TUMI THERAPEUTICS

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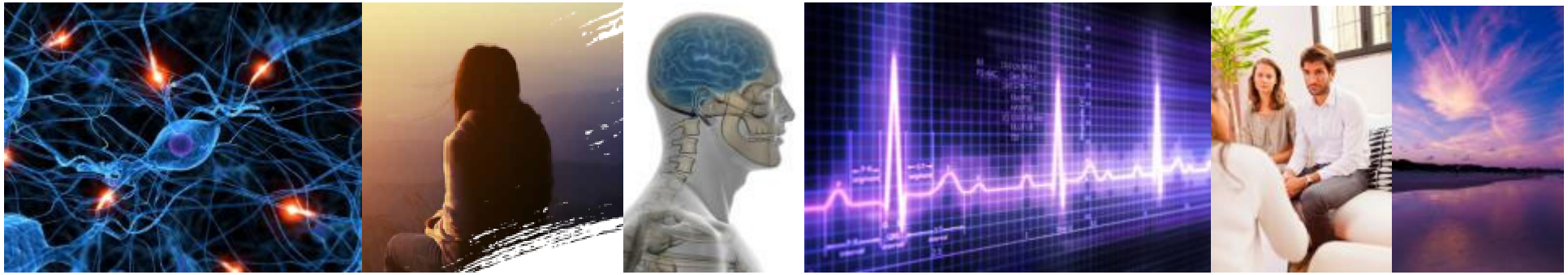
Pain, fatigue and persistent somatic symptoms

Translation from scientific research to clinical practice

17/05/2024

Prof. dr. Katleen Bogaerts



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TUMI THERAPEUTICS

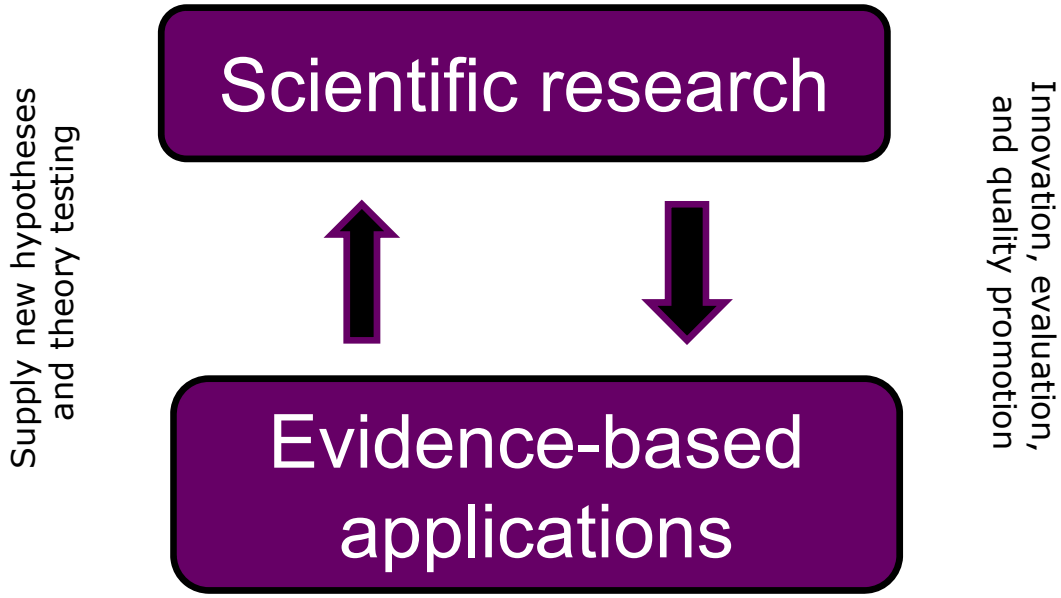
STRESS - HYPERVENTILATIE - MEDISCH ONVERKLAARDE KLACHTEN

Multidisciplinary Center of Expertise for the prevention, diagnostics and treatment of hyperventilation, stress-related disorders and persistent somatic symptoms

TUMI THERAPEUTICS

MISSION

Expanding scientific knowledge in our field of expertise, **knowledge dissemination** and **translation** of evidence-based findings into **healthcare** and **company** applications



Divisions

Tumi Therapeutics

- Tumi Science
- Tumi Care
- Tumi B2B

Tumi 4 Business

TUMI THERAPEUTICS

Tumi Science

Official collaborations with universities

Tumi Therapeutics

KU LEUVEN

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REVAL Pain, Fatigue and Persistent Somatic Symptoms

Health and Rehabilitation Psychology (HRP)

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Since 2018

Team

Lead scientist (PI):

Prof. dr. Katleen Bogaerts

Post-doctoral researchers:

dr. Maaike Van Den Houte

dr. Stef Feijen

PhD students:

Indra Ramakers

Ynse Dooms

Sofie Van Wesemael

Joanna Mourad

Gianluca Florio

Tara Petzke (visiting)









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Research topic

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Mission

Main focus:

To identify underlying mechanisms of ***stress-related and/or persistent somatic symptoms in daily life***, and to translate into (2) treatment components, and (3) interventions for primary prevention

Key words: stress – burnout – chronic pain – fibromyalgia – chronic fatigue – tinnitus – dizziness – dyspnea – hyperventilation

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PSYCHO - PHYSIOLOGY LAB

RESEARCH DOMAINS

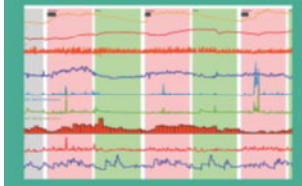
- Pain
- Fatigue
- Persistent somatic symptoms

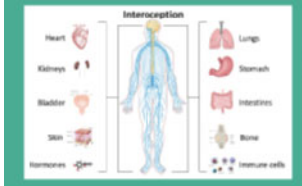
RESEARCH METHODS

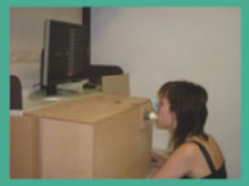
- Capnography
- Stress reactivity tasks
- Respiratory set-ups
- Interoception and symptom perception
- Stress-physiology measures
- Pain measures

MANIPULATIONS

- Visual, auditory, affective, cognitive, tactile, temperature, pain
- Respiratory loads & occlusions, CO2 inhalation, rebreathing, ...







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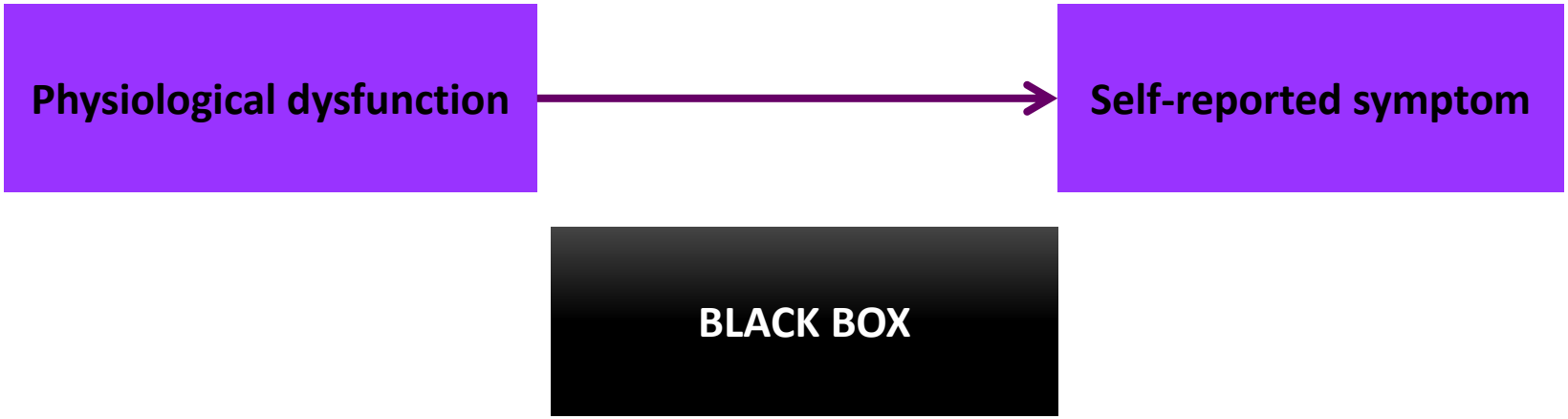
DUALISM OF DESCARTES

Body versus mind

ONE-ON-ONE CORRESPONDENCE?



Brain: passive conduit?

NO ONE-ON-ONE CORRESPONDENCE

Psychological level

- Perception
- Attention
- Interpretation
- Anticipation – learning

Neurobiological level

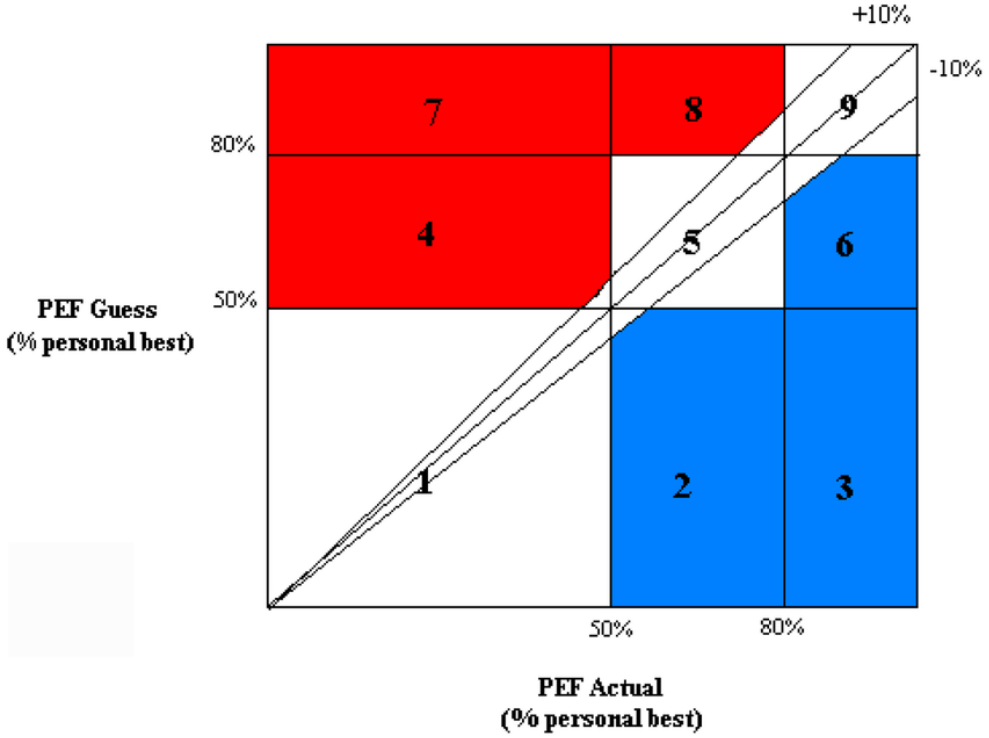
SYMPTOM REPORTING

Self-reported health complaints

are always the result of a **complex integration** in the brain of afferent signals from the body (**bottom-up**) and perceptual-cognitive and affective (**top-down**) processes

HOW WELL DOES THE TRANSLATION WORK?

Also in well-known organic diseases there is no strict one-on-one relationship, cfr. Asthma



Asthma Risk Grid, Klein et al., 2004

HOW WELL DOES THE TRANSLATION WORK?

In at least 1/3th of all medical contacts a sufficient explanation in terms of a clearly defined organic disease is absent

→ **Medically Unexplained Symptoms (MUS)**
Functional Physical Complaints
Persistent Somatic Symptoms

FUNCTIONAL DISORDERS

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Specialismen	Diagnose
Cardiologie	Atypische pijn op de borst
Gynaecologie	Chronische pelvische pijn
Reumatologie	Fibromyalgie; Spasmofilie
Pneumologie	Chronisch hyperventilatiesyndroom
Neurologie	Spanningshoofdpijn; Functionele neurologische stoornis
Gastroenterologie	Prikkelbare darmsyndroom; Functionele dyspepsie; Chronische idiopathische misselijkheid
Allergie en klinische immunologie	Idiopathische omgevingsintolerantie; Multipele Chemische Sensitiviteit; Elektrogevoeligheid
Neus-, Keel-, en Oorziekten	Globus syndroom; Chronische tinnitus en hyperacusis
Tandheelkunde	Temporomandibulaire dysfunctie; Atypische gezichtspijn
Psychiatrie	Conversiestoornis; Somatische-symptoomstoornis en verwante stoornissen
Algologisch centrum; Orthopedie; Fysische geneeskunde en revalidatie	Chronische lage rugpijn; Chronisch whiplash syndroom
Inwendige geneeskunde	Chronisch vermoeidheidssyndroom
Militaire geneeskunde	Golfsyndroom; Balkansyndroom

RESTRICTIONS OF A WITHIN-SYSTEM APPROACH

IMPLICATIONS

- Absenteïsm and presenteïsm
- Frustrated doctors and patients
- Overconsumption of health care services
- Controversial discussions in media

"Are the symptoms real or are they between the ears?"

