Can dogs have a burn out?

How to measure stress in working dogs

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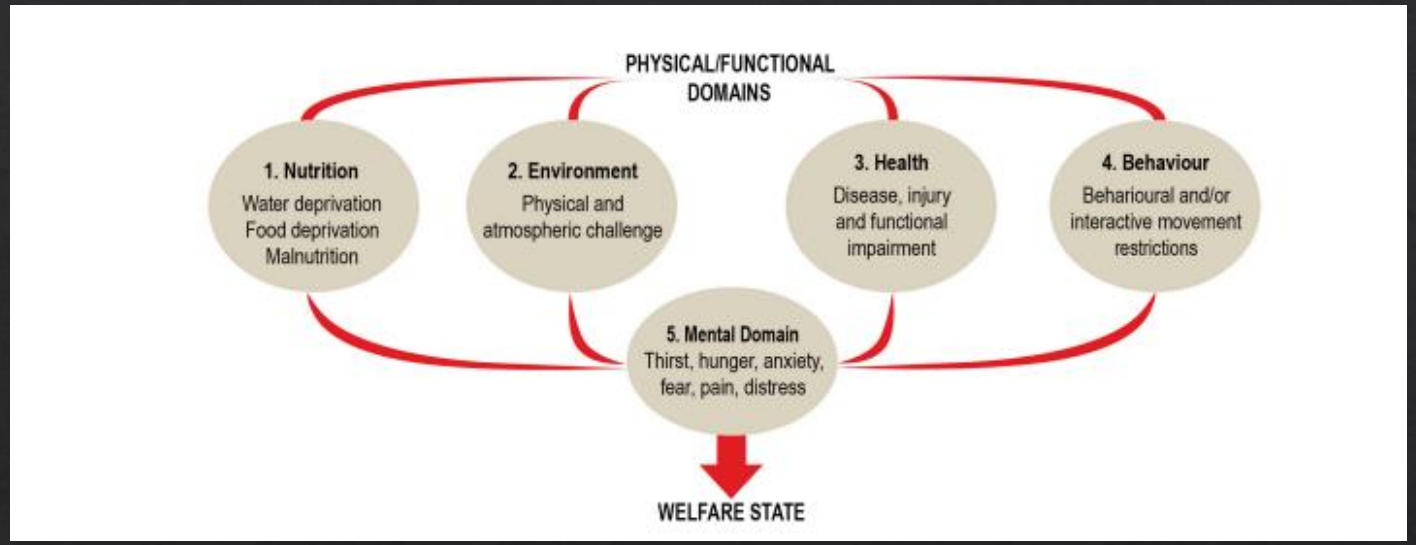
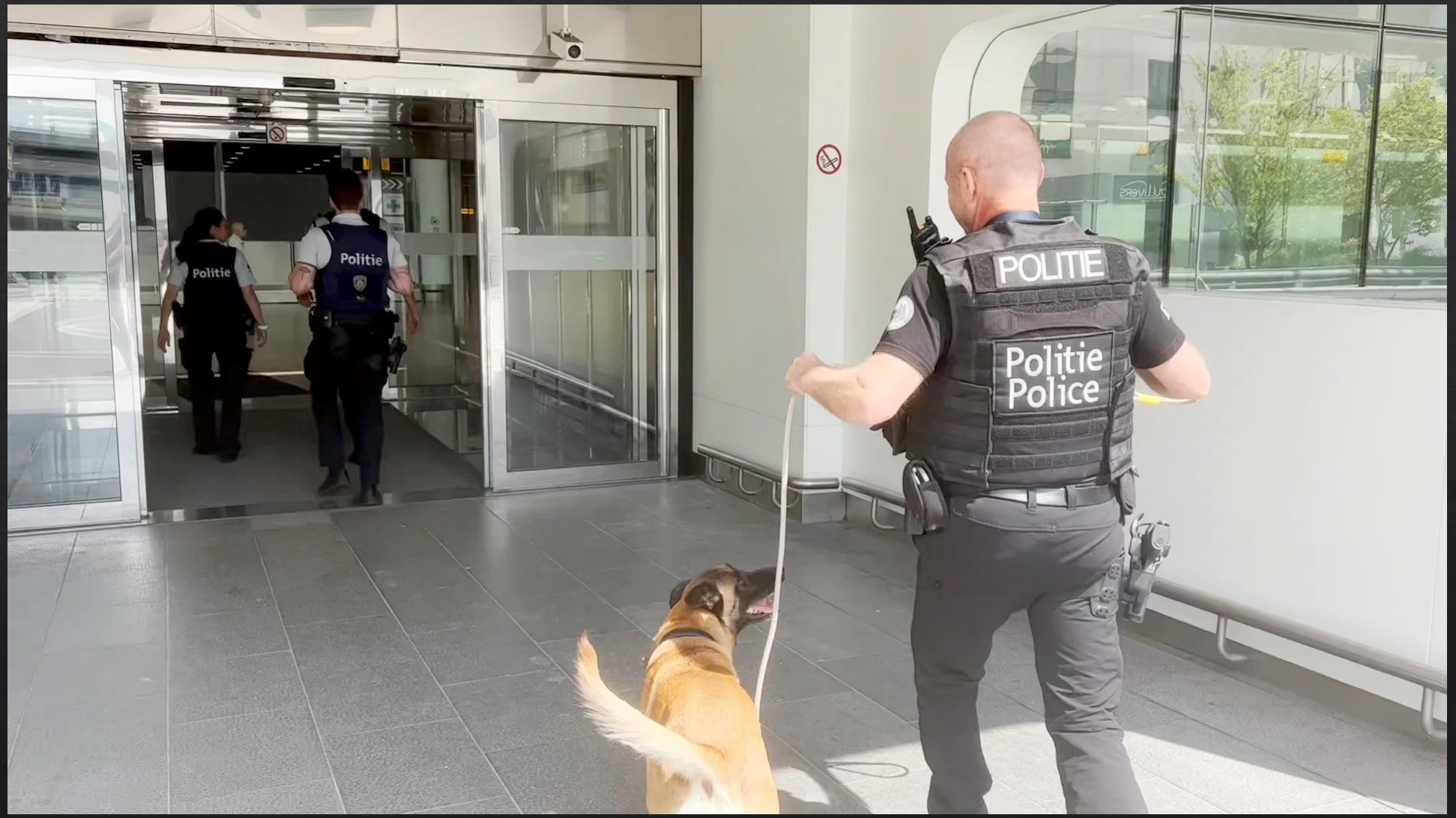
Animal welfare: 5 domain model



