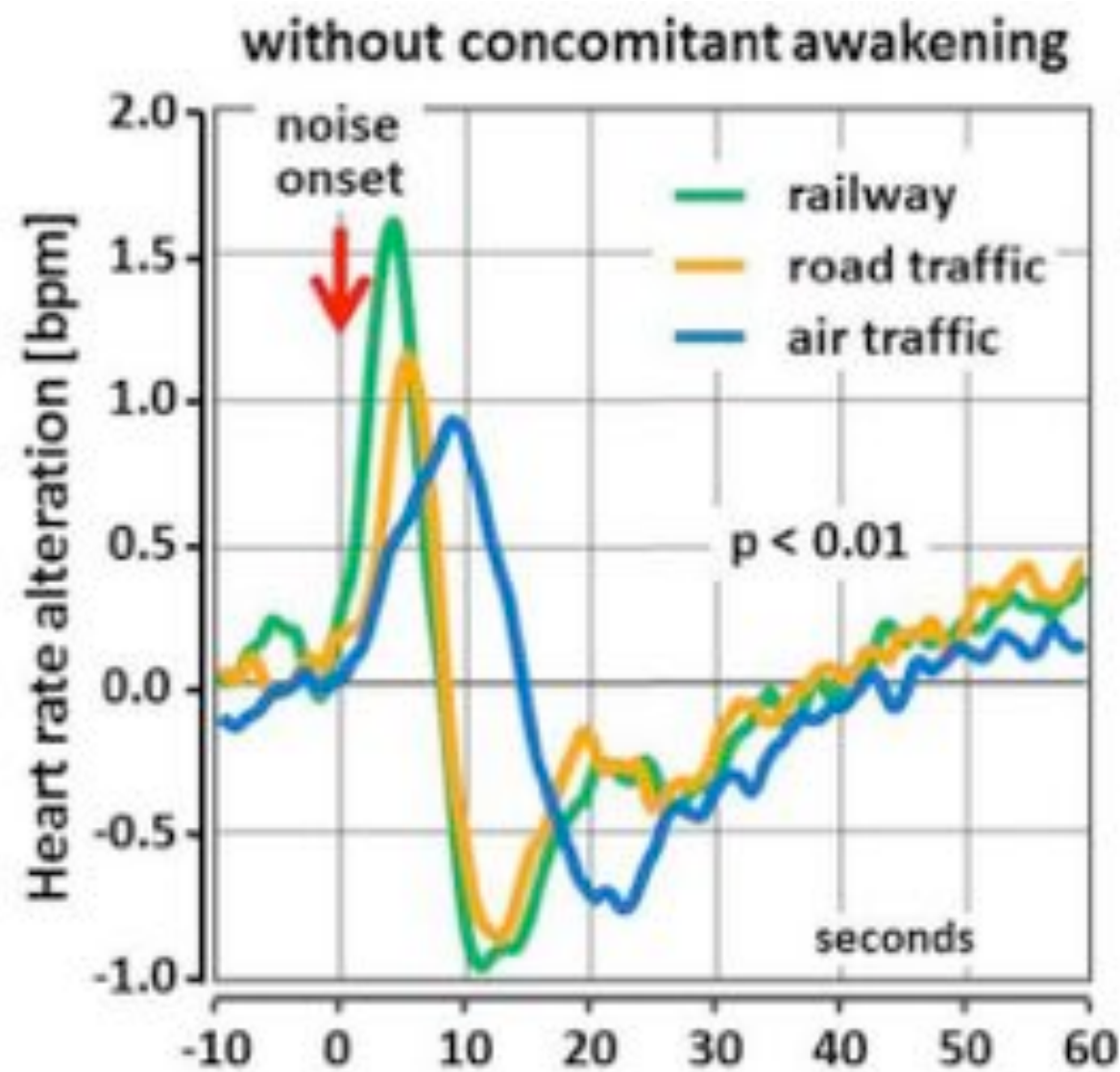
WAT WE HOREN EN EFFECT

– Notice event model



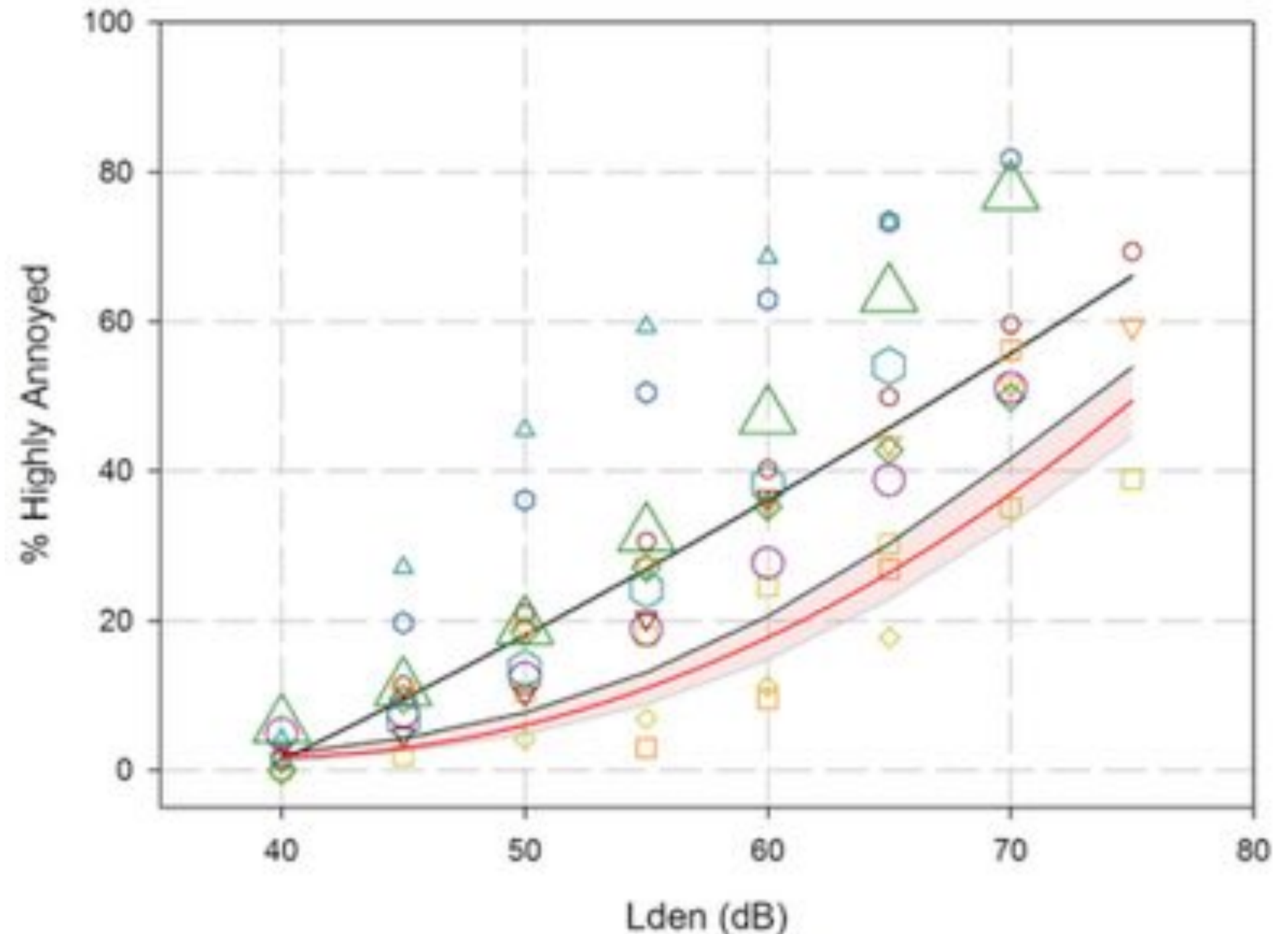
AUTONOME RESPONDS

