

Exploring the Relationship Between Treatment and Causal Theory in Stuttering

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Overview

- Verbal communication and complexity theory
- “What causes stuttering?”
 - causal models/theories
 - P&A 3-factor model
- Do our treatments for stuttering address cause?

Spoken language

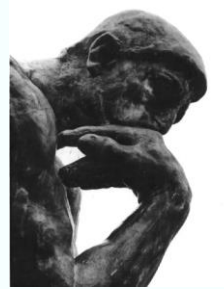
- The most complex thing we humans do
 - thinking up we want to say
 - constructing the language to say it
 - programming this into motor gestures (syllables)
 - 4-6 syllables per second, each one unique
 - all this, taking into account
 - conversational partner
 - topic
 - purpose
 - context

Verbal communication and complexity theory

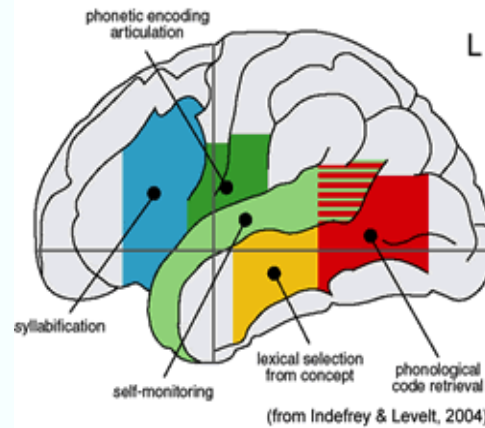
Packman & Kuhn (ODC, 2008; IJSLP, 2009)

- Complexity theory/sciences
 - nonlinear
 - initial condition and the “butterfly effect”
 - self-organising and dynamic

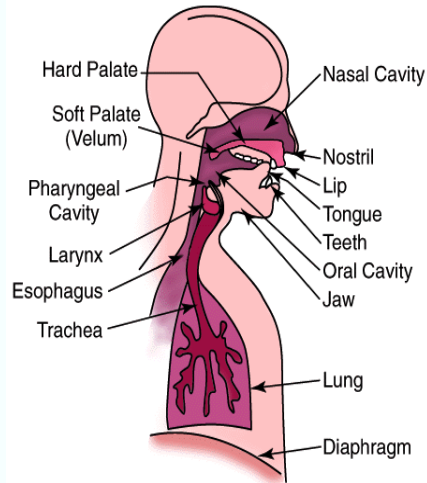
Communicative context



MIND

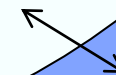
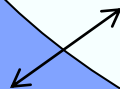
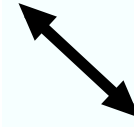
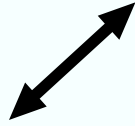
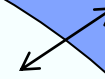


BRAIN



BODY

Communicative environment



“What causes stuttering?”

- Many models and theories
 - Systems control modeling
 - Sensory Motor Modeling Theory
 - Neuroscience Model
 - Variability Model (Vmodel)
 - Speech motor control
 - Syllable Initiation Theory (SI Theory)
 - Interhemispheric Interference Model

Models and theories (cont.)

– Cognitive and linguistic processing

- Neuropsycholinguistic Theory
- Covert Repair Hypothesis
- Suprasegmental Sentence Plan Alignment Model
- EXPLAN

– Multifactorial

- Demands Capacities
- Dynamic Multifactorial Model

Let's talk about cause

Packman & Attanasio (2004)

- Cause = necessary and sufficient conditions
- Individual instances of a phenomenon can have triggers, e.g. bushfires

Rather than asking...

“What causes stuttering?”

we ask...

“What causes a moment of stuttering?”