Nature of Human-Animal Interaction	Lower ← Negative Affective Impact → Higher				
	A: None	B: Low	C: Mild to Moderate	D: Marked to Severe	E: Very Severe
Aversive training of companion animals: • General features of training • Fight, flight, freeze, appeasement behaviours • Fear of trainer and others • Response to trainer	Gentle, calm methods No such responses No fear evident Engaged, compliant, at ease	Punishment sometimes used Mild such responses Mild fear sometimes evident Sometimes non-compliant, mostly at ease and compliant	Regular hitting and shouting Responses apparent when trainer is present Moderate fear overall; marked fear when trainer is present Distracted, nervous, anxious, often non-compliant, sometimes aggressive		Brutal methods Extreme responses, often withdrawn Extreme fear of trainer & others Terrified, panicked; aggressive, shutdown, non-responsive
Pushing performance animals to their physiological/physical limits: e.g., using persistent unassisted urging, whips, spurs and/or drugs	Animals compliant; briefly exercised below maximum levels using unassisted urging; little if any fatigue; rapid return to resting state	Animals compliant; briefly exercised at maximum using persistent unassisted urging; some fatigue; return to resting state somewhat delayed	Animals non-compliant due to persistent use of contradictory aversive stimuli; escalation of injurious force; slow decline of pain and fear to resting levels; markedly fatigued; delayed recovery to resting state		Brutal methods lead to extreme withdrawal; panic, terror; pain from injury; bone fractures when fatigued animals misstep; very slow recovery or euthanasia

Mellor & all

Video van subway vanuit hondenoogpunt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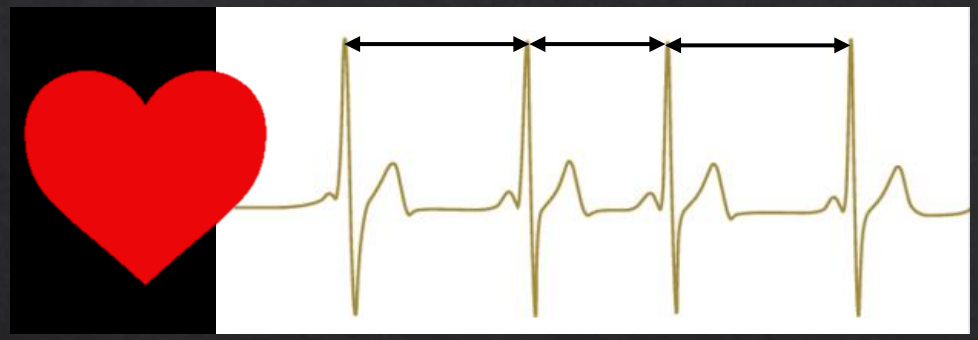
Heart-rate variability

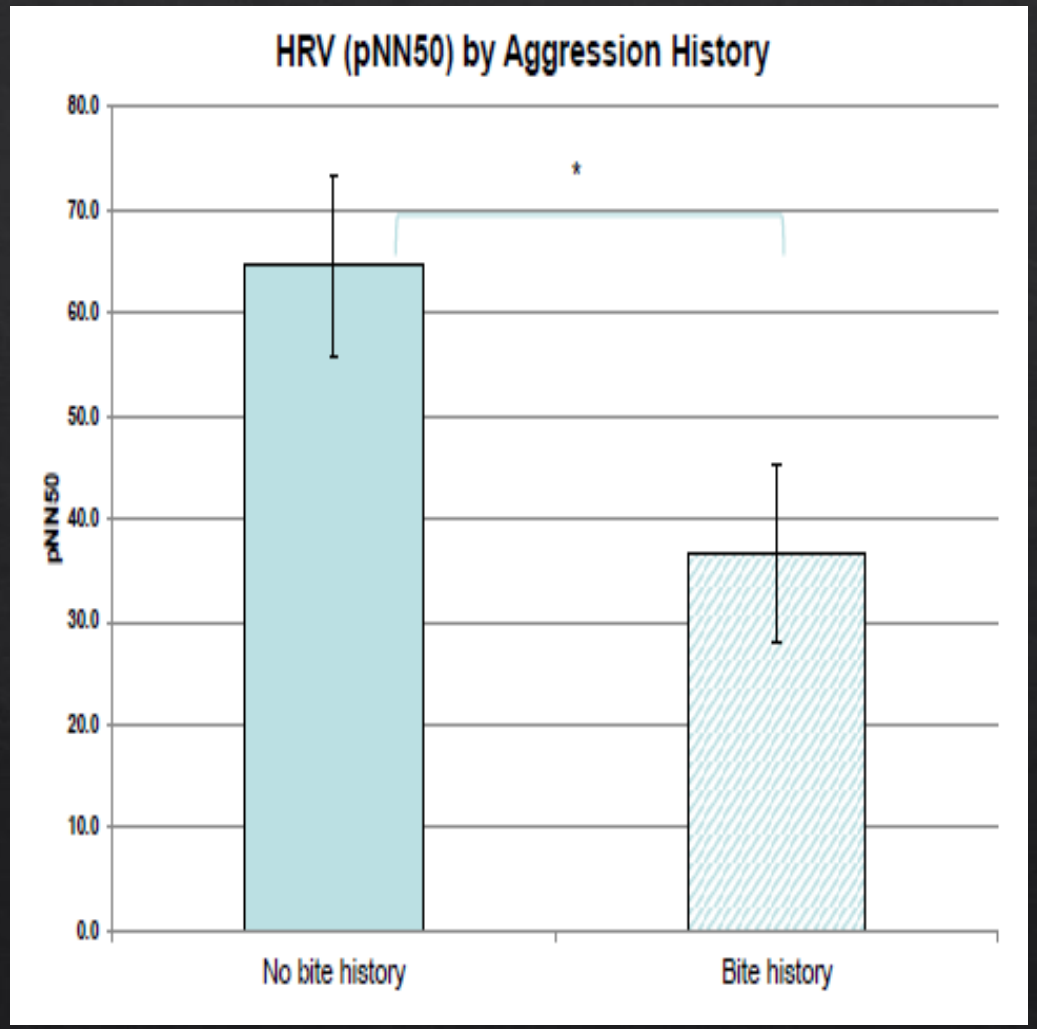


- HRV is an index of **stress** in both humans and nonhuman animals (von Borrel, 2007)

1. **Trait:** The higher baseline HRV, the better one can cope with stess
2. **State:** HRV decreases during stressful episodes

→

HRV: Baseline

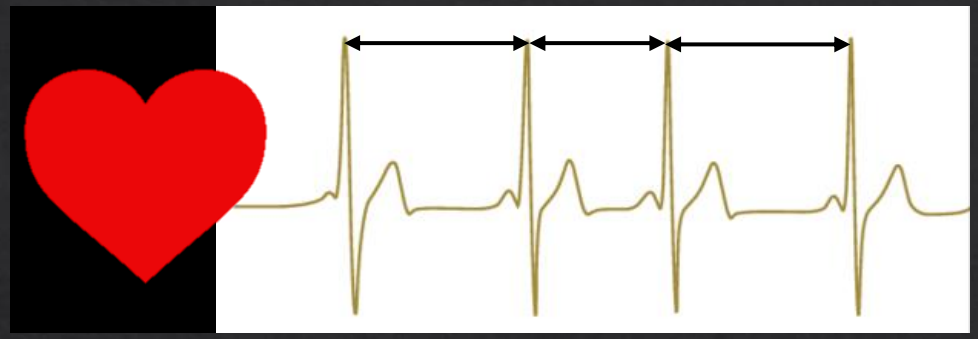


Craig et al. 2015

Heart-rate variability

Polar® RS800CX HR monitor

Heart-rate variability

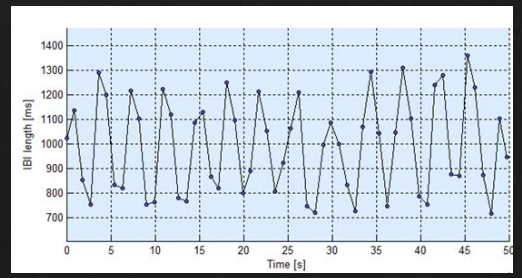


NN: Normal to Normal Interval
= **IBI:** Interbeat Interval
= **RR**: Segment between two consecutive R waves