- Autonomic subcortical arousals

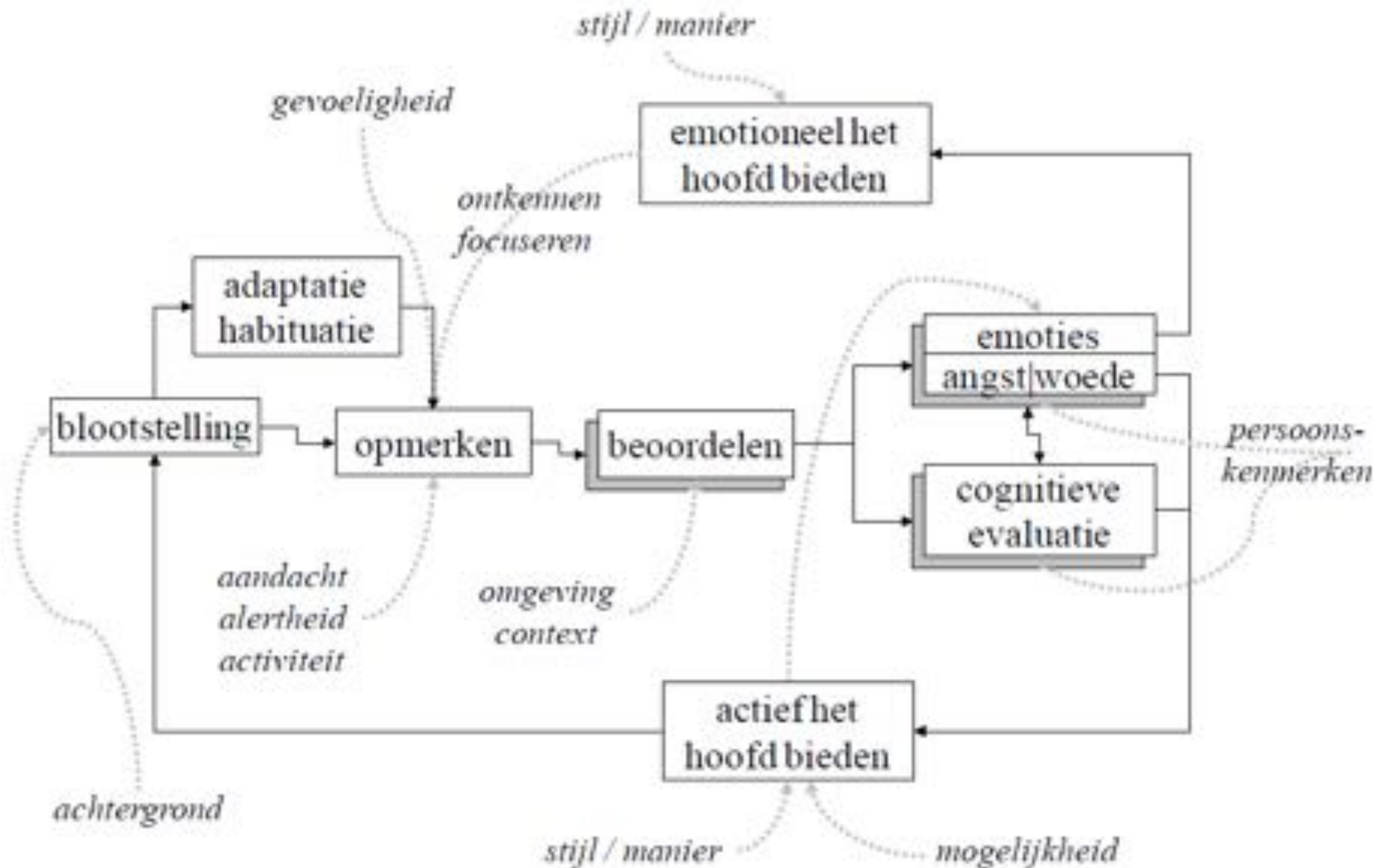


BELEID EN EPIDEMIOLOGISCH ONDERZOEK

– L_{den} – minded \rightarrow