The Packman & Attanasio (P&A) 3-factor causal model of moments of stuttering

Packman (ODC, 2011; JFD, 2012; Enfance, 2013)

1. *Necessary*

neural processing problem

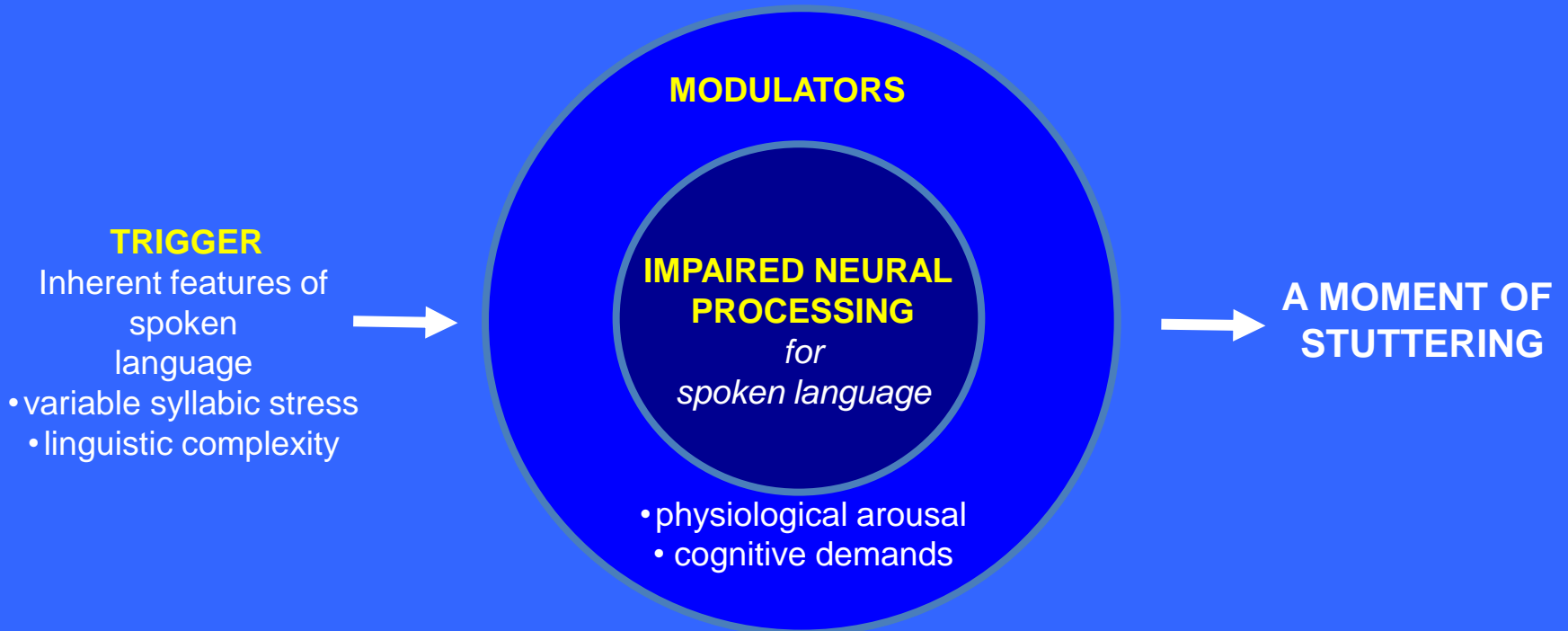
2. *Trigger*

features of spoken language

3. *Modulators*

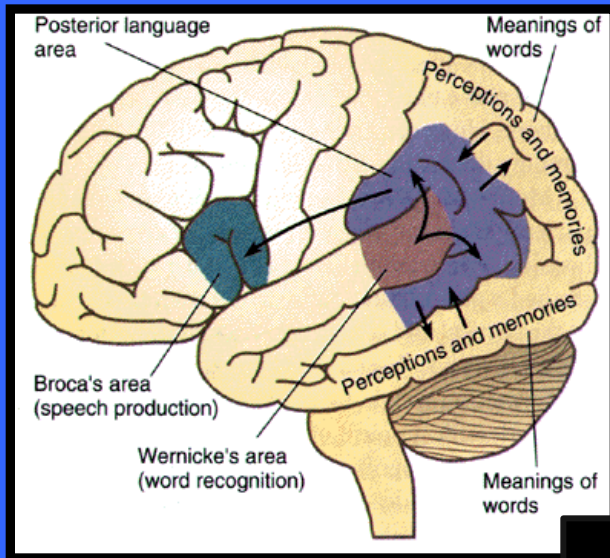
inherent to the individual

P & A 3-factor model

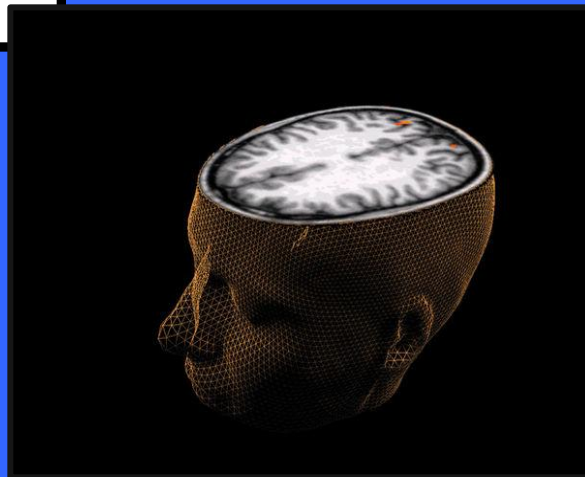


FACTOR 1

Neural processing problem



- Functional
 - Activations & deactivations
- Structural
 - Volume
 - Diffusion Tensor Imaging (DTI)



Putting together the findings of recent imaging and genetic research

Cykowski et al. (NeuroImage, 2010)

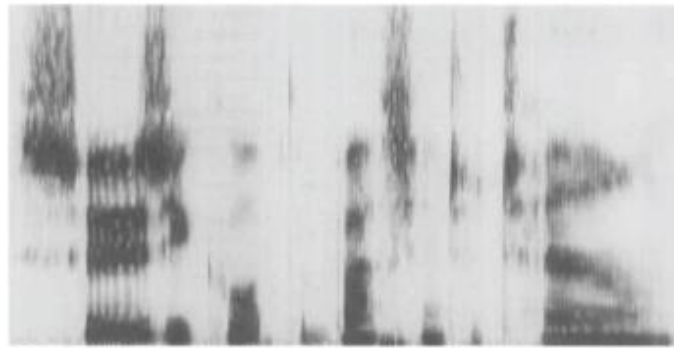