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Towards an integrative model

Stresscontinuüm

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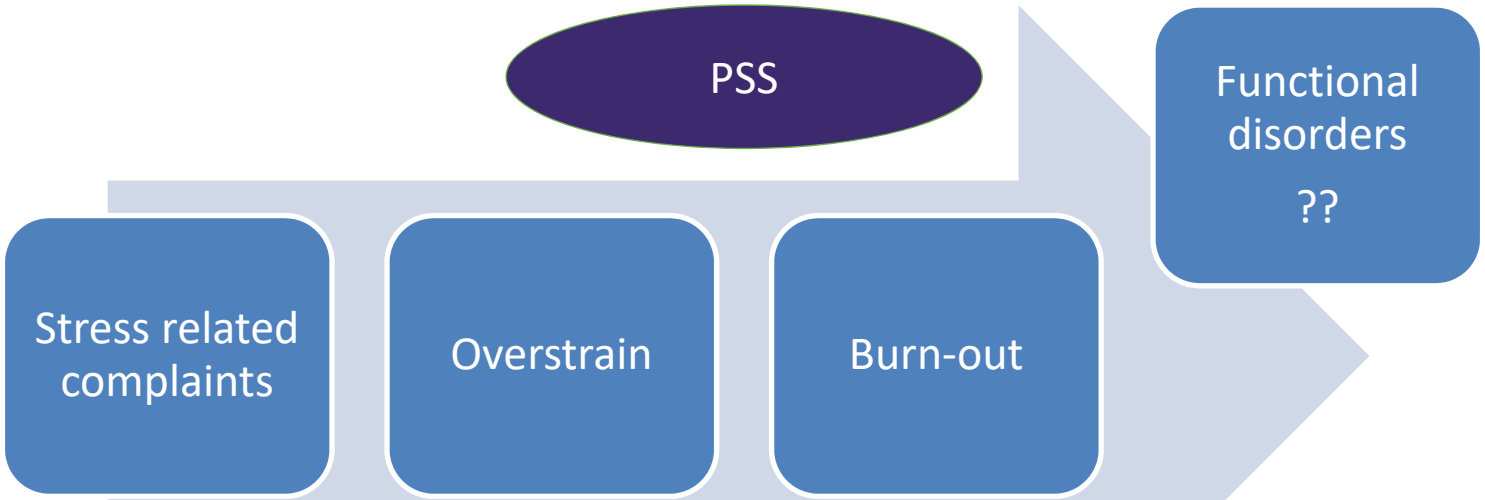

Netherlands Society of Occupational Medicine, 2011; Terluin et al., 2005; Van Der Klink & Van Dijk, 2003

- Chronicity
- Comorbidity
- Specificity/generalisation

Ramakers et al., 2022

Underlying mechanisms

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Biomedical Research

- Immune function
- Central Nervous System
- Autonomic Nervous System
- Microbiota
- (Epi)genetic factors
- ....

?

Psychosocial Research

- Chronic stress
- Personality traits
- Aversive experiences
- Symptom perception
- Learning processes
- Maintaining factors
- ....

Chronic Fatigue Syndrome

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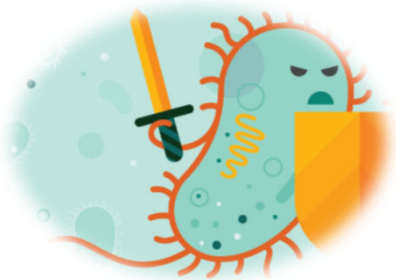
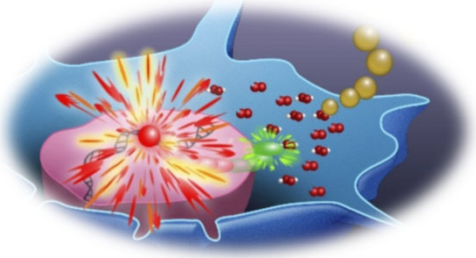
Immune system dysregulation



Endocrine dysfunction

Changes in Central Nervous System

Oxidative stress



Vergaelen, 2022

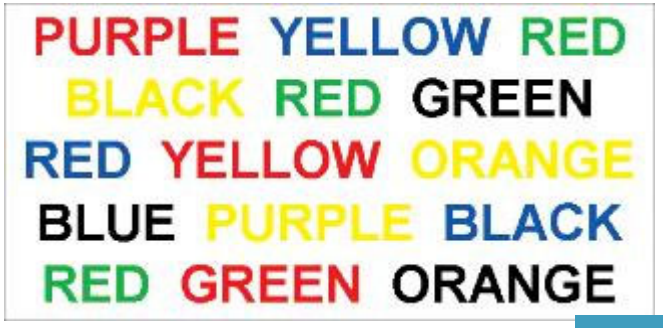
Methods

- **Stress reactivity** (on a subjective, physiological and neurobiological level, in the lab as well as in daily life)
- **Symptom perception** (experimental induction of symptoms such as pain, fatigue, dizziness, dyspnea by use of standardized research paradigms)
- **Interoception** (how accurate are people in perceiving internal signals from their bodies) and **proprioception** (how accurate are people in perceiving the position, motion and equilibrium of their body)
- **Optimalisation of interventions for treatment and prevention** (CBT interventions, biofeedback, bodily perception accuracy training, VR applications, wearables, digital health, …)

Methods

Stress reactivity

Inducing stress in het lab:



Cognitive tasks

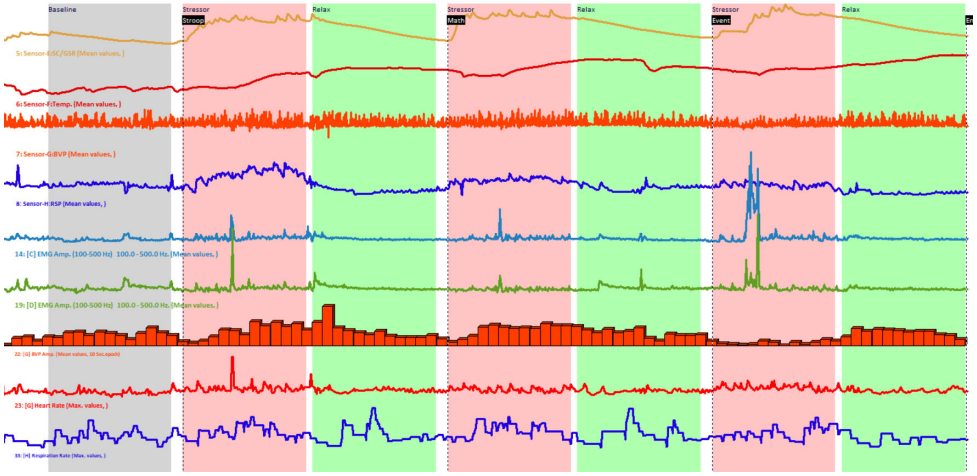
Emotional talk

Negative feedback

Methods

Stress reactivity

Measuring stress reactivity in the lab:



Autonomic nervous system

Cortisol in saliva

Neuroimaging

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Methods

Stress reactivity

Measurement of stress reactivity in daily life (ESM):

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Autonomic Dysfunction

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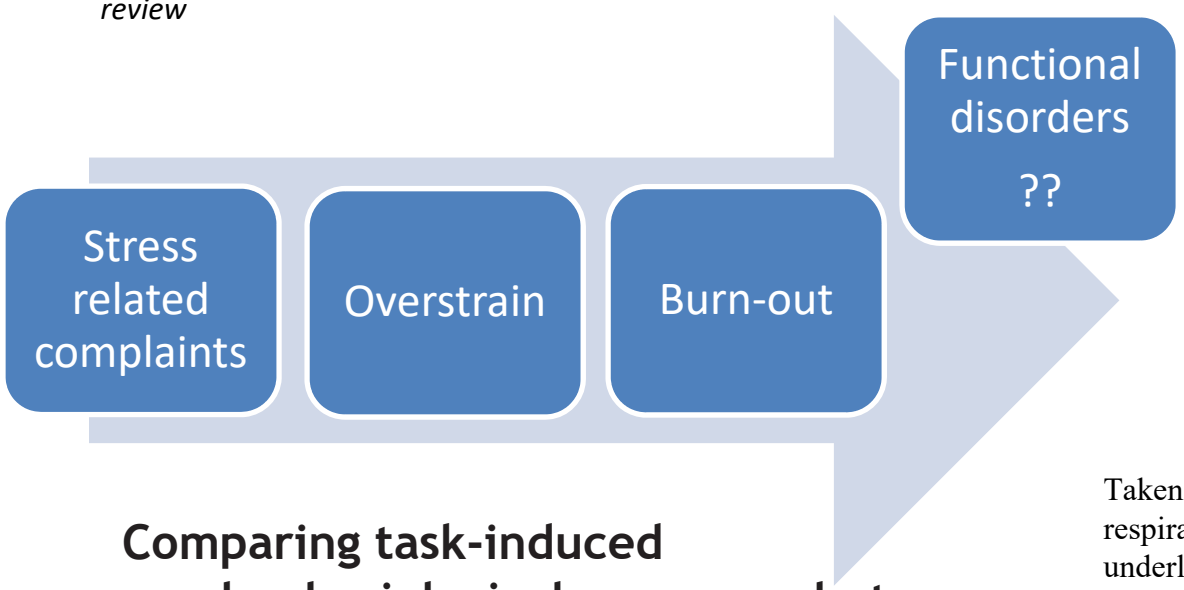
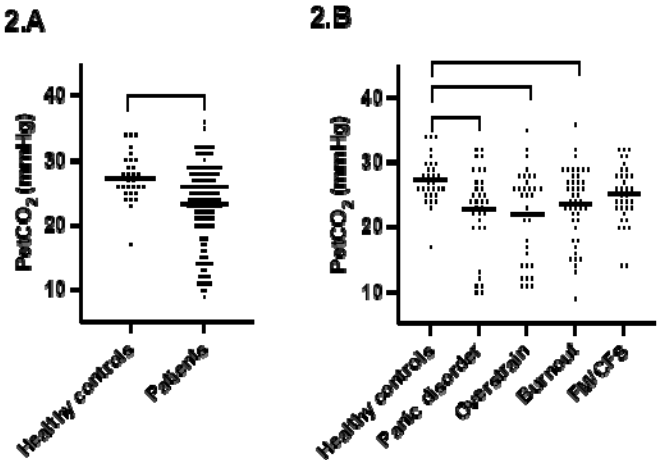
Our results showed a dominance of the SNS regarding HR and SC in SRS and FSS patients compared to HC, suggesting the presence of ANS dysfunctionalities as a transdiagnostic underlying working mechanism

Ramakers et al., 2021, Clin Exp Rheumatol; Van Den Houte et al., under review





Comparing task-induced psychophysiological responses between persons with stress-related complaints and healthy controls: A methodological pilot study

Elena Smets[1,2] | Giuseppina Schiavone3 | Emmanuel Rios Velazquez3 | Walter De Raedt[2] | Katleen Bogaerts4,5 | Ilse Van Diest5 | Chris Van Hoof1,2,3

Taken together, our results suggest: 1) an overactive respiratory system to be a possible transdiagnostic underlying factor of overstrain, burnout, and panic disorder, and 2) the presence of a less active respiratory fight-flight response in the more chronic and severe functional syndromes (FM/CFS).

Ramakers et al., 2022, Appl Psychophysiol Biofeedback

HYPERVENTILATION IN CLBP

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Gait & Posture

Volume 107, January 2024, Pages 253-268

The association between pain-related psychological variables and postural control in low back pain: A systematic review and meta-analysis

Sofie Van Wesemael [a 1], Katleen Bogaerts [a b 1], Liesbet De Baets [c], Nina Goossens [a], Elke Vlemincx [b d], Charlotte Amerijckx [a], Suniya Sohail [a e], Thomas Matheve [a f 2], Lotte Janssens [a 2]

Breathing interventions for spinal pain and disability: a systematic review and discussion on underlying working mechanisms.

Sofie Van Wesemael (*), Lotte Janssens (*), Charlotte Amerijckx, Nina Goossens, Sim Klaps, Elke Vlemincx, (**), & Katleen Bogaerts (**)

"Hyperventilation in patients with non-specific chronic low back pain (LBP)"

Underlying mechanisms

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Biomedical Research

- Immune function
- Central Nervous System
- Autonomic Nervous System
- Microbiota
- (Epi)genetic factors
- ....

