Fatigue in neurological disorders: the sensory attenuation hypothesis

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Disclosure
This certifies that I, Anna Kuppuswamy, have no financial relationship that is relevant to the subject matter of this presentation.
Apathy and fatigue

**Temporal Associations between Fatigue, Depression, and Apathy after Stroke: Results of the Cognition and Affect after Stroke, a Prospective Evaluation of Risks Study**

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**Apathy and depression, but not subjective fatigue, is related with cognitive dysfunction in patients with multiple sclerosis**

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The associations between fatigue, apathy, and depression in Parkinson’s disease


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**Dissociation between mental fatigue and motivational state during prolonged mental activity**

Mónika Gergelyfi, Benvenuto Jacob, Etienne Olivier and Alexandre Zénon

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**Fatigue maybe unrelated to changes in reward sensitivity, but related to perceived effort**

M. Skovranek1,2, Z. Gdovinova2,3, J. Rosenberg2, R. Ghorbani Saeedian1, I. Nagyova4, J. W. Groothoff2, J. P. van Dijk5

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Sensory attenuation (SA) model of fatigue – proprioception

The fatigue conundrum
Kuppuswamy, Brain, 2017

Greater perceived effort maybe explained by abnormal weighting of sensory prediction error
Behavioural evidence of SA in a motor task

Exploring the relationship between effort perception and poststroke fatigue

William De Doncker, MSc, Lucie Charles, PhD, Sasha Ondobaka, PhD, and Arnapoorna Kuppuswamy, PhD

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Altered perceived effort in fatigue can be explained by poor sensory attenuation
Neurophysiological evidence

Post-stroke fatigue: a deficit in corticomotor excitability?
Annapoorna Kuppuswamy, Ellis V. Clark, Isobel F. Turner, John C. Rothwell and Nick S. Ward

Influence of post-stroke fatigue on reaction times and corticospinal excitability during movement preparation
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Fatigue is associated with neurophysiological markers of poor behavioural flexibility
Visual and auditory effort

Perceptual load limitations

Non-target stimulus

Target stimulus

Novel stimulus

Poor Saccadic Suppression

Can poor sensory attenuation also explain greater visual effort?
Target Vs distractor stimulus processing in fatigue

Kuppuswamy et al., 2021 in preparation

Inability to switch attention from distractor to target with increasing load explains fatigue
Fatigue is associated with abnormal activity in resting state salience networks.
Future directions

• Investigate reward prediction errors and sensory prediction errors in the context of trait fatigue and fatigability in disease.

• When investigating sensory attenuation – focus on all sensory inputs, not just somatosensory.

• When studying sensory perception, focus on proprioceptive, visual and auditory inputs, and multi-sensory integration.
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