spectro-temporeel onnauwkeurig



LANGE-TERMIJN ADAPTATIE

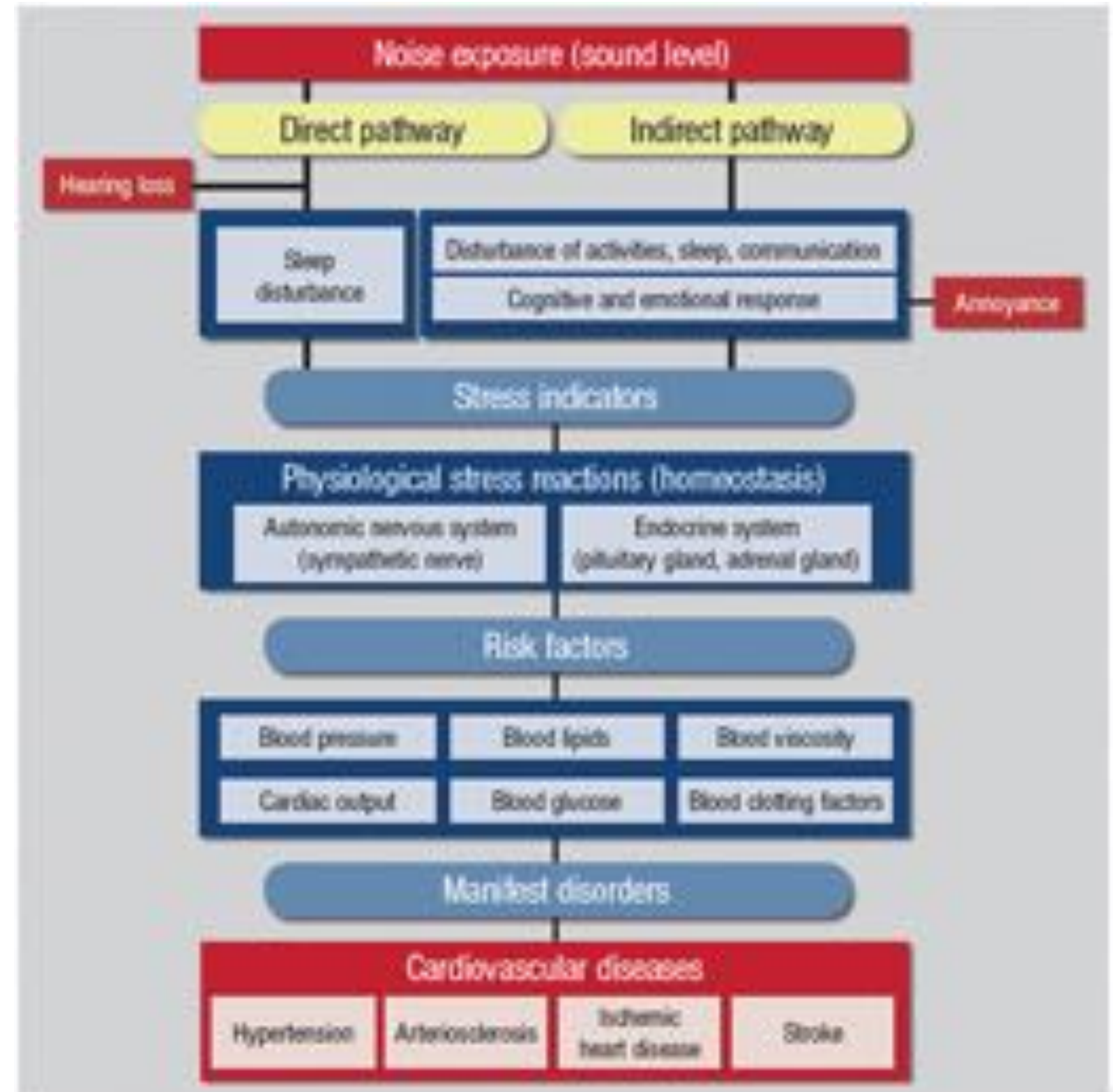
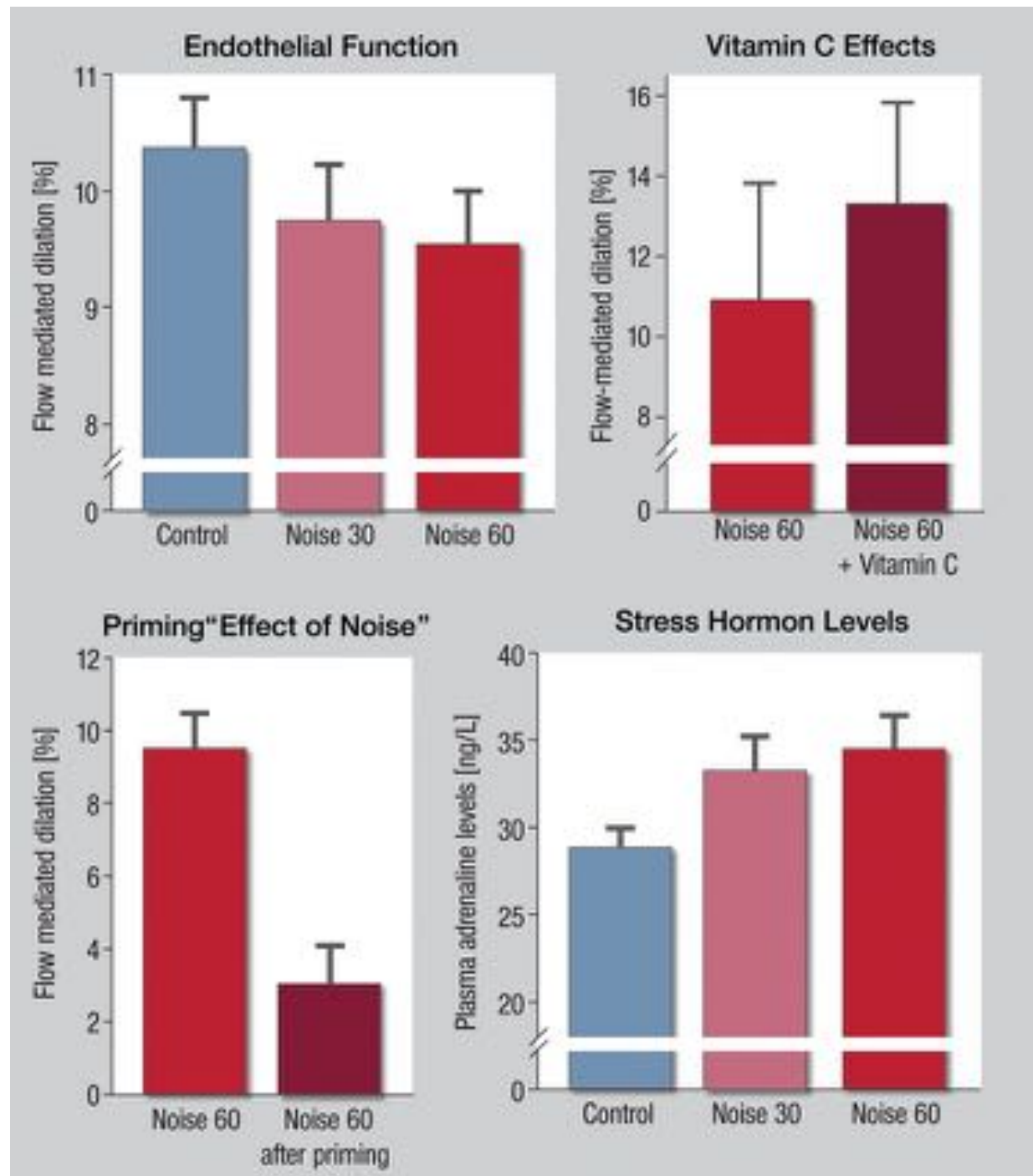