?

Psychosocial Research

- Chronic stress
- Personality traits
- Aversive experiences
- Symptom perception
- Learning processes
- Maintaining factors
- ....

Chronic stress

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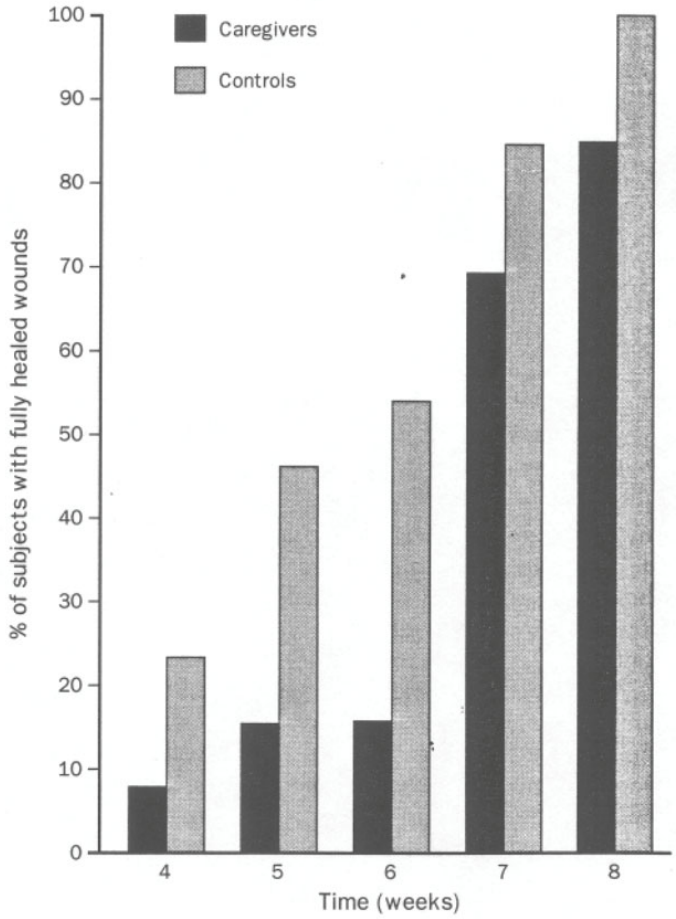

Figure 1: **Percentage of caregivers and controls whose wounds had healed with time**
Range 24–68 days.

Generaal E, Vogelzangs N, Macfarlane GJ, Geenen R, Smit JH, de Geus EJ, Penninx BW, Dekker J 2016 Biological stress systems, adverse life events and the onset of chronic multisite musculoskeletal pain :a 6-year cohort study. Annals of the Rheumatic Diseases 75: 847–854

Melzack's body-self neuromatrix model of pain. From "Pain and the Neuromatrix in the Brain," by R. Melzack, 2001, Journal of Dental Education, 65, p. 1382.

Ladd, C.O., Huot, R.L., Thrivikraman, K.V.,Nemeroff, C.B.,Meaney, M.J.,& Plotsky, P.M. (2000). Long-term behavioral and neuroendocrine adaptations to adverse early experience. Progress in Brain Research, 122, 81-103.

Ḧauser, W., Kosseva, M̈., Uceyler, N., Klose, P., & Sommer,C. (2011). Emotional, physical, and sexual abuse in fibromyalgia syndrome: A systematic review with meta-analysis. Arthritis Care and Research, 63(6), 808-820.

Afari,N., Ahumada, S.M., Wright, L.J., Mostoufi, S., Golnari,G., Reis,V., & Cuneo, J.G.(2014). Psychological trauma and functional somatic syndromes: a systematic review and meta-analysis. Psychosomatic Medicine, 76(1), 2-11.

Oliveira,P., & Costa, M.E.(2009).Interrelationships of adult attachment orientations, health status and worrying among fibromyalgia patients. Journal of Health Psychology, 14(8), 1184-1195.

Meredith, P., Ownsworth, T., & Strong, J. (2008). Are view of the evidence linking adult attachment theory and chronic pain: Presenting a conceptual model. Clinical Psychology Review, 28(3), 407-429.

Adverse Childhood Experiences in CFS

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Table 2. Logistic Regression Models Estimating the Likelihood of Having Chronic Fatigue Syndrome Relative to Childhood Trauma Exposure[a]

Predictor	No. (%) Over Cutoff[b]		OR (95% CI)	*P* Value[c]
	Individuals With CFS (n=106)	Well Control Subjects (n=122)		
Any category				
Yes	66 (62.3)	29 (23.8)	5.6 (3.1-10.0)	<.001
No	40 (37.7)	93 (76.2)	1 [Reference]	
Emotional abuse				
Yes	35 (33.0)	9 (7.4)	6.4 (2.9-14.3)	<.001
No	71 (67.0)	113 (92.6)	1 [Reference]	
Physical abuse				
Yes	35 (33.0)	12 (9.8)	4.7 (2.6-9.7)	<.001
No	71 (67.0)	110 (90.2)	1 [Reference]	
Sexual abuse				
Yes	35 (33.0)	13 (10.7)	4.2 (2.0-8.6)	<.001
No	71 (67.9)	109 (89.3)	1 [Reference]	
Emotional neglect				
Yes	27 (25.5)	11 (9.0)	3.5 (1.6-7.6)	.001
No	79 (74.5)	111 (91.0)	1 [Reference]	
Physical neglect				
Yes	26 (24.5)	6 (4.9)	6.5 (2.5-16.7)	<.001
No	80 (75.5)	116 (95.1)	1 [Reference]	

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PERSONALITY TRAITS

The Need for Controllability and Predictability questionnaire: Psychometric properties and first findings in a clinical sample

Indra Ramakers[1] MSc (indra.ramakers@uhasselt.be)
Riet Fonteyne[2] PhD (riet.fonteyne@asster.be)
Marta Walentynowicz[3,4] PhD (marta.walentynowicz@kuleuven.be)
Lukas Van Oudenhove[2,6,7] MD, PhD (lukas.vanoudenhove@kuleuven.be)
Maaike Van Den Houte[1,5] PhD (maaike.vandenhoute@uhasselt.be)
Katleen Bogaerts[1,8,9] PhD (katleen.bogaerts@uhasselt.be)

The Interoceptive Sensitivity and Attention Questionnaire: Evaluating Aspects of Self-Reported Interoception in Patients With Persistent Somatic Symptoms, Stress-Related Syndromes, and Healthy Controls

Katleen Bogaerts, PhD, Marta Walentynowicz, PhD, Maaike Van Den Houte, PhD,
Elena Constantinou, PhD, and Omer Van den Bergh, PhD

Tumi Therapeutics Personality Traits

Annals of Physical and Rehabilitation Medicine 66 (2023) 101712

Available online at ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com

Review

Are contextual factors associated with activities and participation after total hip arthroplasty? A systematic review

Abner Sergooris[a,*], Jonas Verbrugghe[a], Liesbet De Baets[b,g], Mira Meeus[c,g], Nathalie Roussel[c,g], Rob J.E.M. Smeets[d,e,g], Katleen Bogaerts[a,f], Annick Timmermans[a]

[a] REVAL Rehabilitation Research, Faculty of Rehabilitation Sciences, UHasselt, Diepenbeek, Belgium
[b] Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education and Physiotherapy, Vrije Universiteit Brussel, Brussels, Belgium
[c] Department Rehabilitation Sciences and Physiotherapy (MOVANT), Faculty of Medicine and Health Sciences, Antwerp University, Antwerp, Belgium
[d] Department Rehabilitation Medicine, Maastricht University, Maastricht, the Netherlands
[e] Research School CAPHRI and CIR Revalidatie, Eindhoven, the Netherlands
[f] Department Health Psychology, Faculty of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium
[g] Pain in Motion Research Group (PAIN), Belgium

BMC Musculoskeletal Disorders

Open Access

Clinical phenotypes and prognostic factors in persons with hip osteoarthritis undergoing total hip arthroplasty: protocol for a longitudinal prospective cohort study (HIPPROCLIPS)

Abner Sergooris[1*], Jonas Verbrugghe[1], Thomas Matheve[1,2], Maaike Van Den Houte[1,3], Bruno Bonnechère[1], Kristoff Corten[4,5], Katleen Bogaerts[1,6] and Annick Timmermans[1]

Methods

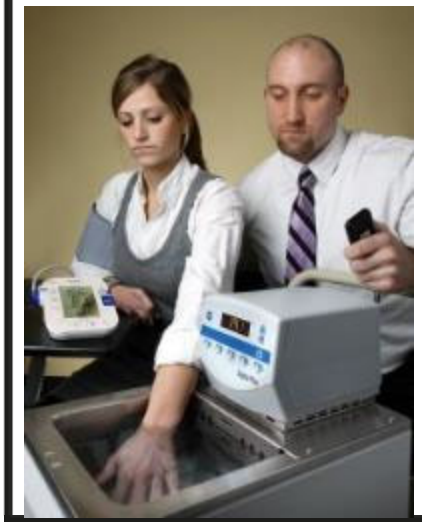
- **Stress reactivity** (on a subjective, physiological and neurobiological level, in the lab as well as in daily life)
- **Symptom perception** (experimental induction of symptoms such as pain, fatigue, dizziness, dyspnea by use of standardized research paradigms)
- **Interoception** (how accurate are people in perceiving internal signals from their bodies) and **proprioception** (how accurate are people in perceiving the position, motion and equilibrium of their body)
- **Optimalisation of interventions for treatment and prevention** (CBT interventions, biofeedback, bodily perception accuracy training), VR applications, wearables, digital health, …)

Methods

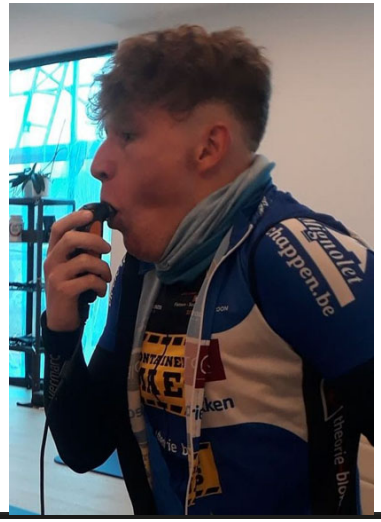
Symptom perception

➔ By experimentally inducing, in the lab, physical symptoms and investigating how participants react subjectively and (neuro)physiologically

Pain



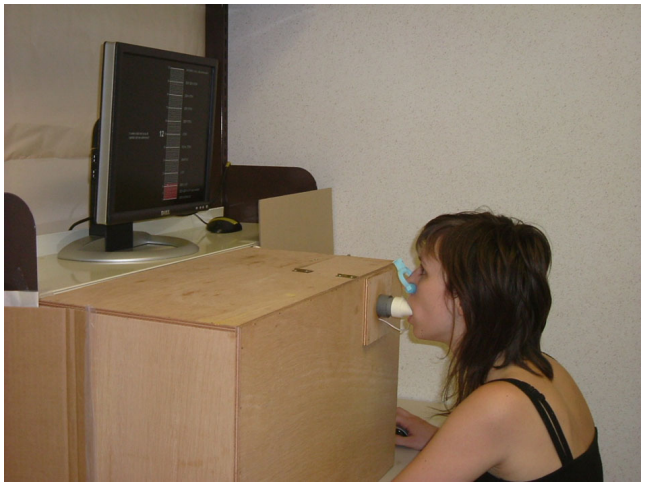
Dyspnea

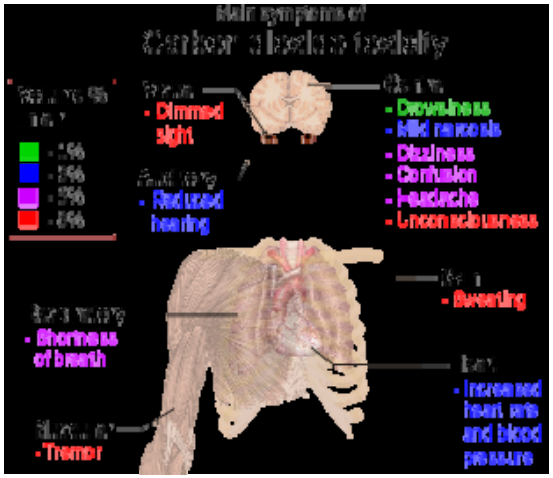


Fatigue

Experimental dyspnea induction

Respiratory flow resistors





CO_2 inhalation

Rebreathing test

Rebreathing test (Bogaerts et al., JPR, 2008)