Analyses: thanks to Stefan Sutherland, faculty of computer sience, Hochschule Albstadt-Sigmaringen, Germany

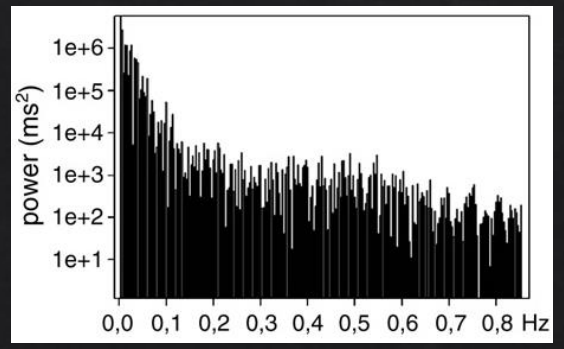
Time domain

SDNN: standard deviation of IBI Intervals
RMSSD: root mean square of the standard deviation
pNN50: the proportion of consecutive IBI's that differ more than 50ms

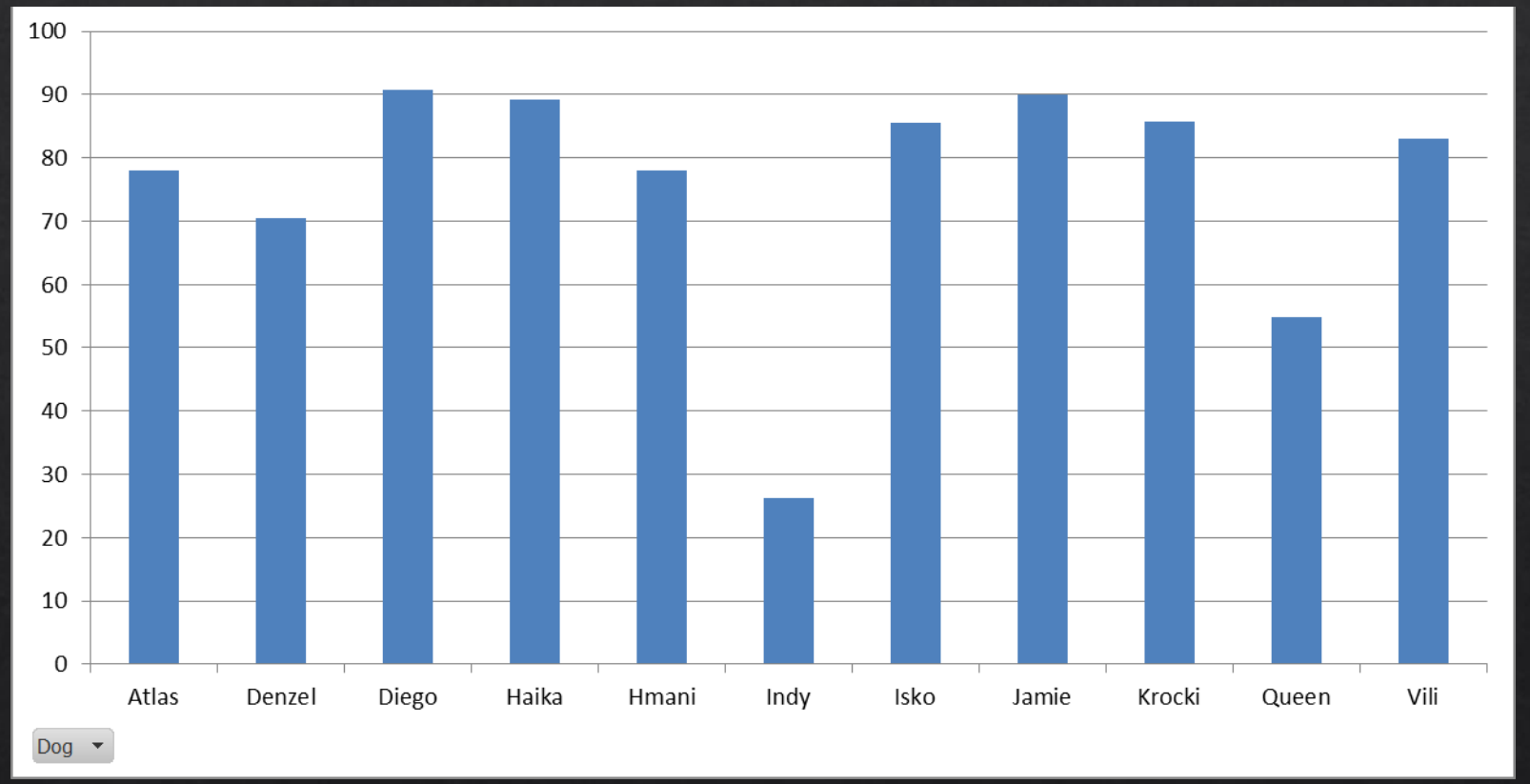


Frequency domain

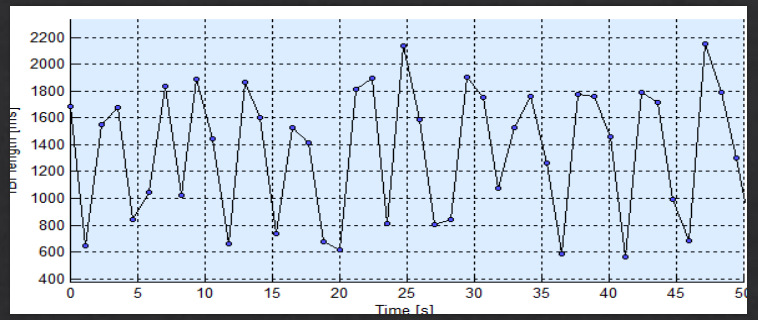
LF: low-frequency waves (0,04-0,15Hz in humans)
HF: high-frequency waves (0,15-0,4Hz in humans)
LF/HF: ratio