Hypothesis:

The neural processing problem underlying stuttering is incomplete or late myelination of the white fibre tracts subserving the production of spoken language

FACTOR 2

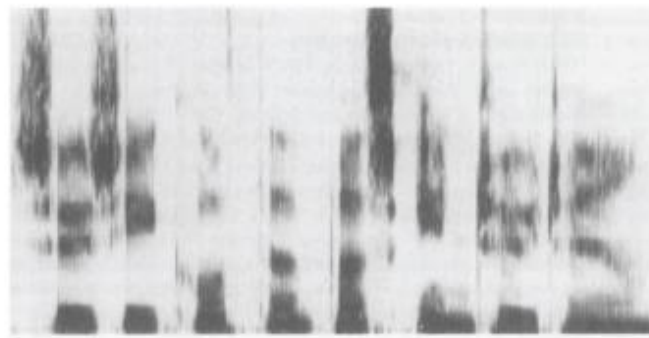
Variability of syllabic stress

Packman et al. (CLP,1996)



1.8 sec

Su zie caught the bus in to town



2.4 sec

Su zie caught the bus in to town

FACTOR 2:

Effects of linguistic complexity on motor stability

see Smith and colleagues (JSLHR, 2000)

“Buy Bobby a puppy”

“You buy Bobby a puppy
now if he wants one”

FACTOR 3

Modulators

Alm (JFD, in press), Eggers et al. (JFD, 2013), Jones et al. (JCD, 2014),
Metten et al. (Dis. Rehab., 2011)