Switch to rebreathing bag Switch to room air

Basislijn	Rebreathing	Recovery
(60 sec)	(150 sec)	(150 sec)

Online subjective and respiratory measures (correspondance measure)

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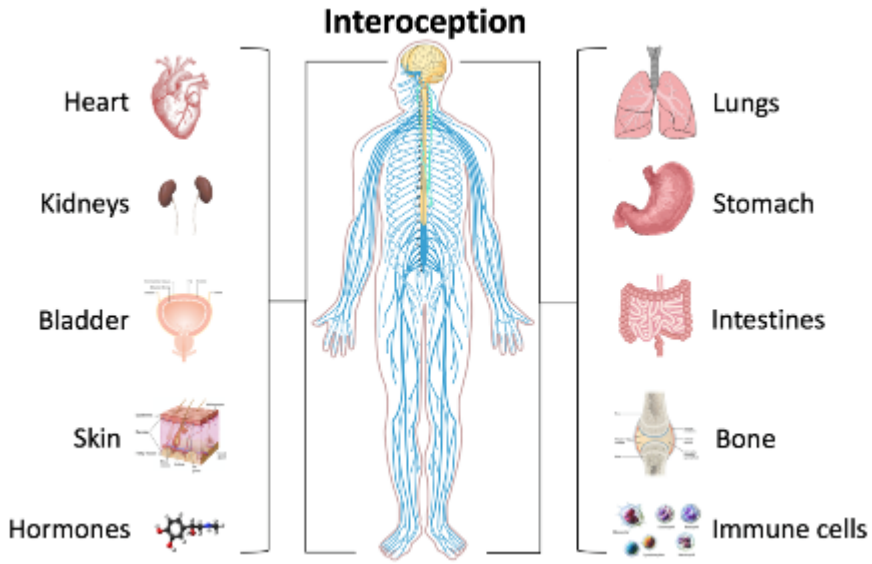
Methods

Interoception

Accuracy tasks, in which a (non-aversive) physical sensation/change is induced, and is tested how accurate participants are in the perception of these changes



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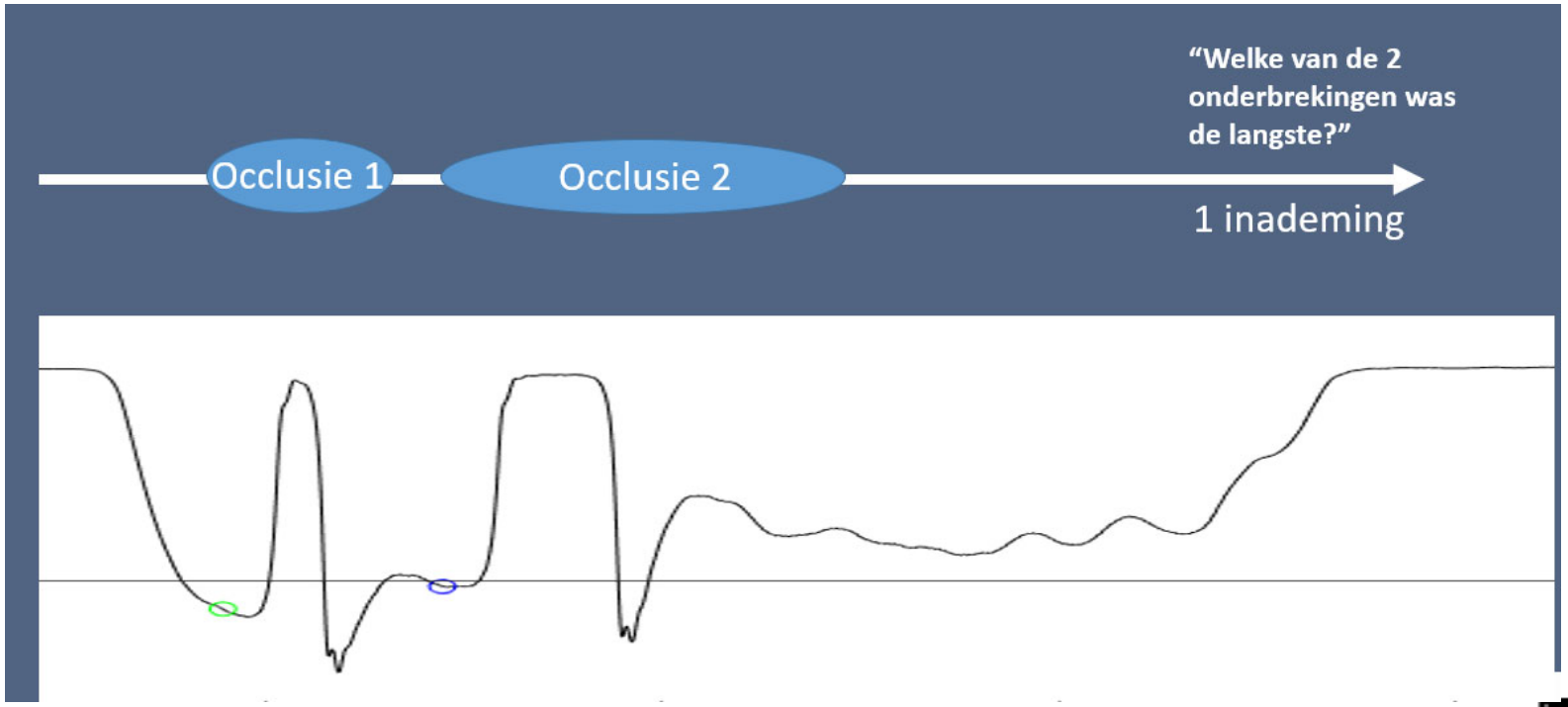
Methods

ROD task (Van Den Houte et al., Psychophysiology, 2021)

F.e. : accuracy of estimation of the lenght of short respiratory occlusions (interoceptive detection)



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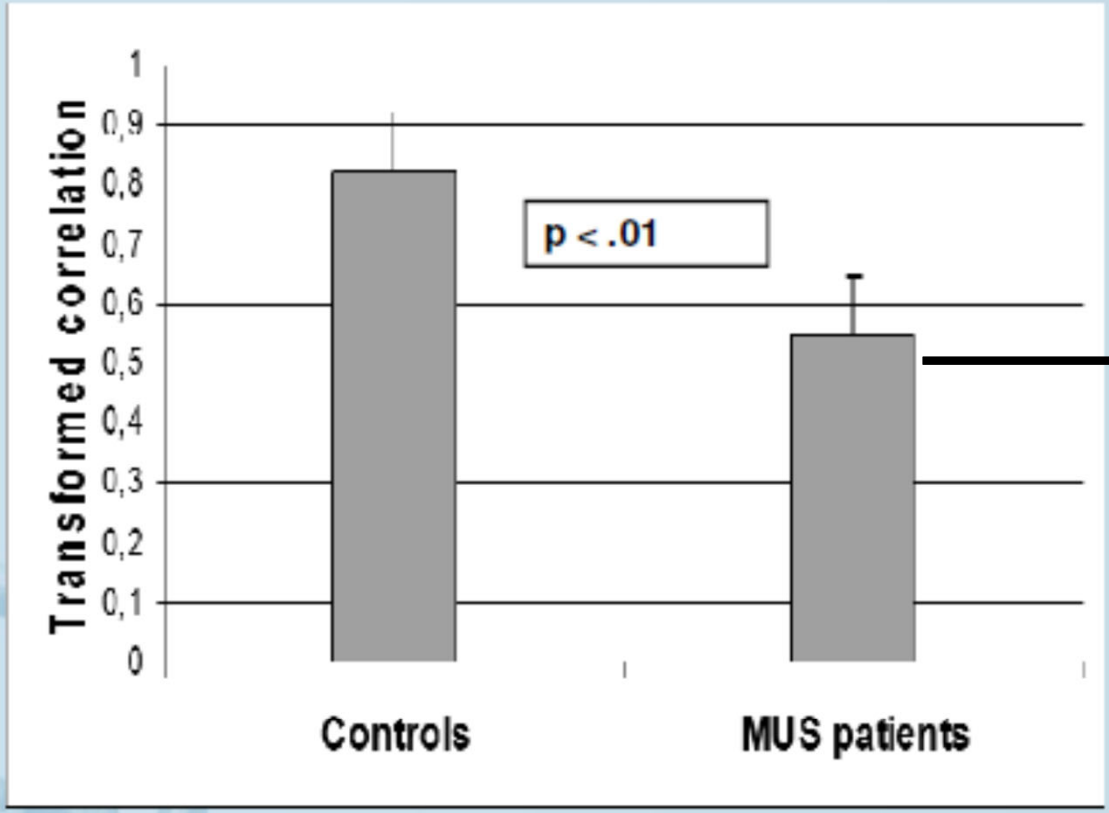
Clinical somatizing patients

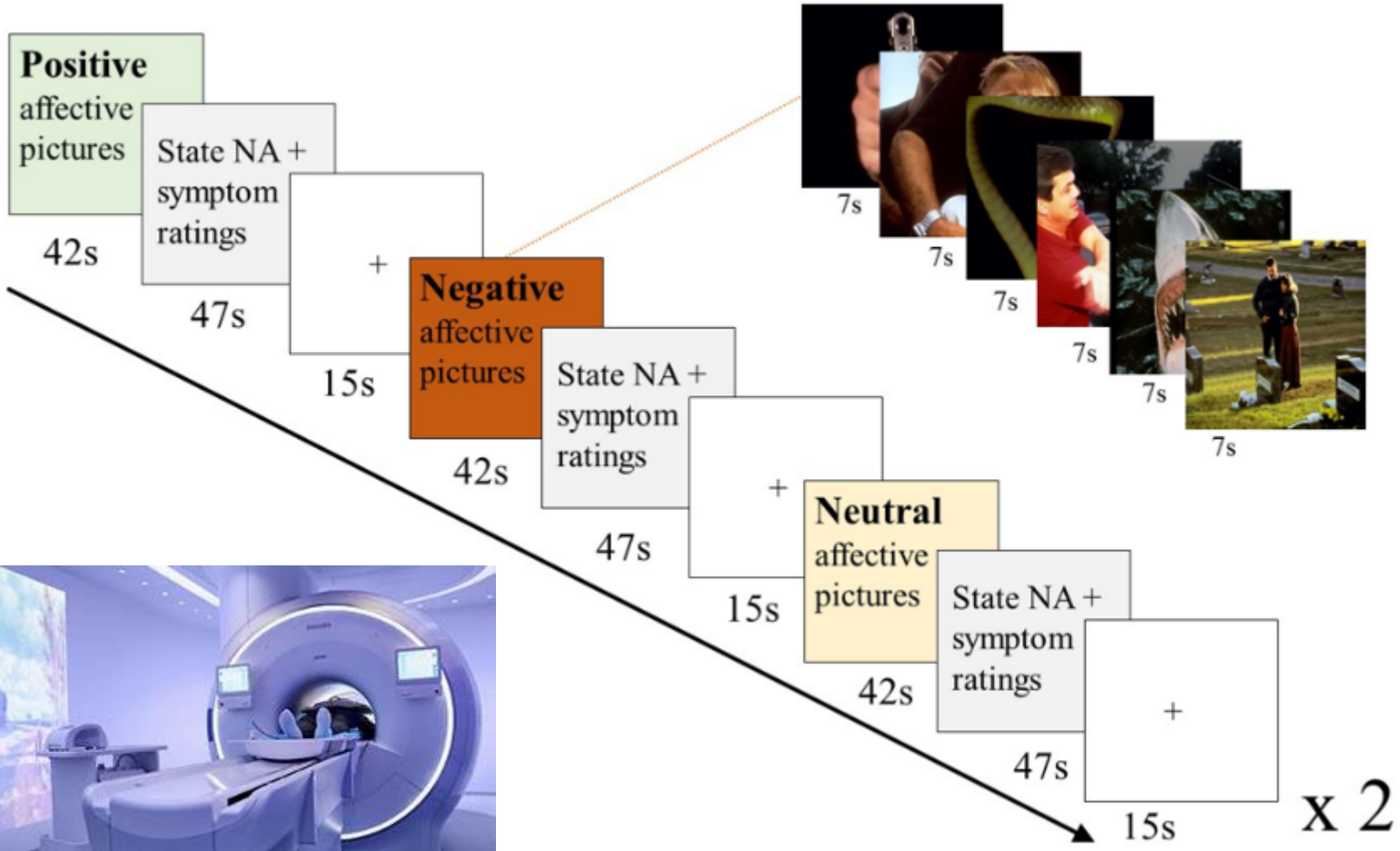


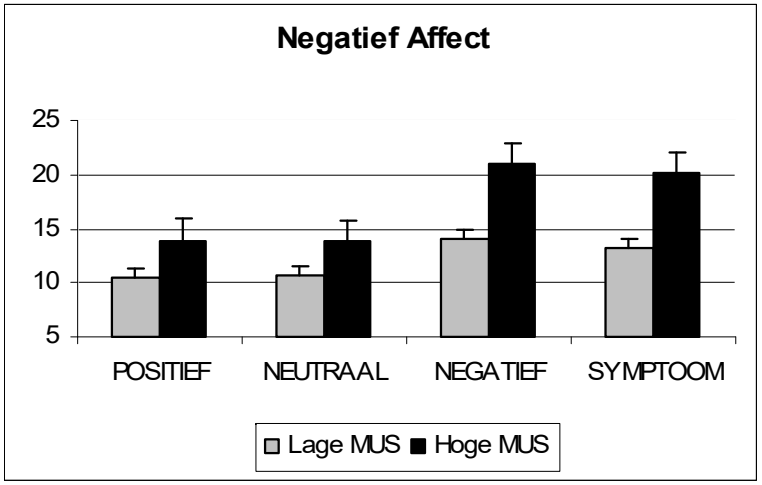
Contrast ***objective*** interoceptive accuracy and ***self-reported*** interoceptive sensibility in patients with FD