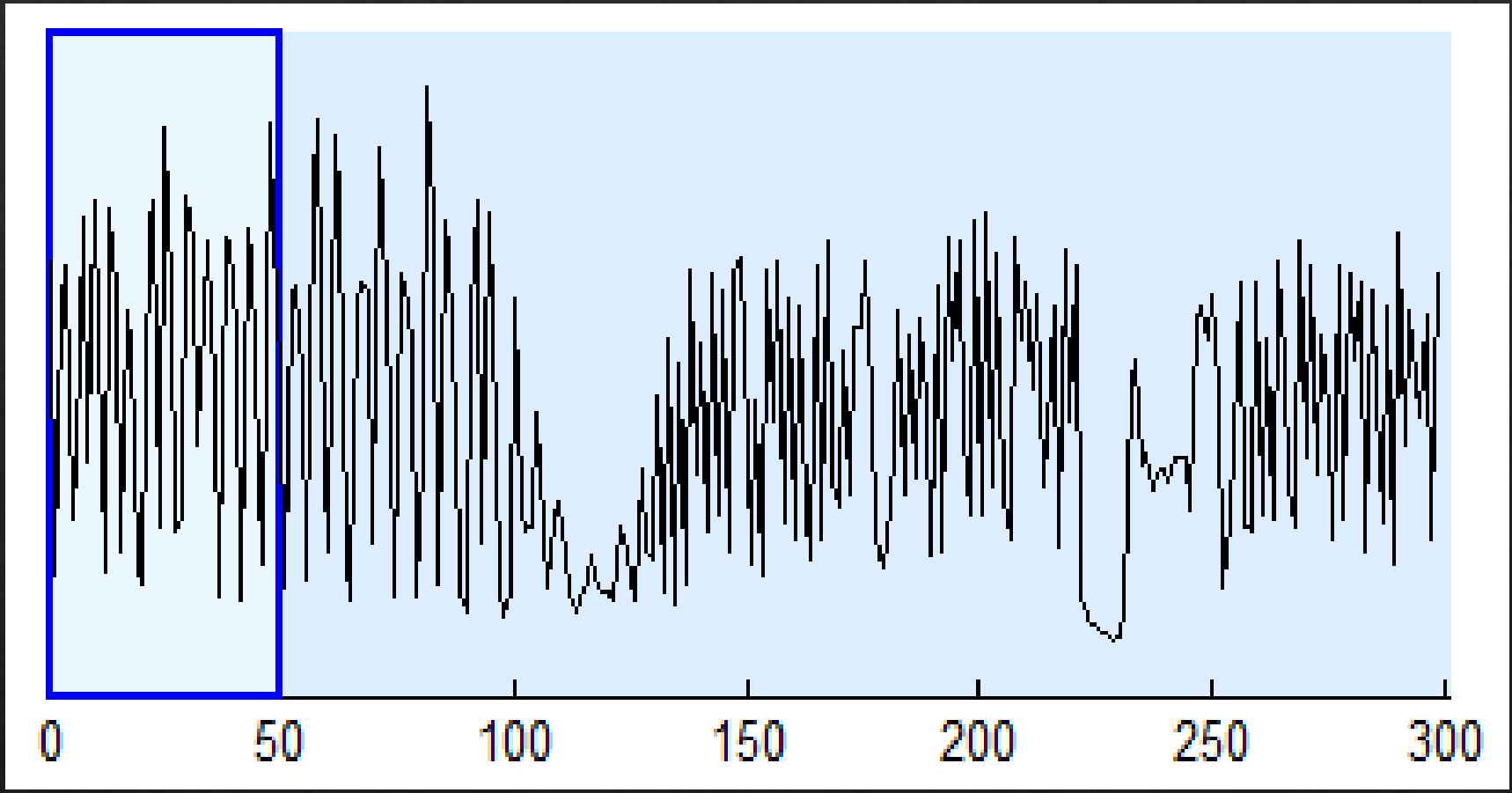


HRV Baseline

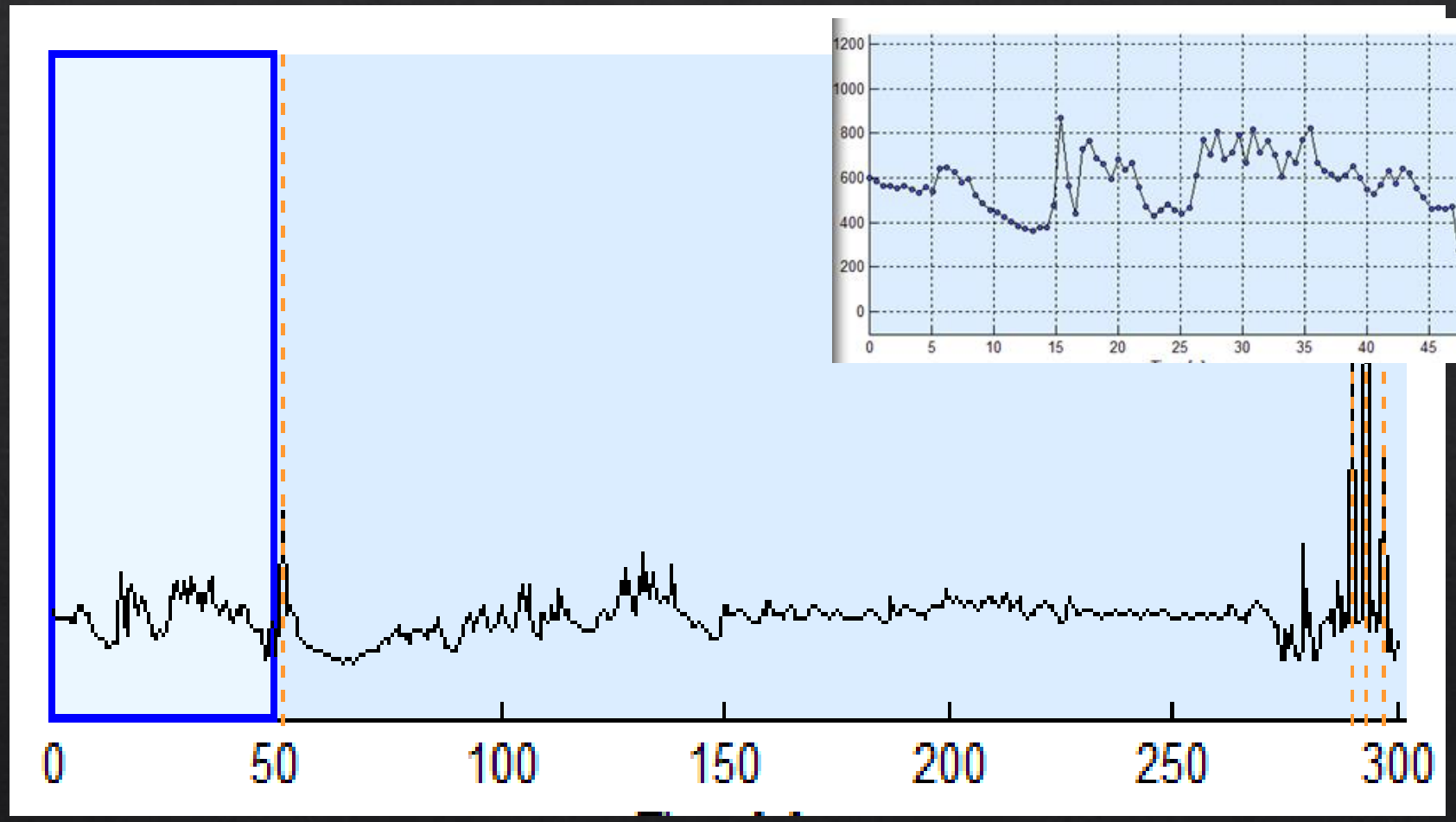


Haika Baseline





Indy Baseline



Experiment : HRV in the subway

20 min.
Baseline

Metro

v.s.