INHOUD

- Wat kunnen we horen
- Wat horen we
- Autonome respons
- Lange-termijn adaptatie
- **Cardiovasculair**
- **Mentaal**
- **Speciale geluidsbronnen**

CARDIOVASCULAIR EFFECT

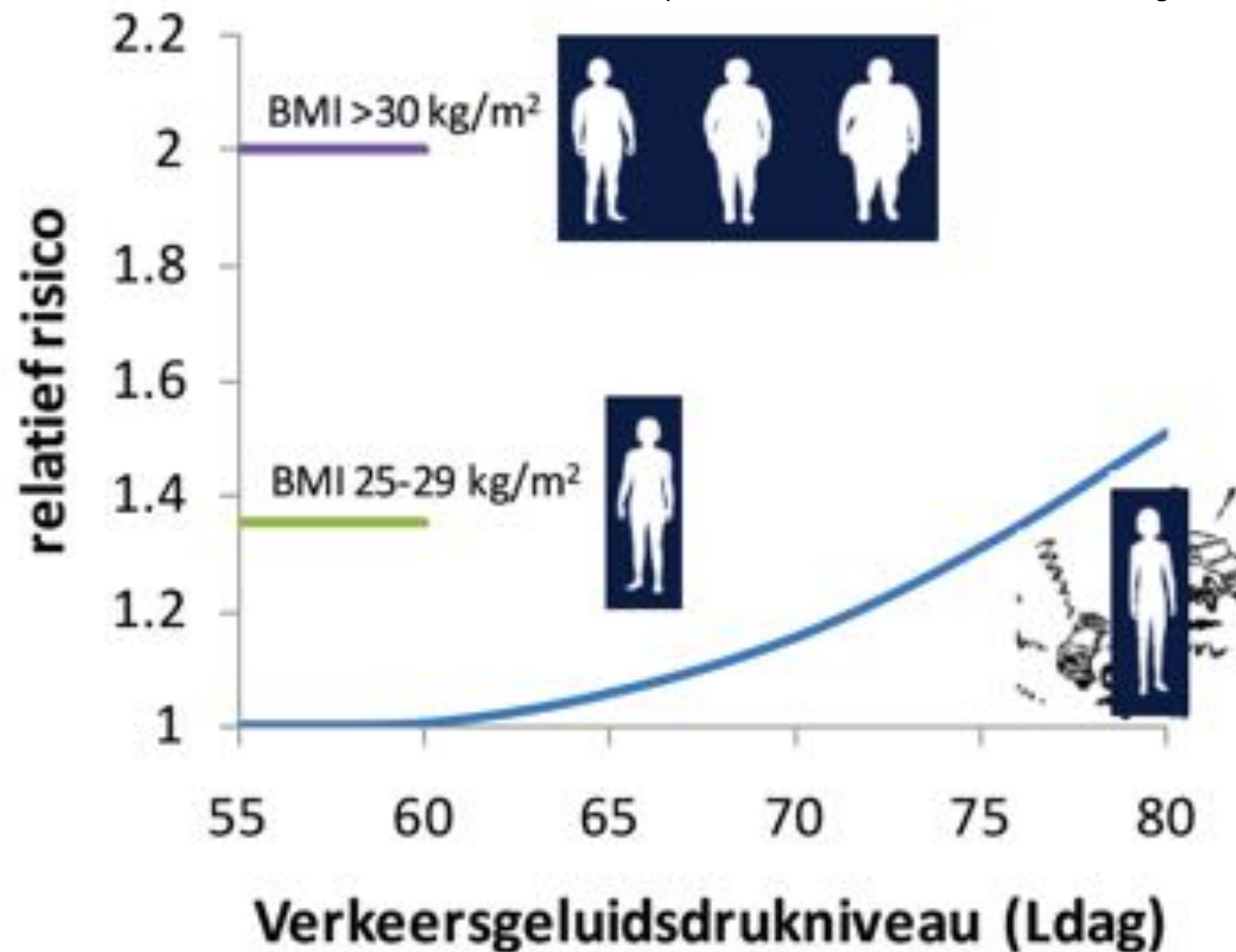
– Mechanismen



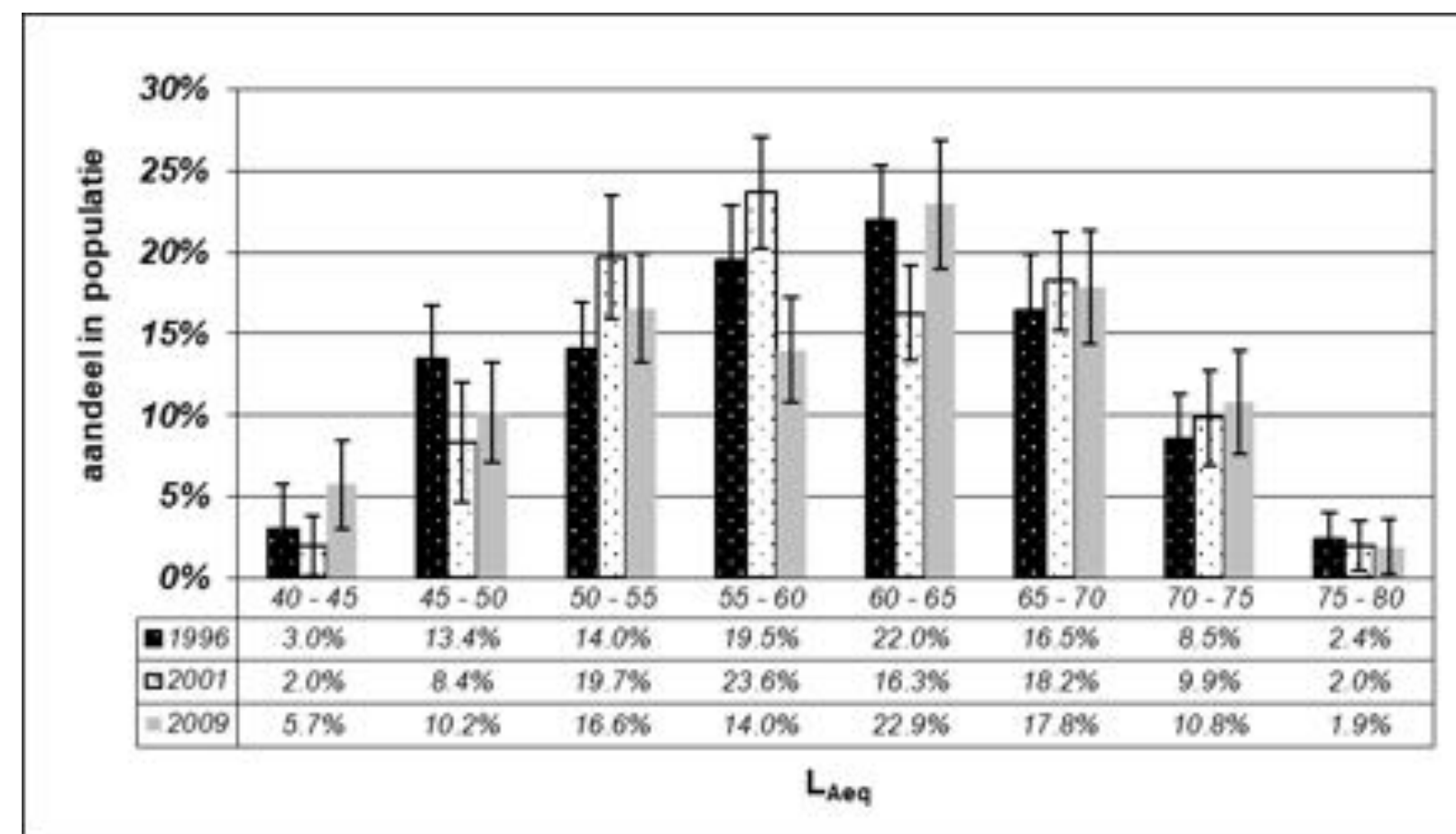
CARDIOVASCULAIR EFFECT

– Epidemiology

relative risk for developing ischemic heart disease as a function of the sound level (LAeq) during the day caused by road traffic noise at the most exposed façade, compared with the risk related to overweight.



blootstelling aan geluid in Vlaanderen (1996-2009)