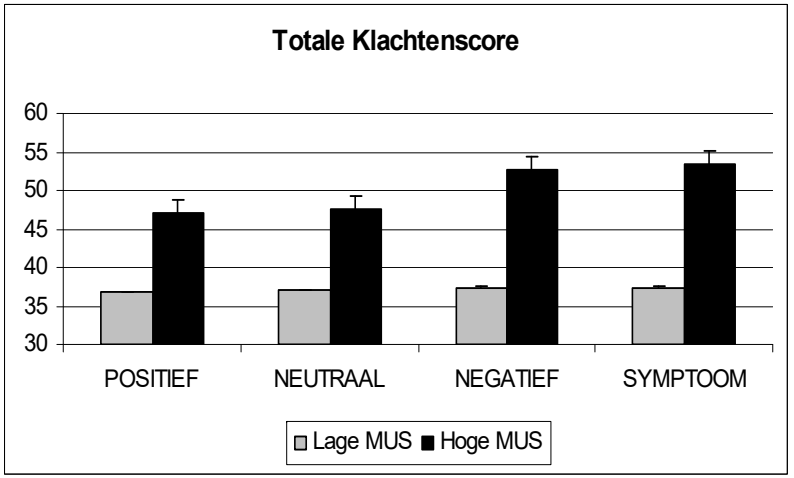
(ISAQ, Bogaerts et al., Psychosom Med, 2022)

Bogaerts et al., J. Abn Psych, 2010

Affective picture paradigm (APP; Bogaerts et al., 2010)







Mere viewing of negative pictures, disregarded of their reference to symptoms, caused significant increases in self-reported symptoms in high MUS versus low MUS persons, and this without group differences in peripheral physiological activity

Bogaerts et al., 2010, Psychology & Health

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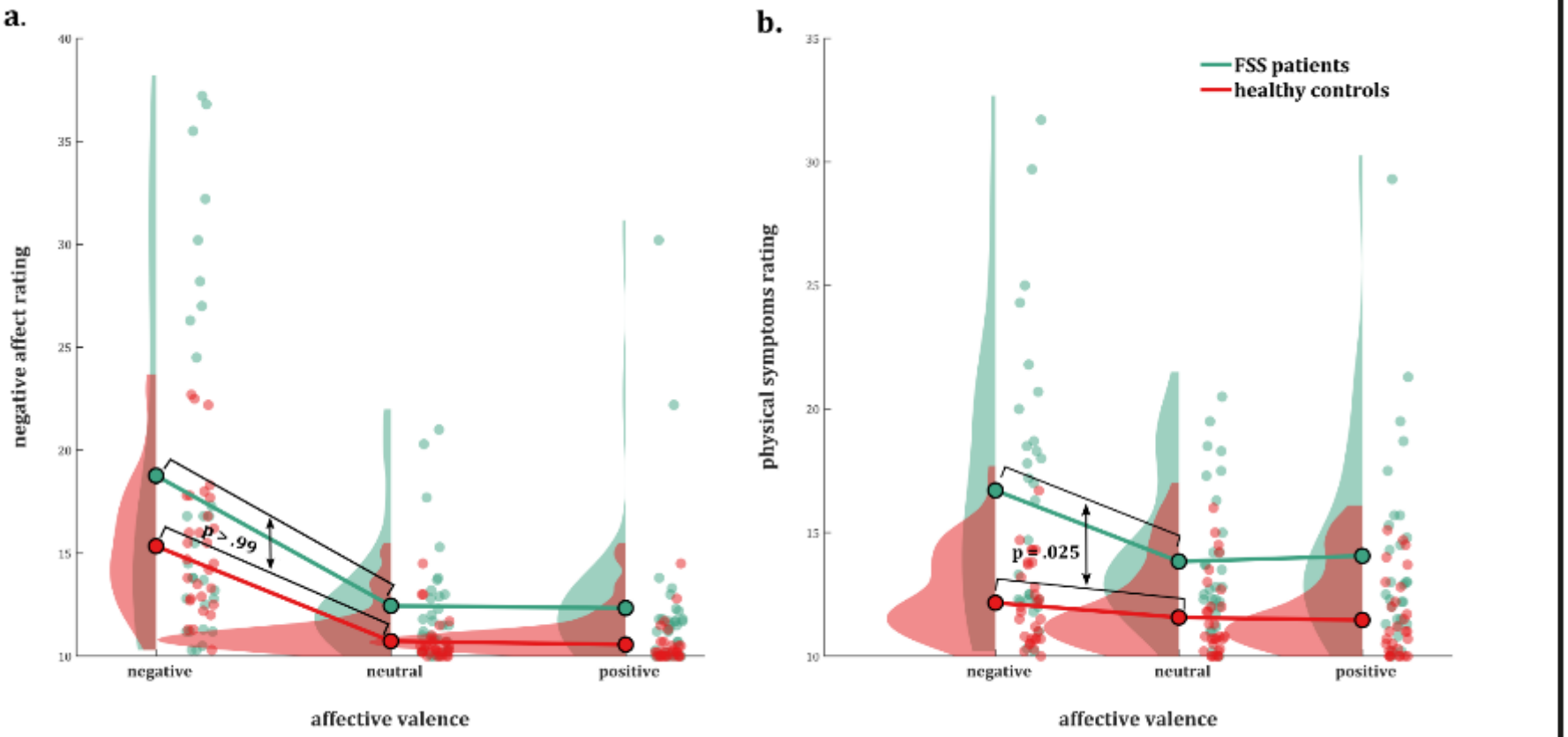
We replicated that negative – compared to neutral – pictures cause more physical symptoms (pain, fatigue, cardiorespiratory, cerebral, gastrointestinal) in patients with FSS than in healthy controls (p=0.025).



Bogaerts, K. *, Van Den Houte, M. *, Jongen, D., Giao Ly, H., Coppens, E., Schruers, K., Van Diest, I., Tack, J., Van Wambeke, P., Petre, B., Kragel, P.A., Lindquist, M.A., Wager, T.D., Van Oudenhove, L. *, & Van den Bergh, O*. (2023). Brain mediators of negative affect-induced physical symptom reporting in patients with functional somatic syndromes. Translational Psychiatry.

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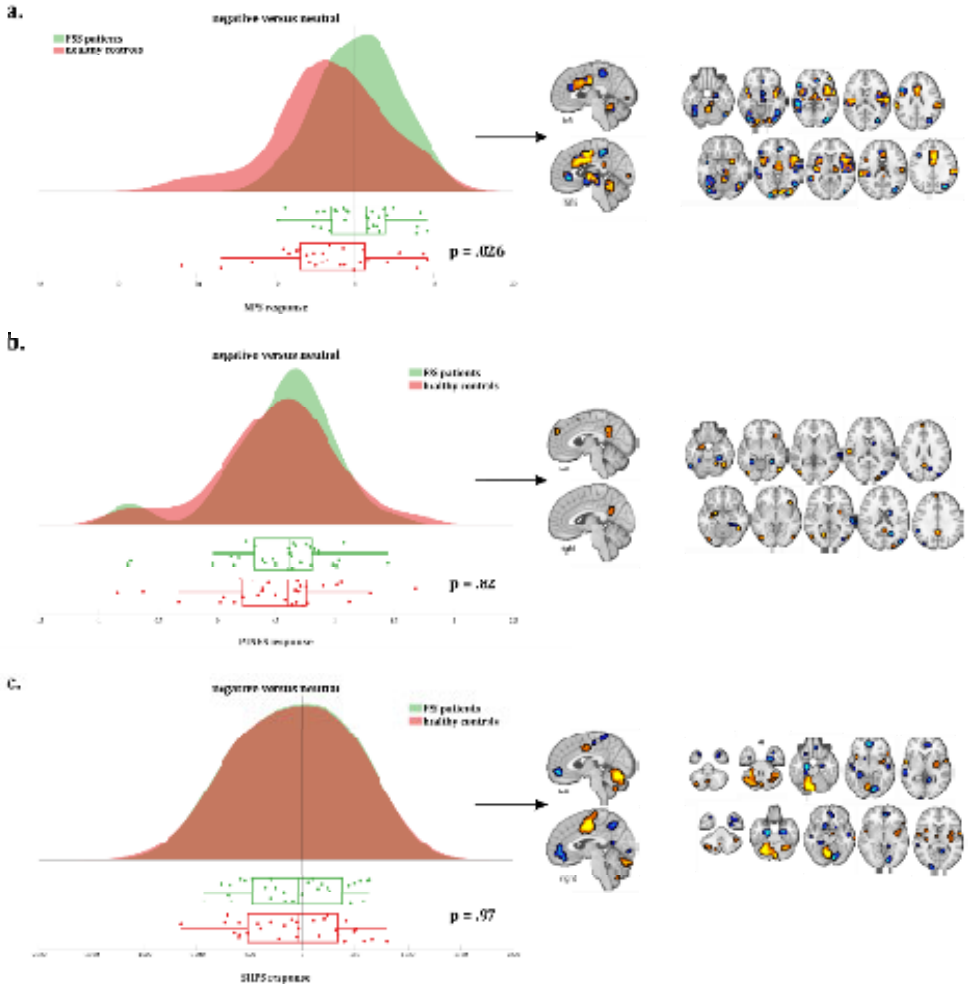

Patients showed stronger activation in somatosensory regions and NPS activation during negative versus neutral pictures

NPS (neurologic pain signature), but not SIIPS (stimulus intensity-independent pain signature) and PINES (picture-induced negative emotion signature) responses were higher in patients than controls during negative versus neutral pictures.

Differential NPS responses mediated between-group differences in physical symptoms.

Bogaerts, K. *, Van Den Houte, M. *, Jongen, D., Giao Ly, H., Coppens, E., Schruers, K., Van Diest, I., Tack, J., Van Wambeke, P., Petre, B., Kragel, P.A., Lindquist, M.A., Wager, T.D., Van Oudenhove, L. *, & Van den Bergh, O*. (2023). Brain mediators of negative affect-induced physical symptom reporting in patients with functional somatic syndromes. Translational Psychiatry.

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Interoceptive accuracy and symptom perception are influenced by:

- Intensity of input
- Learning history, earlier aversive experiences

Bogaerts et al., 2005, 2008, 2010, 2012, 2015; Constantinou et al., 2013, 2014, 2015, Van Den Houte et al., 2017, 2018, 2019

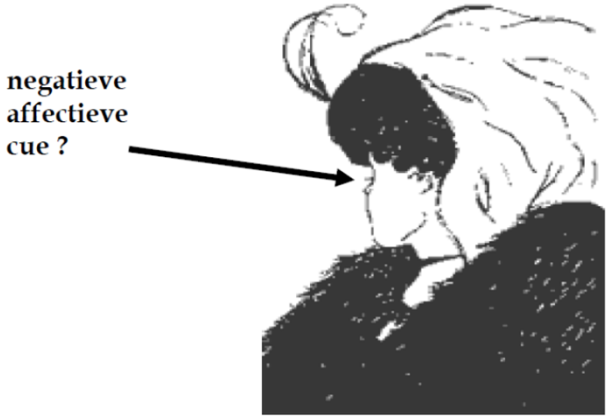
Distorted sensory-perceptual processing in negative contextual cues:

"Better safe than sorry" processing strategy

at threat instead of extensive, detailed

sensory-perceptual processing

Van den Bergh et al., 2021



Rational for bodily perception accuracy training

(perceptual differentiation of bodily sensations) and interoceptive exposure?