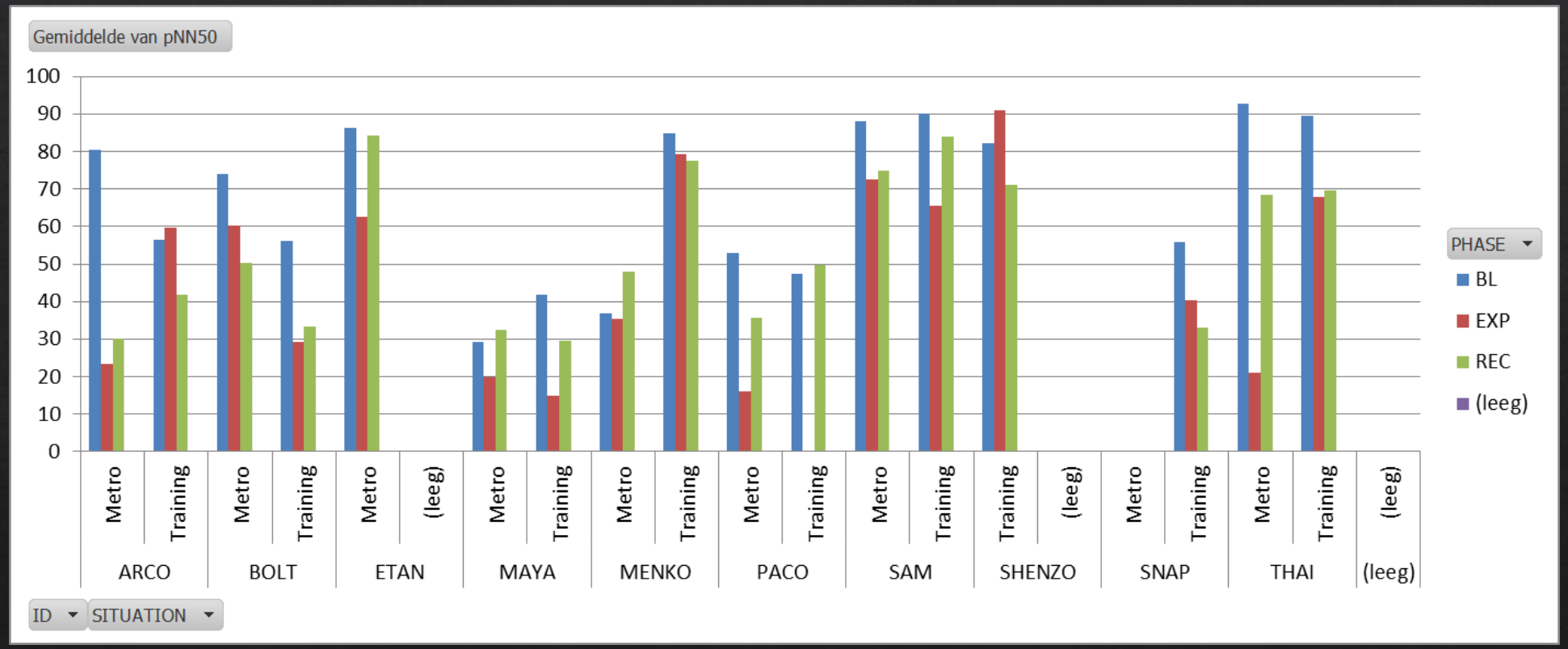
20 min.
Recovery

20 min.
Baseline

Training location

20 min.
Recovery

pNN50


Gemiddelde van pNN50
100
90
80
70
60
50
40
30
20
10
0
Metro
Training
Metro
Training
Metro
(leeg)
Metro
Training
Metro
Training
Metro
Training
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Training
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ARCO
BOLT
ETAN
MAYA
MENKO
PACO
SAM
SHENZO
SNAP
THAI
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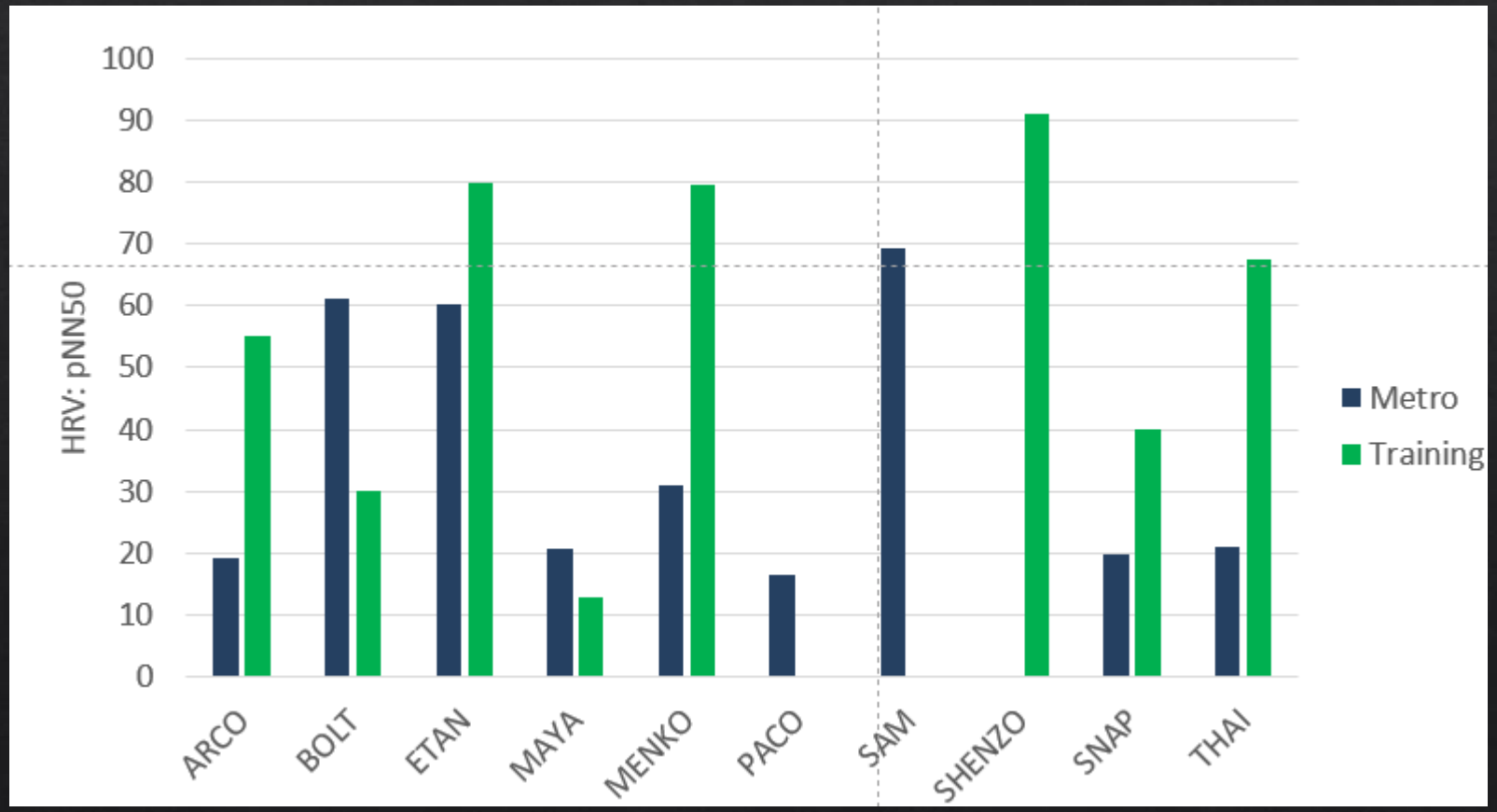
SITUATION