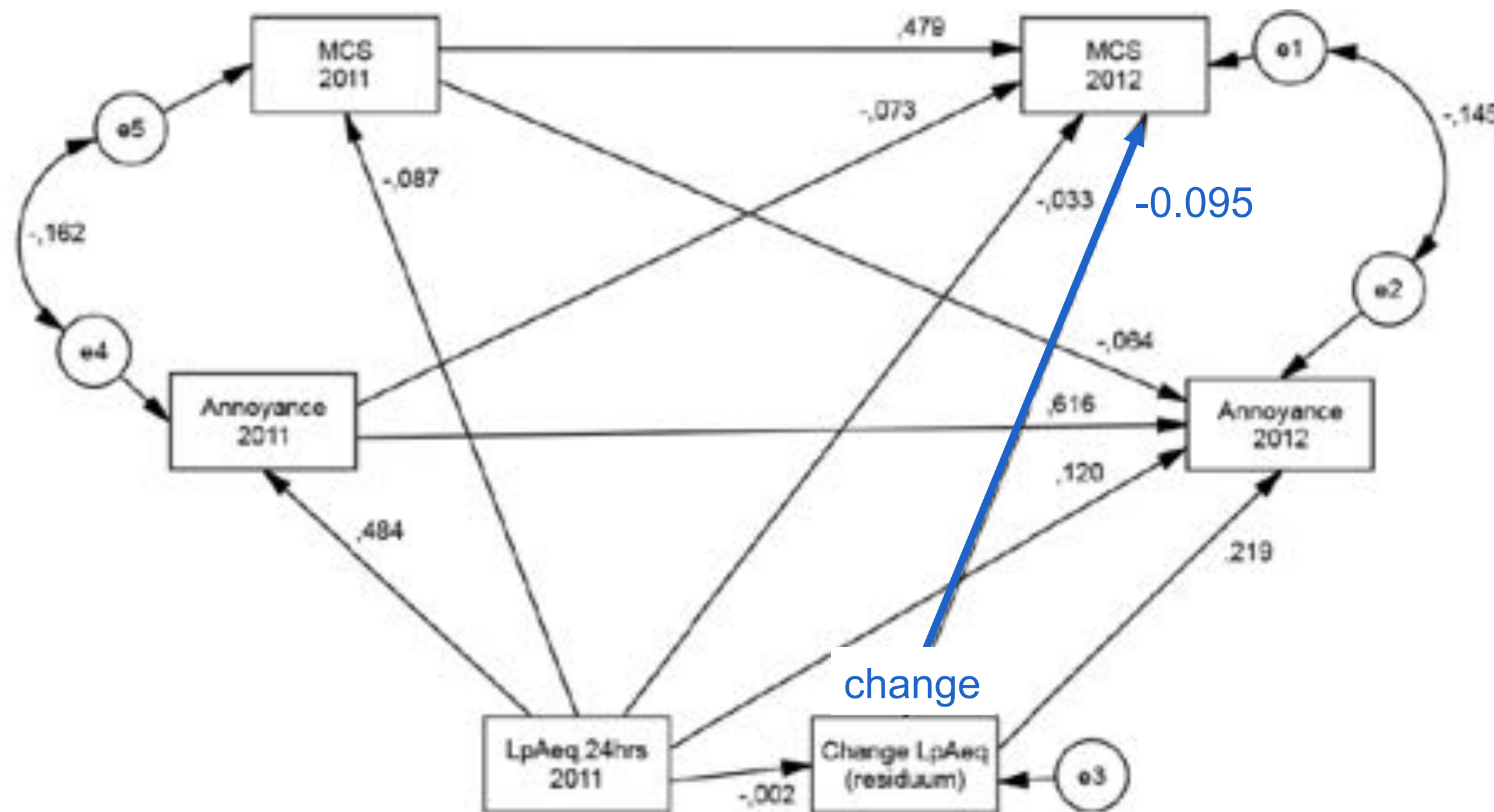


60 dBA

80 dBA

MENTALE GEZONDHEID

- Causaal verband is moeilijk
- Verandering van luchthavenactiviteit – mental Health related QoL



MENTAAL HERSTEL

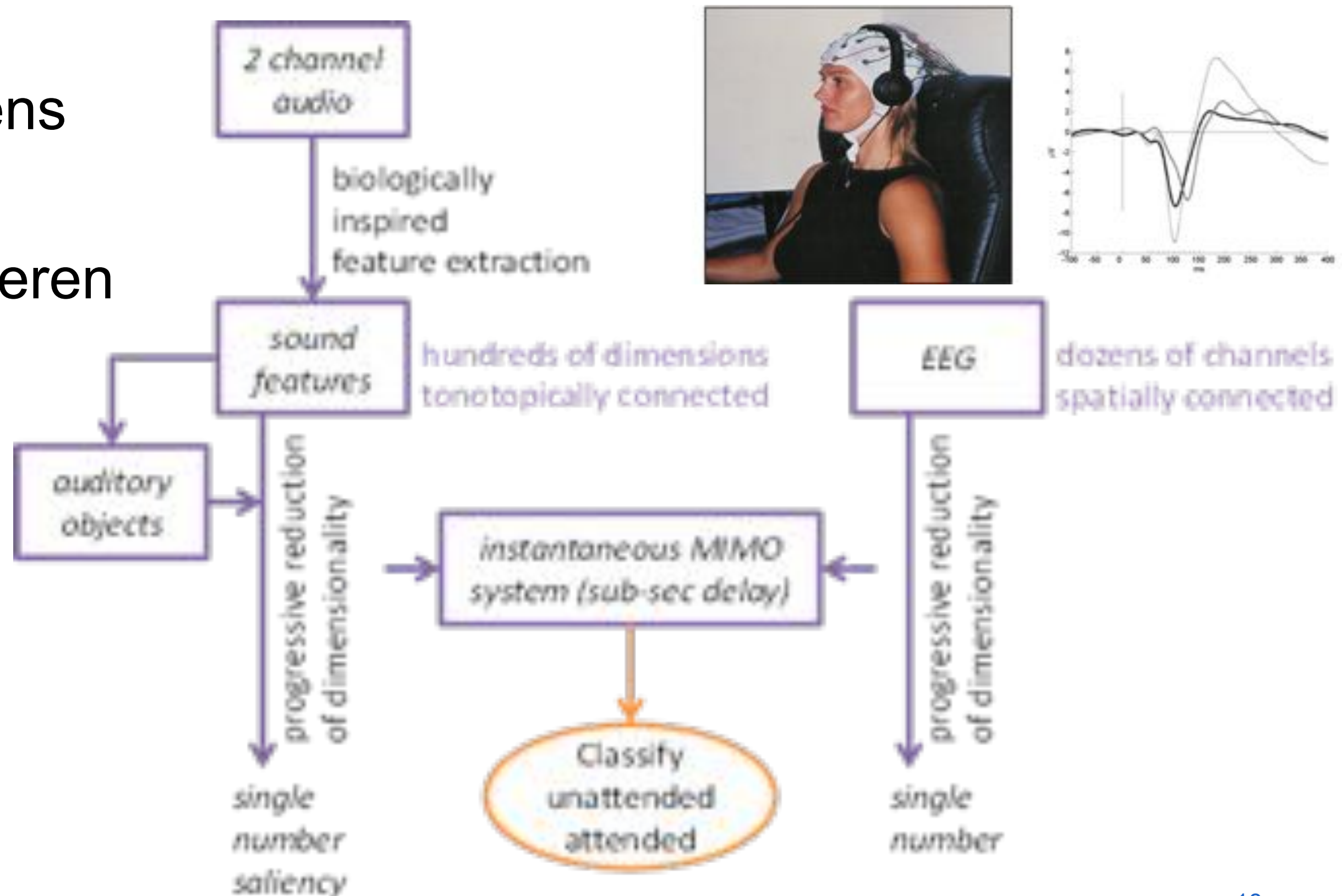
- Geluidslandschap als ondersteuning voor publieke (groene) ruimte en natuur



The role of augmented reality?