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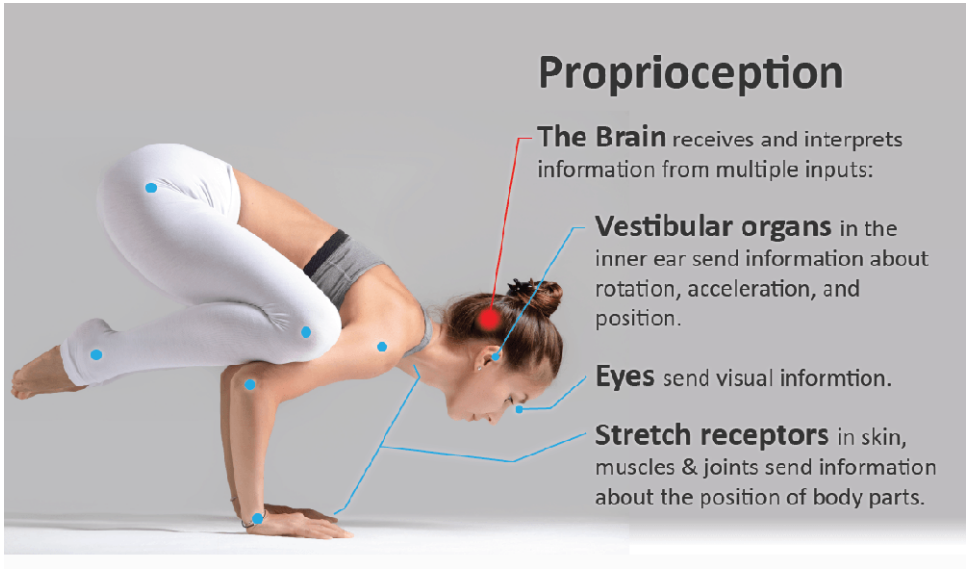
Methods

Proprioception

Accuracy task in which a change in body posture is induced and is tested how accurate participants are in perceiving the change



Ramakers, I. *, Feijen, S.*, Janssens, L., Meyns, P., Van Den Houte, M., Sercu, P., & Bogaerts, K. (under review). Proprioception in patients with fibromyalgia : A systematic review.

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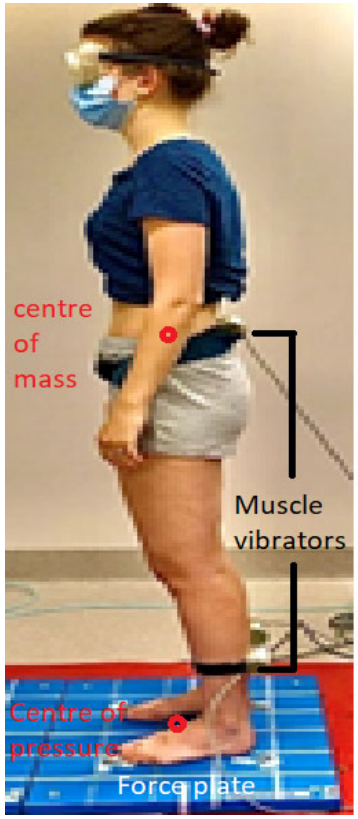
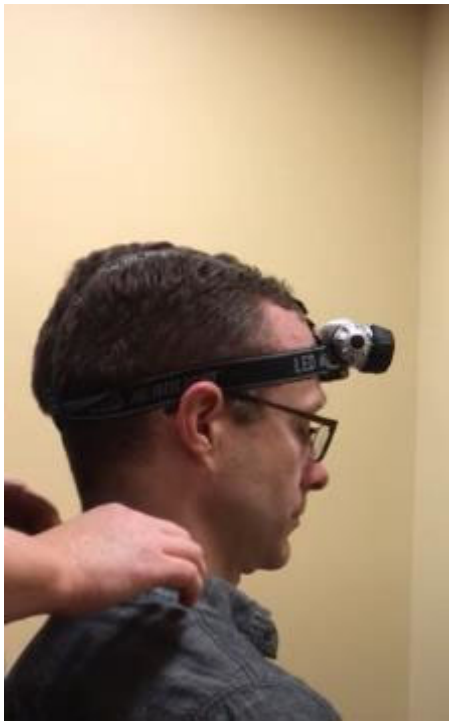
Methods

Proprioception

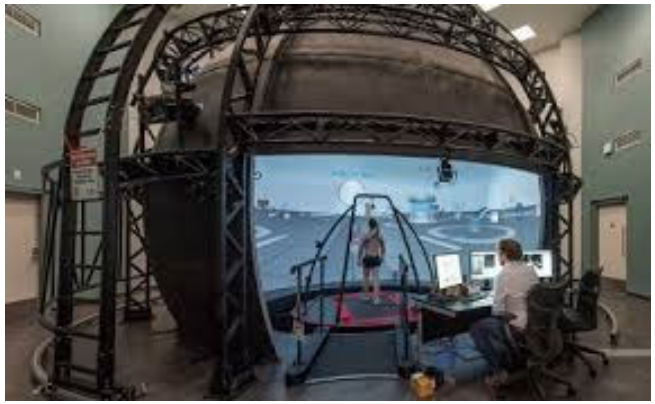


Postural control tasks



Joint position matching tasks

MoveLab



Diagnostics, VR, biofeedback, sensomotory exercises (dizziness, pain, kinesiofobia, fear of falling, …)

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Methods

- **Stress reactivity** (on a subjective, physiological and neurobiological level, in the lab as well as in daily life)
- **Symptom perception** (experimental induction of symptoms such as pain, fatigue, dizziness, dyspnea by use of standardized research paradigms)
- **Interoception** (how accurate are people in perceiving internal signals from their bodies) and **proprioception** (how accurate are people in perceiving the position, motion and equilibrium of their body)
- **Optimalisation of interventions for treatment and prevention** (CBT interventions, biofeedback, bodily perception accuracy training, VR applications, wearables, digital health, …)

TUMI THERAPEUTICS TREATMENT COMPONENTS

Matheve *et al. Journal of NeuroEngineering and Rehabilitation* (2020) 17:55
https://doi.org/10.1186/s12984-020-00688-0

Journal of NeuroEngineering and Rehabilitation

RESEARCH Open Access

Virtual reality distraction induces hypoalgesia in patients with chronic low back pain: a randomized controlled trial

Thomas Matheve[1*], Katleen Bogaerts[1,2] and Annick Timmermans[1]

EJP European Journal of Pain EFIC

ORIGINAL ARTICLE

Lumbar range of motion in chronic low back pain is predicted by task-specific, but not by general measures of pain-related fear

Thomas Matheve, Liesbet De Baets, Katleen Bogaerts, Annick Timmermans

Persistent physical fatigue in virtual reality:
New paradigms to modify sensory input and priors and their clinical relevance.

SYMPHONIE

Recent research projects

FACULTY OF REHABILITATION SCIENCES

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Stress prevention

Research focused on preventive, nature-based and/or technology-supported screening and interventions of stress (on the workplace) and the promotion of mental health

1. **The effect of a nature-based multidisciplinary intervention program on the prevention of burnout**

2. Interreg project: **Healthy lifestyle in the EMR blue zone: an integrated preventive medicine approach**

Interreg Co-funded by the European Union
Meuse – Rhine (NL – BE – DE)

3. HORIZON-HLTH-2024 TEENSMART
Personalised prevention of non-communicable diseases
Submitted

European Commission

Collaboration with **Tumi Therapeutics**

FACULTY OF REHABILITATION SCIENCES
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Identification of underlying mechanisms and translation into treatment components

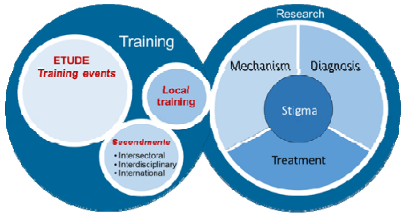
1. Detection of underlying working mechanisms of Medically Unexplained Symptoms (MUS) and its translation into treatment components
01/10/2020 - 30/09/2024

2. Body Schema in Adults with Autism
01/01/2023 - 31/12/2027

3. Cognitive, psychological, and physical functioning in long-covid patients with different levels of chronic fatigue
01/10/2021 - 30/09/2024

4. European Union's H2020 Project Marie Skłodowska-Curie Research Training Group "ITN ETUDE" on the topic of functional disorders (956673)
01/01/2021 -31/12/2024
Project information: https://etude-itn.eu/

ETUDE



Collaboration with **Tumi Therapeutics**

FACULTY OF REHABILITATION SCIENCES
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Identification of underlying mechanisms and translation into treatment components

5. Hyperventilation in recurrent non-specific low back pain: a bottom-up and top-down perspective
01/10/2021 - 30/09/2025

6. Your smart performance: Understanding perceptive accuracy for motor performance to personalize task-specific training in people with multiple sclerosis.
01/10/2023 - 30/09/2027

7. Validation of the WAIS-5-NL in Flanders
01/05/2024 – 01/03/2026

8. Identifying (psycho)physiology-based subgroups in chronic fatigue syndrome and their relevance for rehabilitation
FWO junior research project (G057921N)
01/01/2021 - 31/12/2025

Collaboration with **Tumi Therapeutics**

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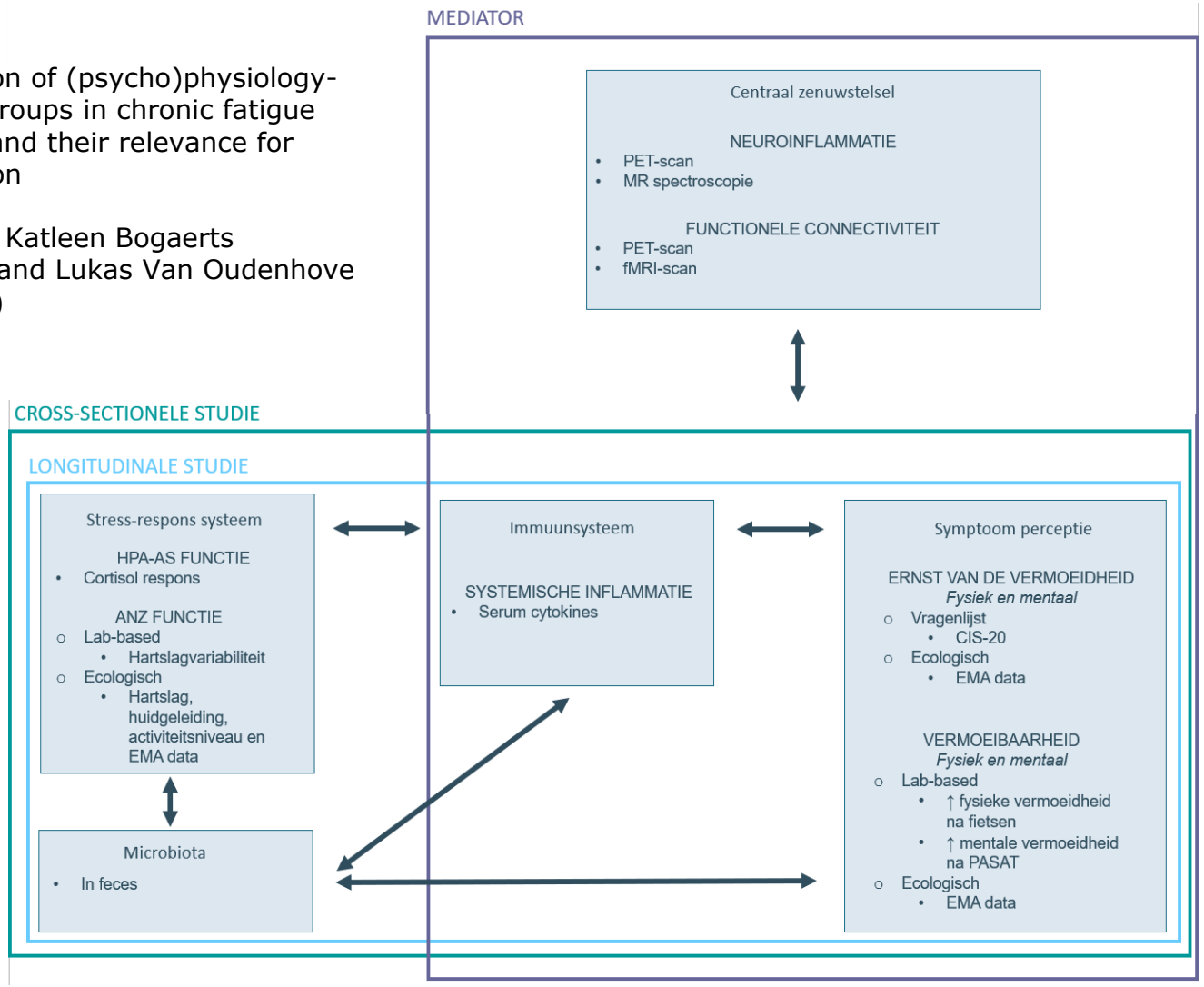
Identification of (psycho)physiology-based subgroups in chronic fatigue syndrome and their relevance for rehabilitation

Promotors: Katleen Bogaerts (UHasselt) and Lukas Van Oudenhove (KULeuven)



TUMI THERAPEUTICS

Tumi Care

Business Operation

Tumi Therapeutics

- Multidisciplinary team (N = +30): clinical and health psychologists, child psychologists, trauma psychologists, diagnosticians, neuropsychologists, work and organizational psychologists, psychiatrists, physiotherapists, dieticians, remedial educationalists, sexuologists, relationship and family therapists, cognitive-behavioral therapists, HR specialists

- Five locations in Belgium (covering two provinces Vlaams-Brabant and Limburg)

- Expertise in diagnostics, stressphysiological measurements and state-of-the art prevention and treatment

Tumi Therapeutics

Business Operation

- Full focus on quality management
  - Academic post-graduates
  - Unique internal training program for all Tumi co-workers
- Commitment to qualitative, consistent, and innovative services
- High satisfaction rates in clients and referrers

Target groups

A. Stress-related problems

- Hyperventilation complaints
- Tension headache
- Overstrain
- Burn-out
- Stress in relation to:
  - Infertility
  - Relational problems
  - Chronic diseases
  - ...