HRV as a measure of stress

HRV: Subway (metro) vs. Training



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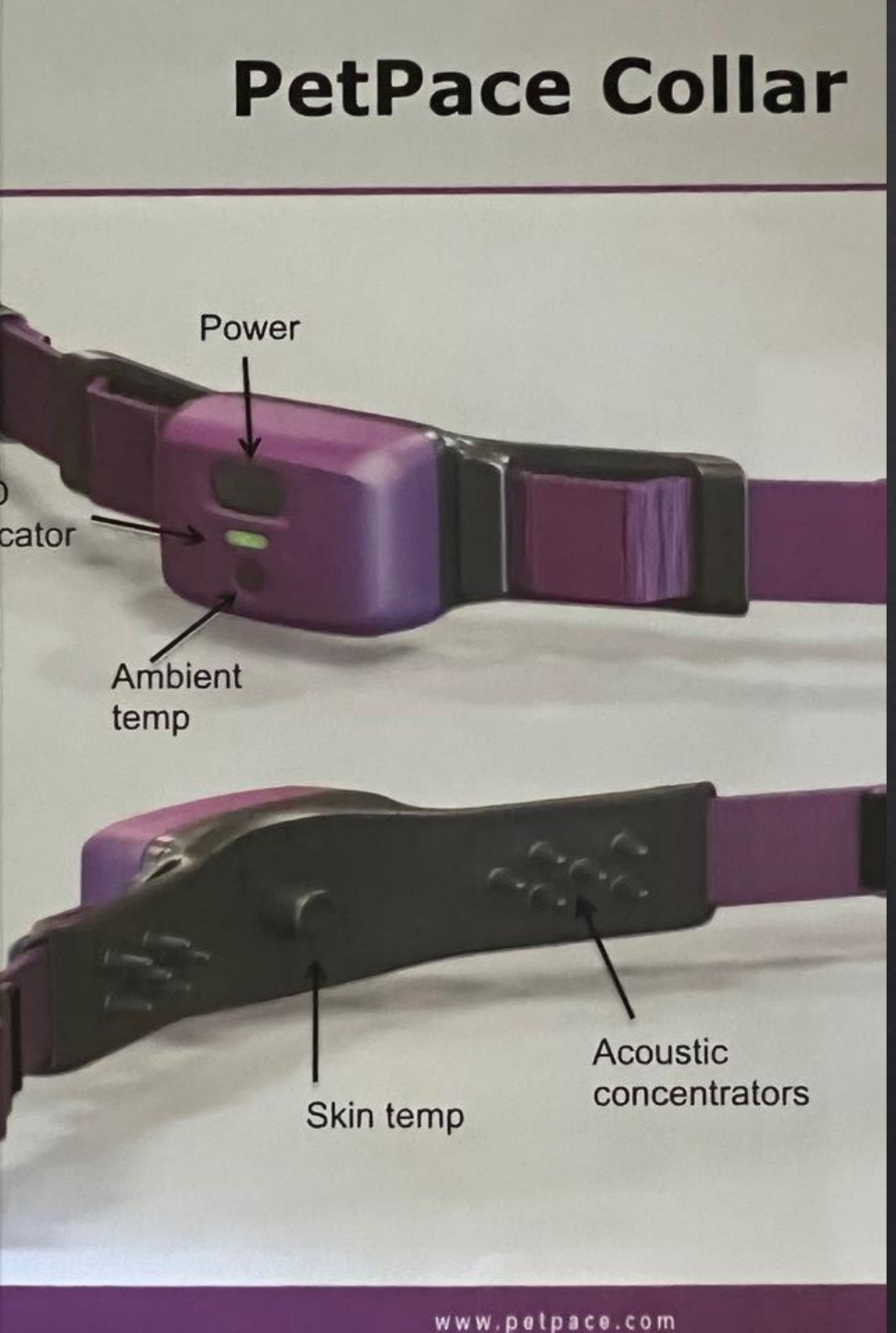
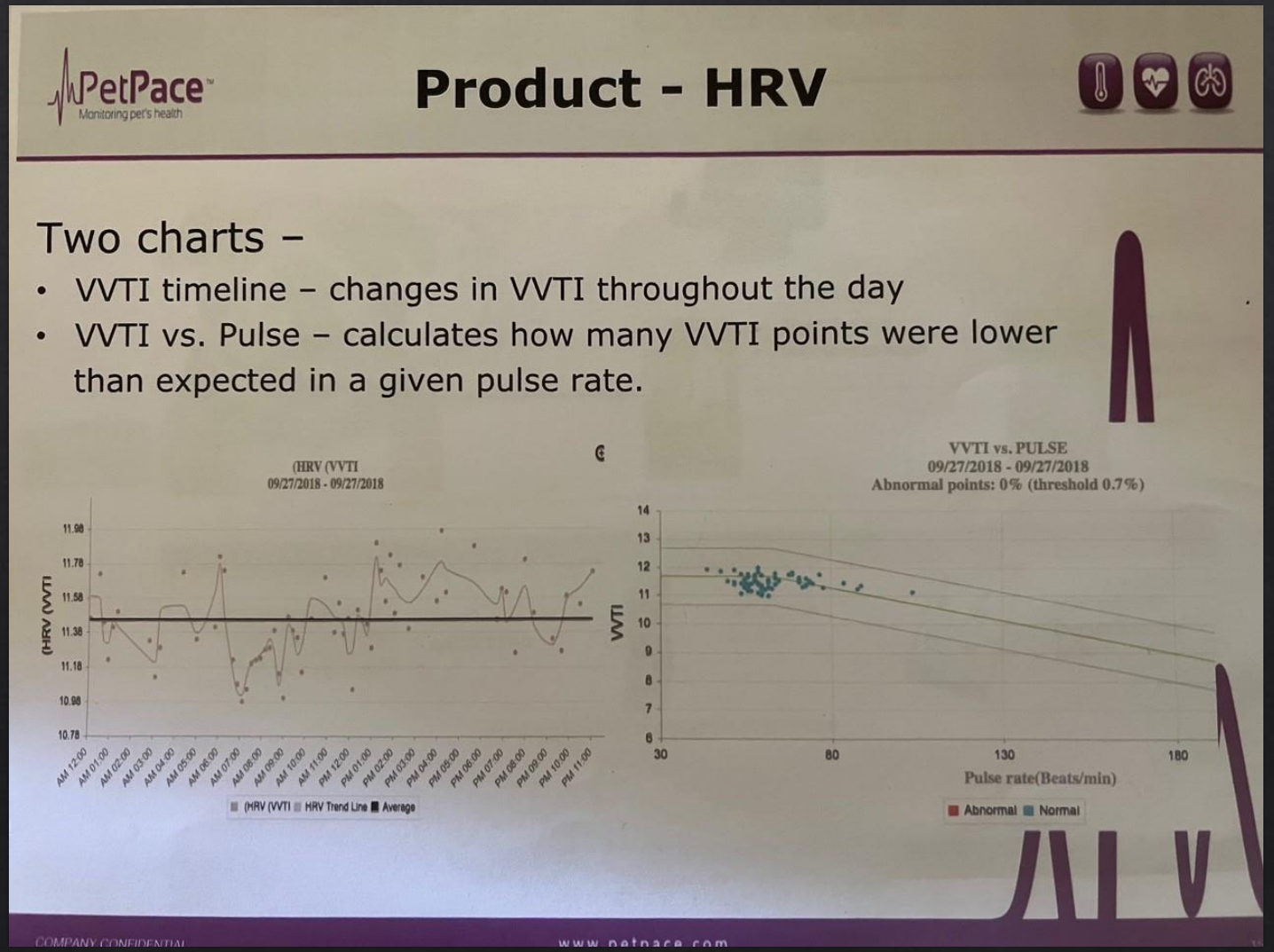
HRV using Petpace colar