- Determine the triggering threshold
 - physiological arousal
 - Anxiety? Excitement? Temperament?
 - influenced by environment
 - cognitive demands
 - multi-tasking

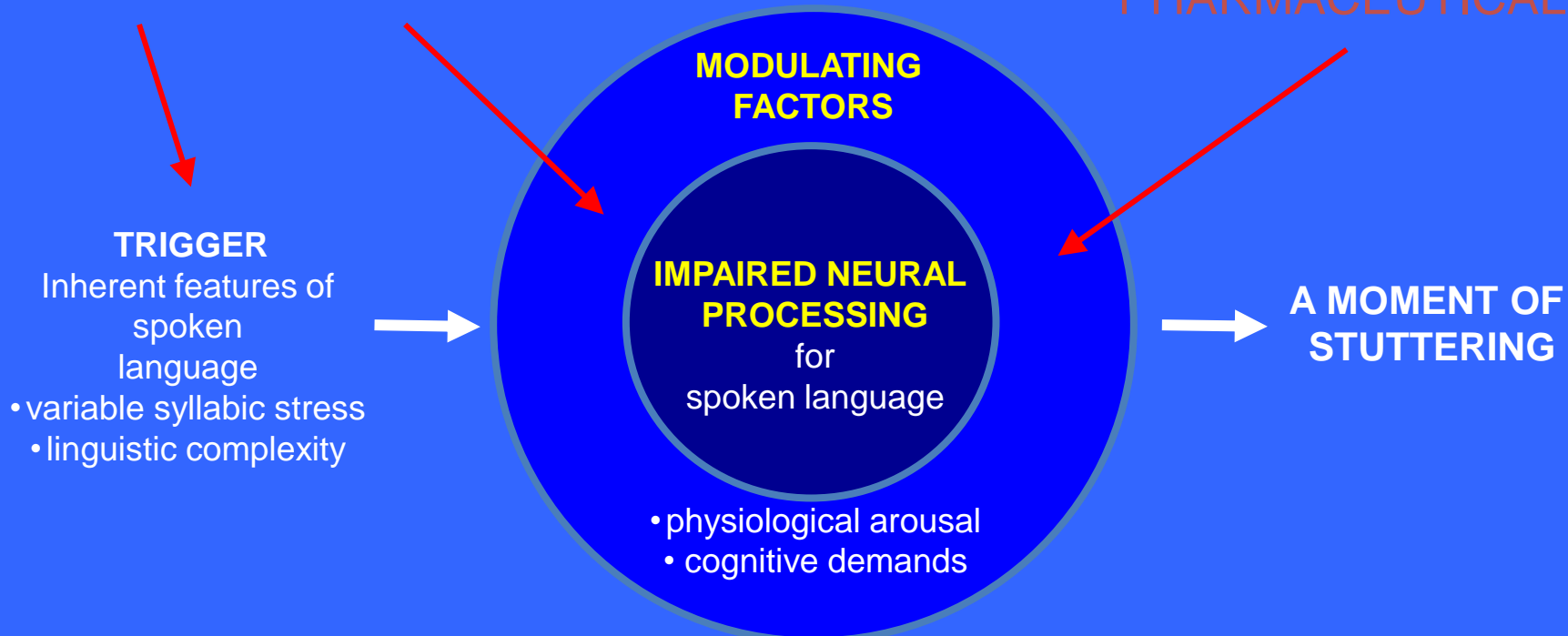
Evaluating the P&A 3-Factor Model

- Explanatory power?
 - Stuttering not normal disfluency
 - Onset and development
 - Topography
 - Natural recovery
 - Variability
- Testability?
- Parsimony?
- Heuristic value?

Do our treatments for stuttering address cause?

Behavioral treatments
designed to reduce
stuttering
DIRECT **INDIRECT**

Other treatments
PSYCHOLOGICAL
(incl. CBT)
PHARMACEUTICAL



Theory and therapy



Should theory drive therapy?

Can therapy drive theory?

Thank you! Dankjewel!



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