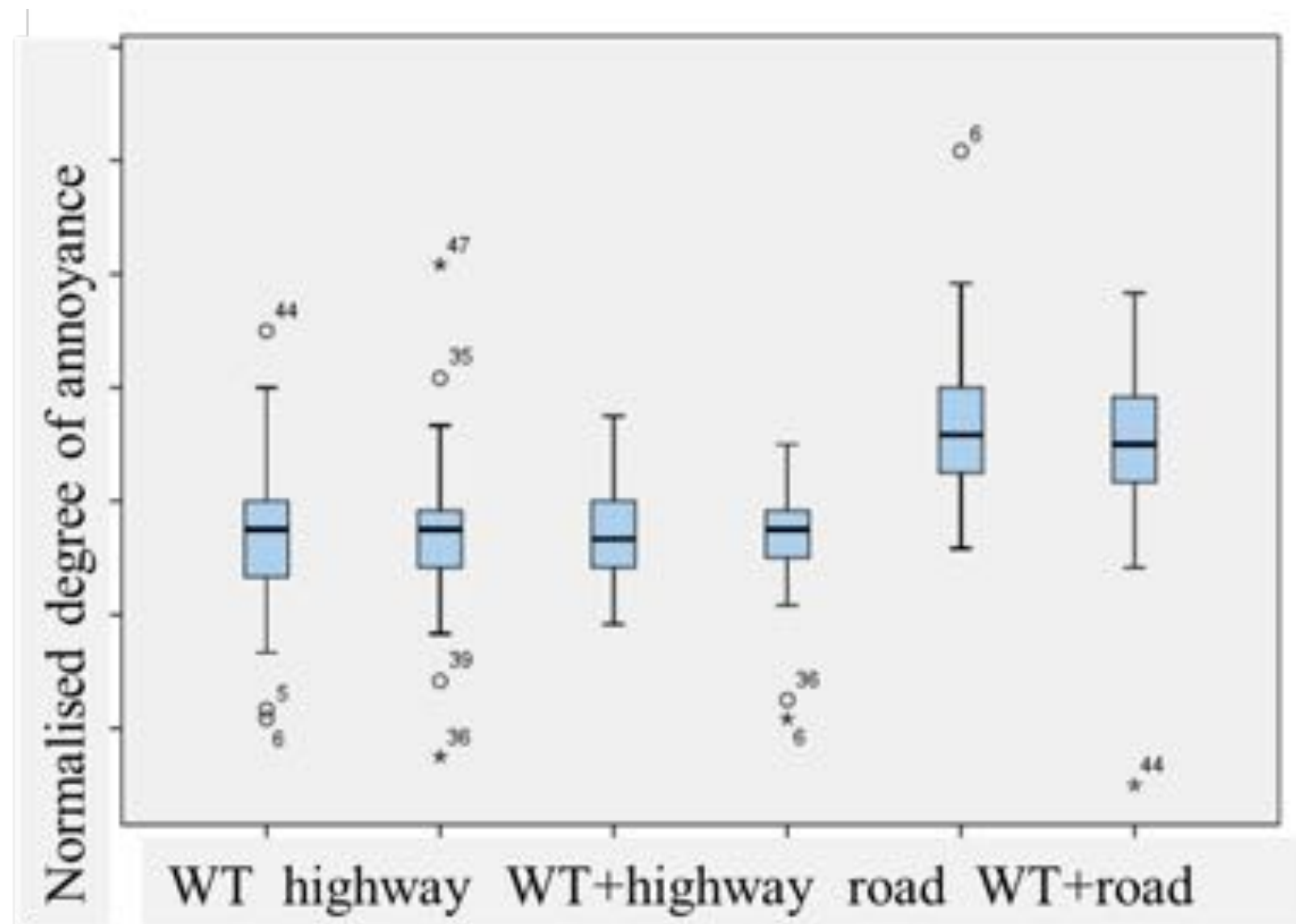
COGNITIEVE EFFECTEN

- Blootstelling thuis
 - Op school en tijdens taakuitvoering
- Afleiding / focuseren van aandacht