Brain scans of dogs with stress symptoms

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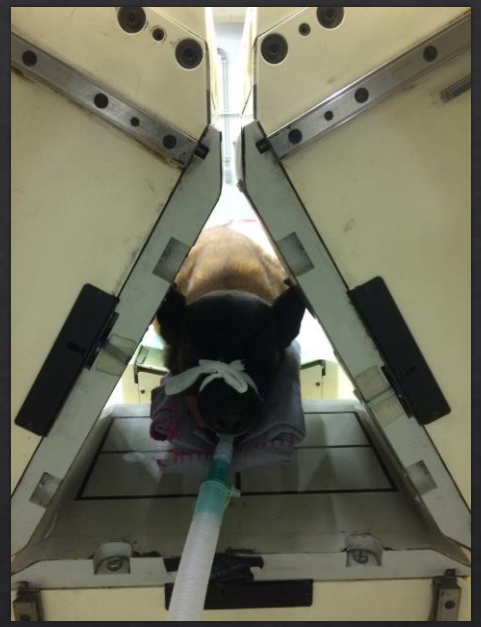
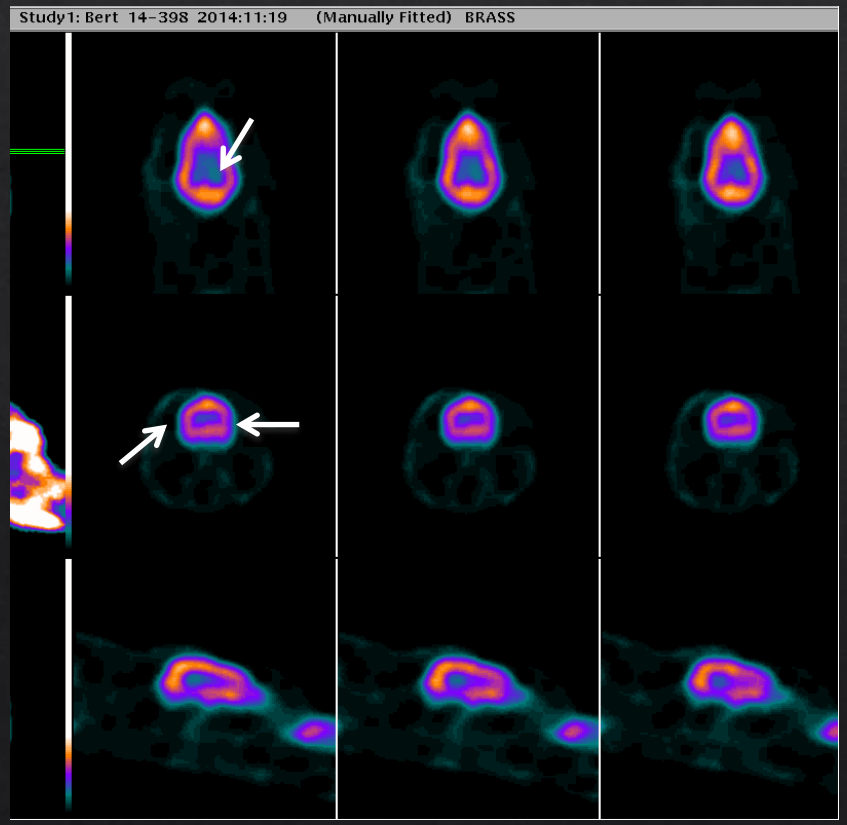
SPECT brain scans of dogs with stress symptoms

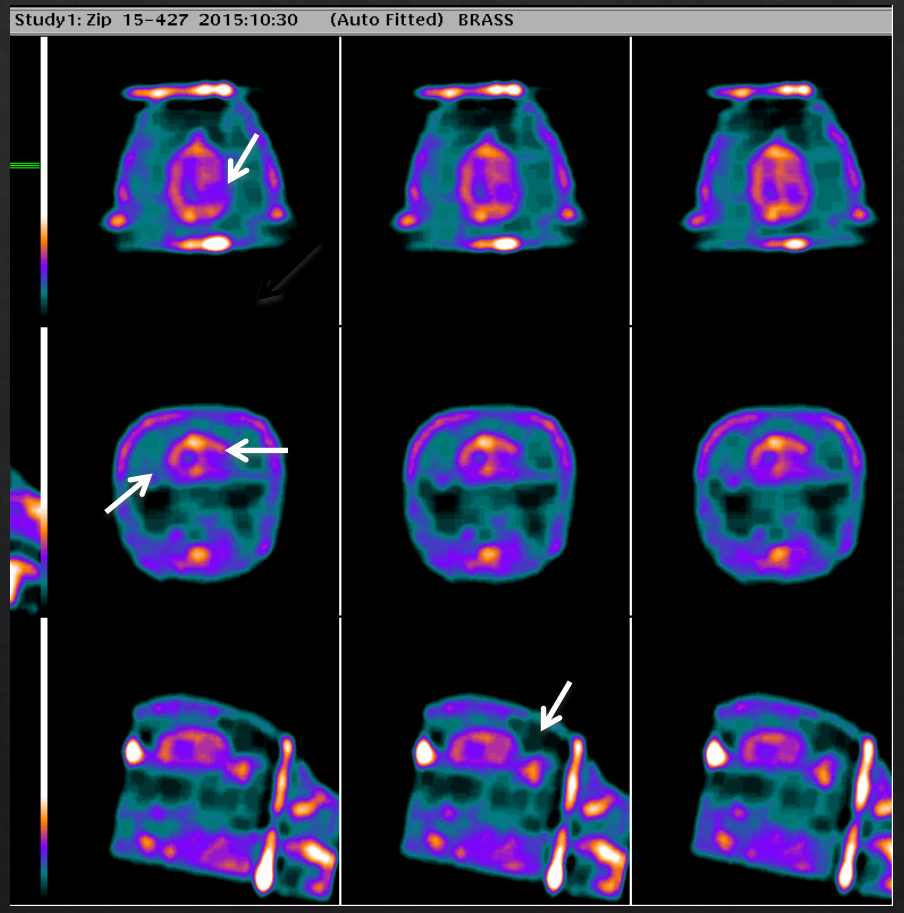
@Prof. Dr.K.Peremans, Department of Medical Imaging, Faculty of Veterinary Medicine, Gent, BE



Based on the use of radioactive tracers – allows an estimation of the number of receptors/transporters present in different brain regions