Target groups

B. Psychological problems

- Sleeping disorders
- Panic disorder
- PTSD
- Hypochondria
- OCD
- Body dismorphic disorder
- Trichotillomania
- Skin picking

Target group

B. Psychological problems

- Sexual problems
- Specific phobias
  - ✓ Asthenophobia
  - ✓ Emetophobia
  - ✓ Anginophobia
  - ✓ Algophobia
  - ✓ Claustrophobia
  - ✓ Medical phobia
  - ✓ Blood phobia

Target group

C. Functional disorders

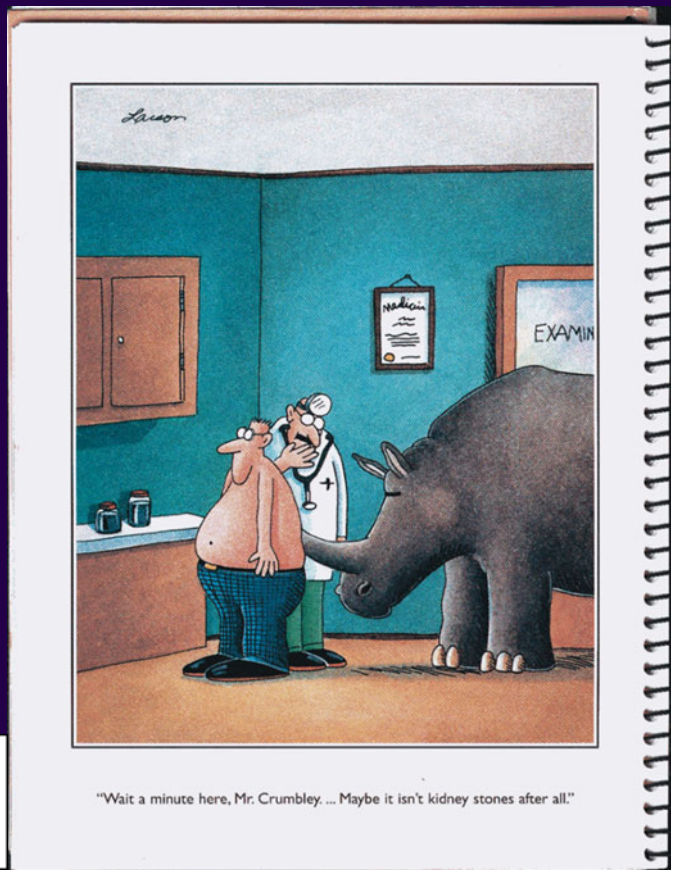
- Chronic Fatigue Syndrome
- Fibromyalgia
- Idiopatic Environmental Intolerance
    - ✓ *Multipele chemical sensitivity (MCS)*
    - ✓ *Electrosensitivity*
    - ✓ *Sick Building Syndrome*
- Irritable Bowel Syndrome; Functional dyspepsia; chronic idiopatic nausea; globus syndrome
- Chronic pelvic pain

Target group

C. Functional disorders

- Chronic low back pain
- Chronic whiplash
- Atypical facial pain
- Temporomandibular dysfunction
- Chronic tinnitus and hyperacusis
- Functional Neurologic

Symptom disorder



"Wait a minute here, Mr. Crumbley. ... Maybe it isn't kidney stones after all."

Wait a minute here, Mr. Crumbley, maybe its not kidney stones after all!

DIAGNOSTIC PHASE

TUMI THERAPEUTICS

- **Diagnostic phase: 2 à 4 sessions**

1. **Intake (1u)** – diagnosticus
   - Anamnesis (SCEGS-model)
   - Underlying mechanisms (cfr. Tumi working model)
   - Differential diagnostics – psychiatric examination
   - Comorbidities
   - Physical examination and lab results; reports physical specialists
   - Clinical examination physiotherapist
2. **Stressphysiology (2u)** – diagnosticus
   - *Optional*
   - Stress reactivity (ANS) during standardized stress tests: PetCO2, HRV, SC, ST, EMG, HR, breathing parameters
   - Psycho-education
3. **(Standardized) Tumi questionnaire battery** – at home by patient
4. **Treatment plan (1u)** – diagnosticus
   - Shared-decision making

TUMI WORKING MODEL

(BOGAERTS ET AL., 2020)

TUMI THERAPEUTICS

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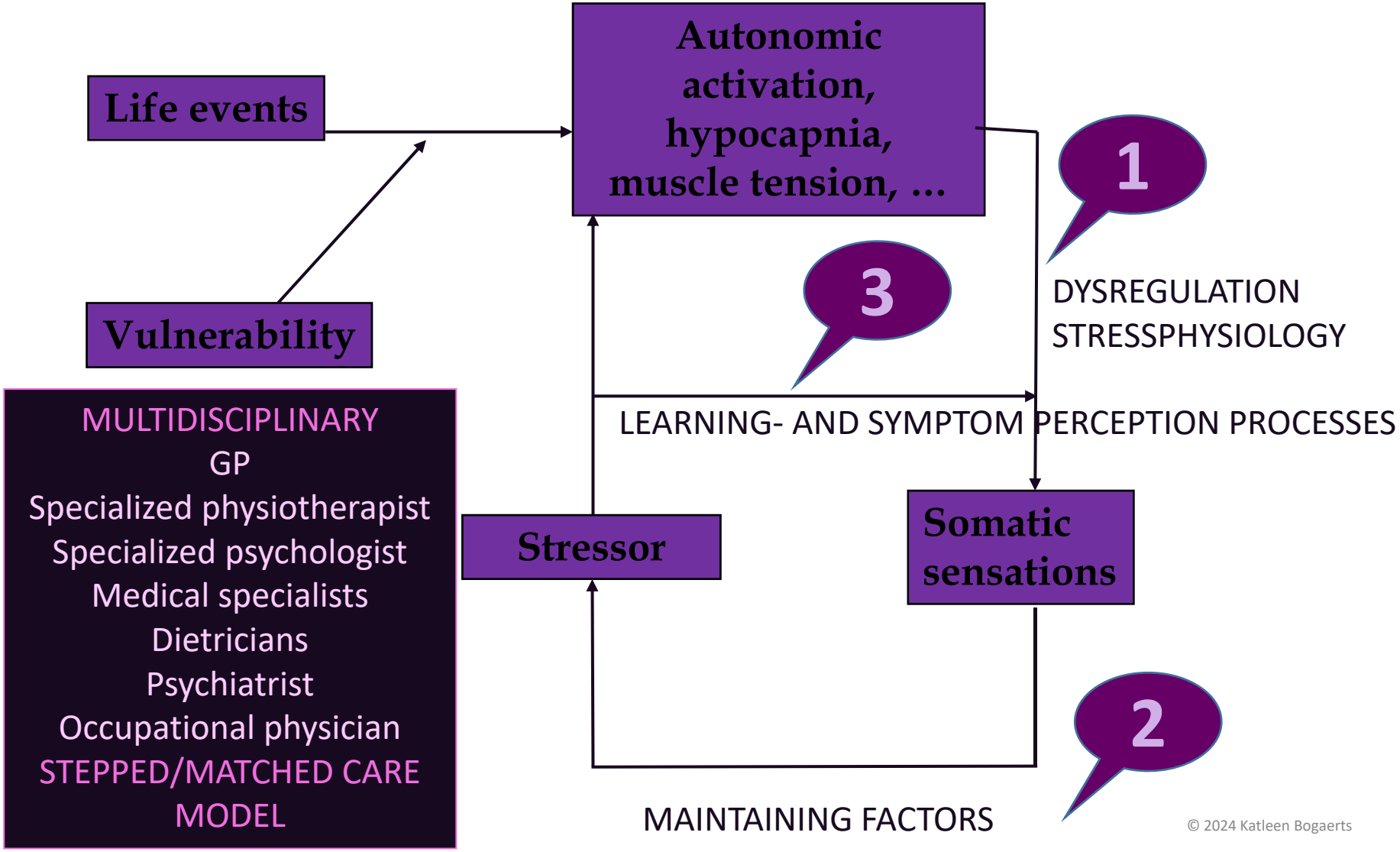
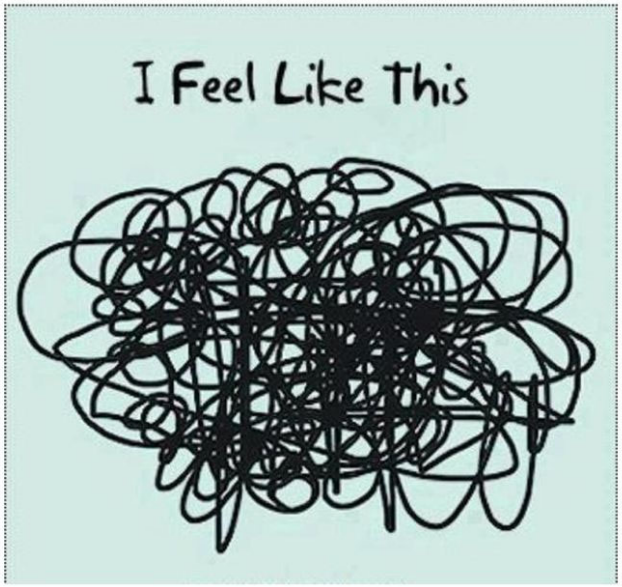
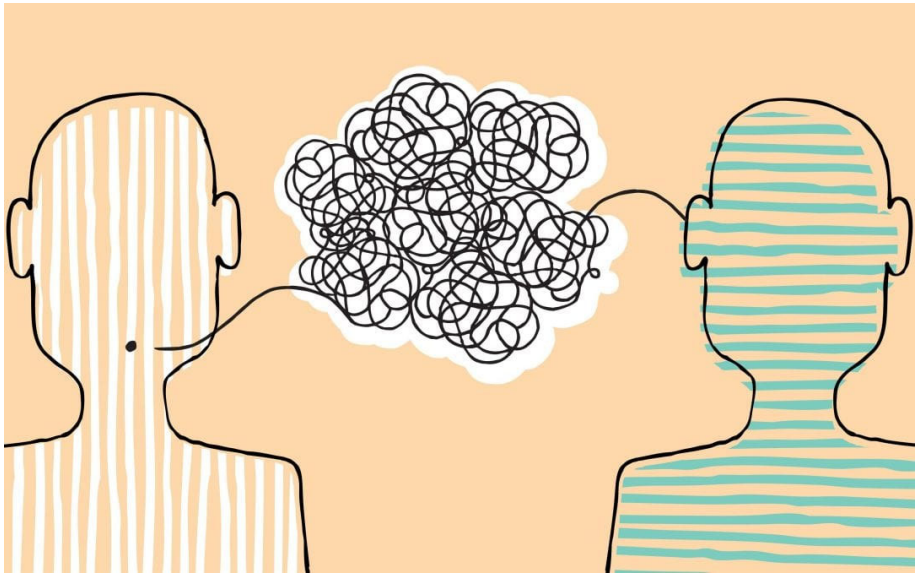
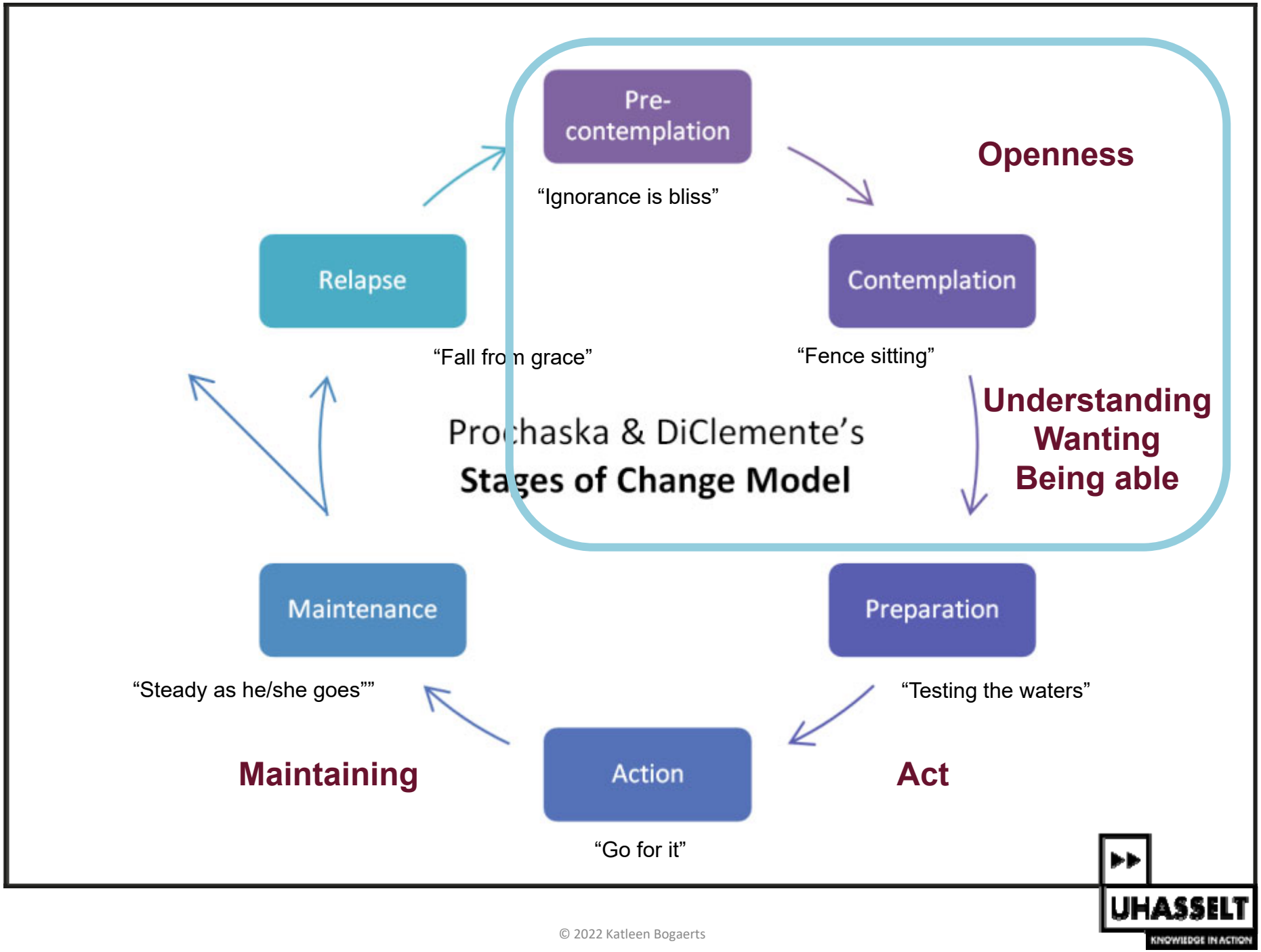