BIJZONDERE GELUIDSBRONNEN

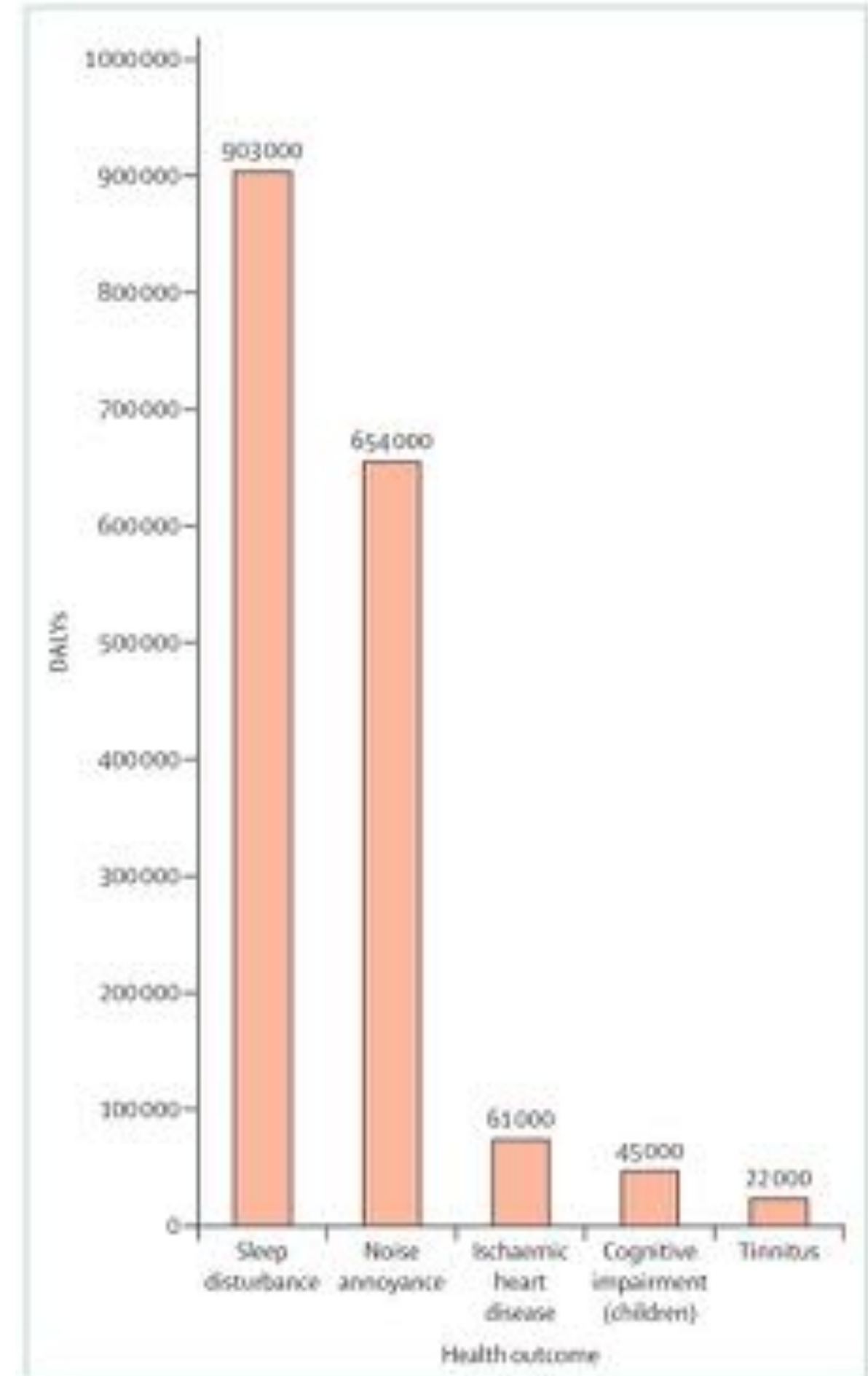
- Zeer laagfrequent geluid
- Windturbines
 - Gezondheidsklachten vaak overeenkomend met bezorgdheid



People unaware of wind turbine noise are not more annoyed by it than by highway noise

OVERALL HEALTH EFFECT

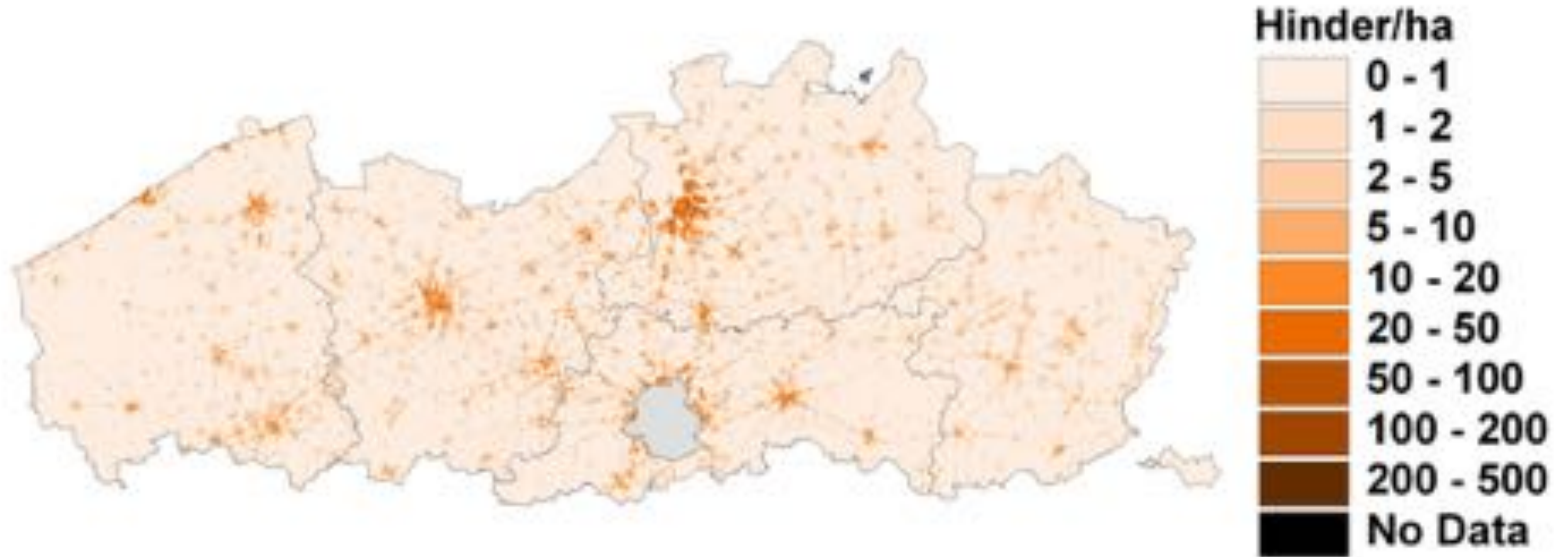
- DALYs in Europe
 1. sleep
 2. noise annoyance
 3. ischemic heart disease
 4. cognitive impairment



Fritschi L, Brown AL, Kim R, Schwela DH, Kephelopoulou S, editors. Burden of disease from environmental noise. Bonn: World Health Organization; 2011.

VLAANDEREN

- Potentieel ernstig gehinderden door verkeersgeluid



WAT ONTHOU IK?

- Omgevingsgeluid is een 'andere' stressor
- Blootstelling aan omgevingsgeluid, geen dosis!
- Ook autonoom zenuwstelsel reageert op opvallende geluiden
- De mens is geen passieve ontvanger, maar zoekt een manier om om te gaan met de blootstelling (geluid is te horen)
- Omgevingsgeluid: mentale belasting en herstel

Dick Botteldooren

Professor

RESEARCH GROUP WAVES

E dick.botteldooren@ugent.be

T +32 9 264 99 68

www.ugent.be

 Ghent University

 @ugent

 Ghent University