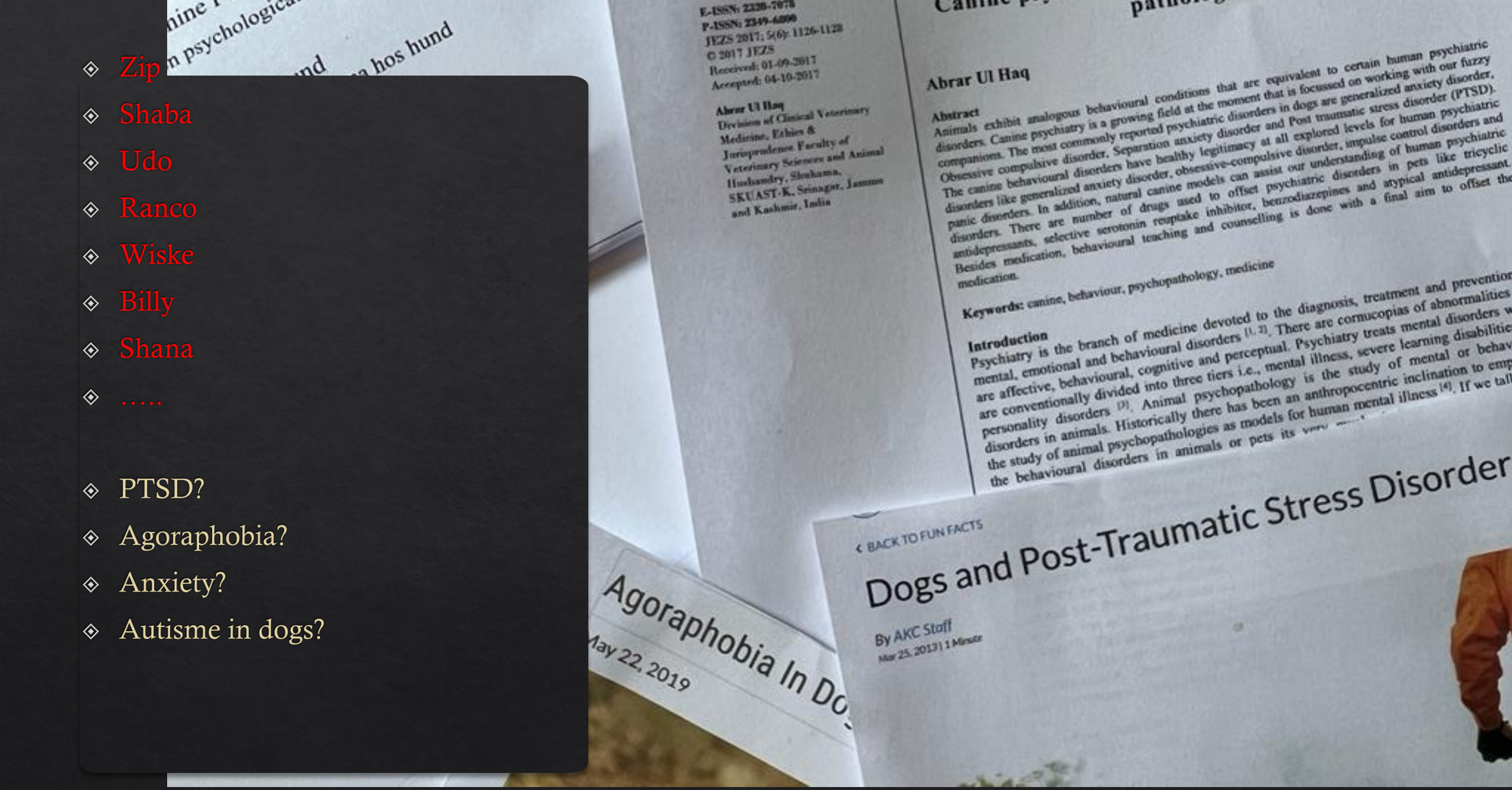
SPECT image of brain ZIP





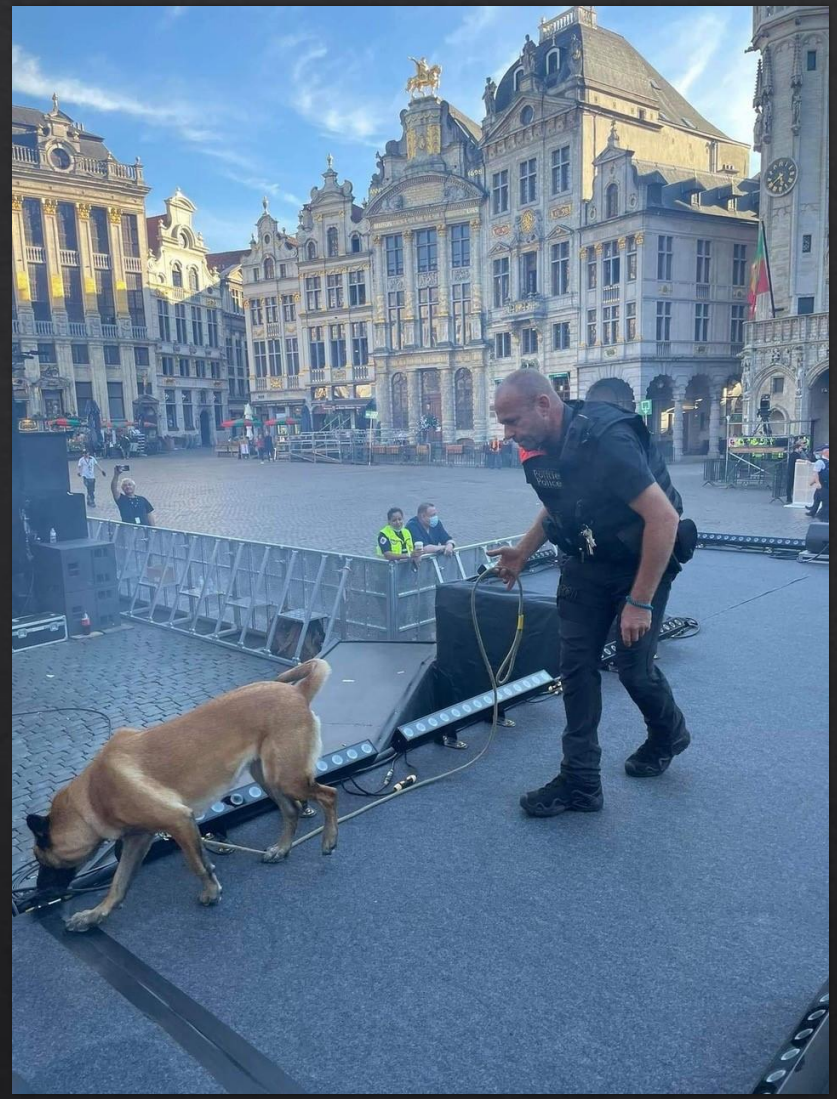
- Zip
- Shaba
- Udo
- Ranco
- Wiske
- Billy
- Shana
- …..

- PTSD?
- Agoraphobia?
- Anxiety?
- Autisme in dogs?



Conclusion

- Some dogs experience stress in busy environments
- HRV might be a good way to monitor stress
- SPECT analyses show significant brain deficiencies in the dogs that suffer severely from anxiety stress
- Selection of dogs is very important



Thanks to

-the dog handlers and dogs

-Sarah Beums, KUL, research Unit for psychology of learning and experimental psychopathology