What is a “difficult” patient?





The “difficult” patient does not exist



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POINTS OF INTEREST

- **Tips (attachment style; personality)**

  - ✓ Validation and explanation
  - ✓ Use of metaphors
  - ✓ Sensitivity in word choice
  - ✓ Horse of Troy

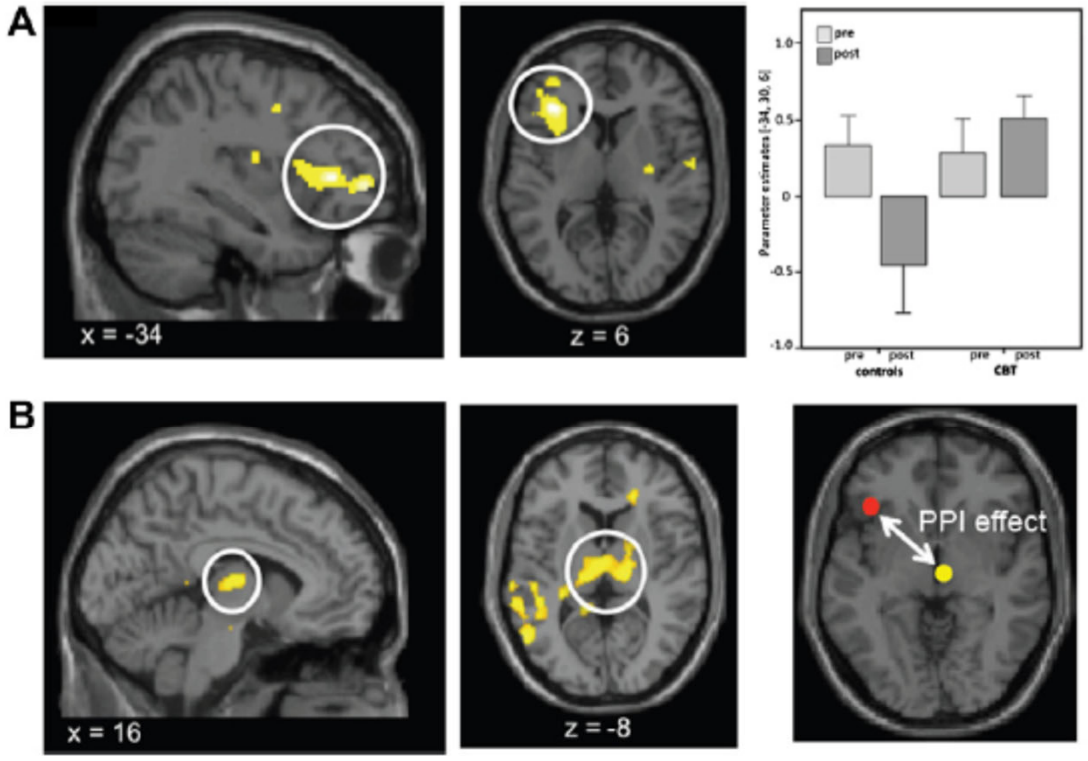
PAIN® 153 (2012) 1495–1503

PAIN®

www.elsevier.com/locate/pain

Cognitive Behavioral Therapy increases pain-evoked activation of the prefrontal cortex in patients with fibromyalgeia

Karin B. Jensen [a,b,*], Eva Kosek [c,d], Rikard Wicksell [c,e], Mike Kemani [c,e], Gunnar Olsson [e,f], Julia V. Merle [g], Diana Kadetoff [c,d], Martin Ingvar [c,d]



Biofeedback

Treatment Phase

Tumi Therapeutics

- **Based on transdiagnostic and specific underlying mechanisms**
  - Tailor-made
  - Multi/interdisciplinary
    - Psychotherapy
    - Specialized physiotherapy
    - …
  - Tumi working model and decision tree
    - Personalized
    - Evidence-based or best-practice

Treatment Phase

Tumi Therapeutics

- **First and third wave CBT**
  - Education
  - Defusion
  - Attention training/Mindfulness
  - Acceptance (vs fight/flight)
  - Values, goals and action
  - Interoceptive exposure
  - Schema therapy (if needed)

TUMI THERAPEUTICS

TREATMENT PHASE

- **Specialized body oriented interventions**
  - Biofeedback
  - Breathing exercises
  - Activity pacing/graded activity/exposure
  - Bodily perception accuracy training
    - Body awareness interventions
    - Tension in the body
    - Slow movement interventions
    - Manual interventions
    - Balance interventions
    - Sensations versus symptoms
    - Paradigms
    - …

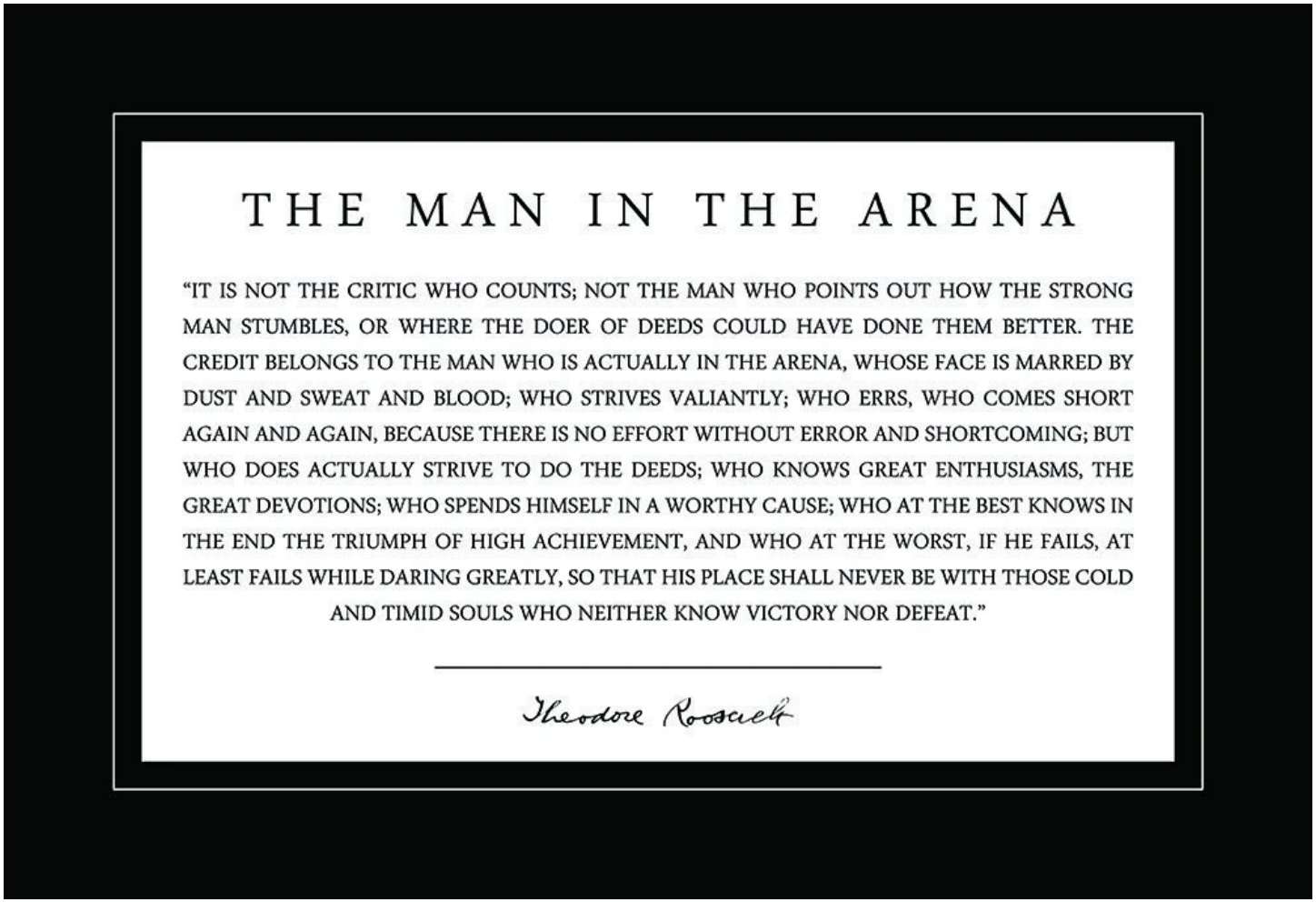
TUMI THERAPEUTICS

Questions

Scientist-practitioner model?

Challenges and differences across countries?

TUMI THERAPEUTICS



TUMI THERAPEUTICS

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MORE INFORMATION?

Prevention, diagnostics and treatment:

http://www.tumitherapeutics.be

Research:

http://ppw.kuleuven.be/home/english/research/ogp/

https://www.uhasselt.be/nl/onderzoeksgroepen/reval/pijn-vermoeidheid-somatisch-onverklaarbare-klachten

katleenbogaerts@tumitherapeutics.be

katleen.bogaerts@uhasselt.be

katleen.bogaerts@kuleuven.be

"I am not a lazy bum! I am a potential workaholic with highly developed stress management skills!"