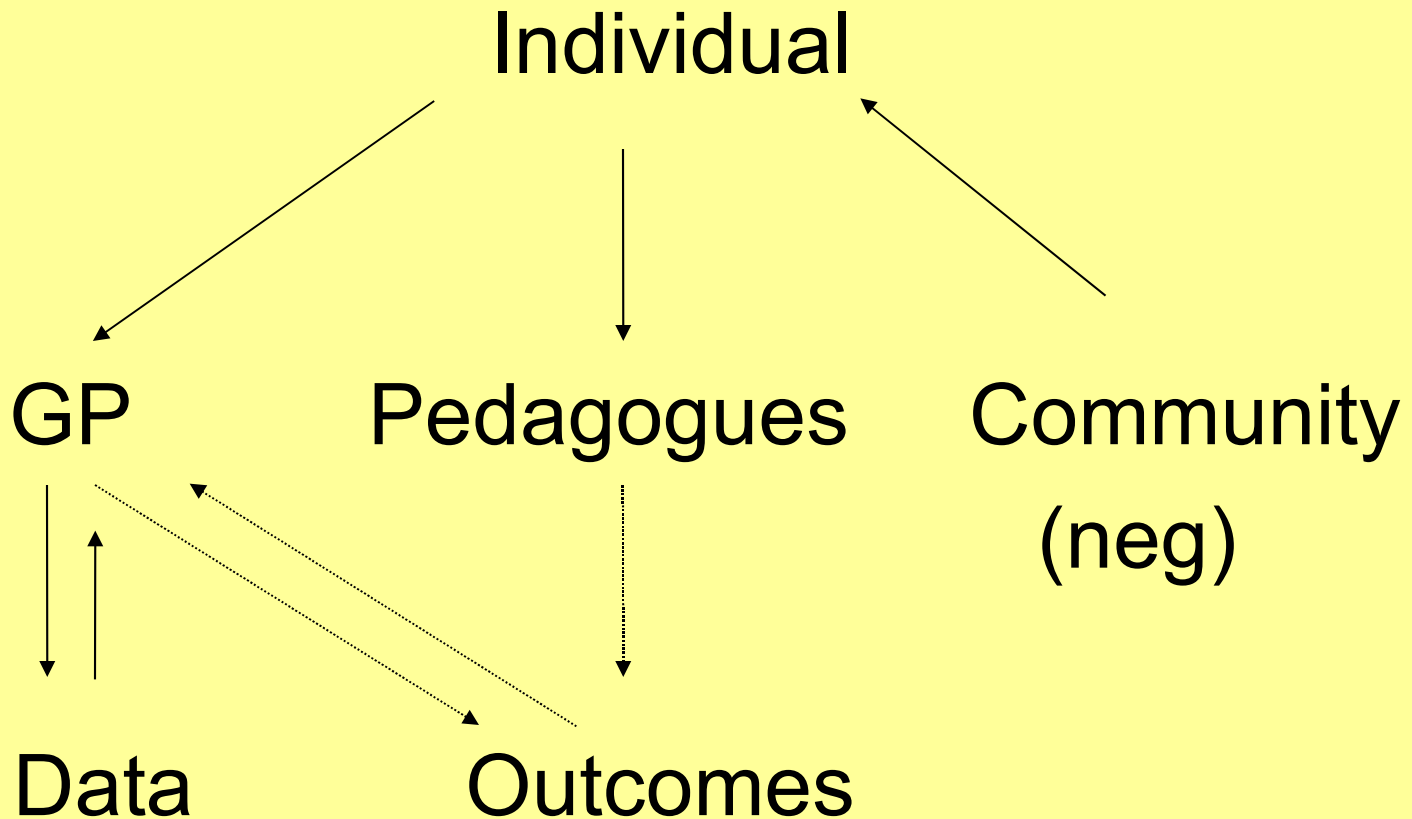


FOCAL DYSTONIA: BEHAVIORS AND PATHWAYS

1. Research Pathways
2. Preliminary Medical Conclusions
3. Status Quo
4. Where to From Here
5. Acknowledgements, QA

RESEARCH PATHWAYS

[current : linear/forward]



RESEARCH PATHWAYS

Community Research: [nil available]

Seth David Fletcher, Denton Thomas, Martin Cochran

Primary Medical Research Teams:

Germany (Altenmuller et al)

UK (Rosenkranz et al)

USA NYC (Frucht et al)

USA Chicago (Brandfonbrener/Lederman et al)

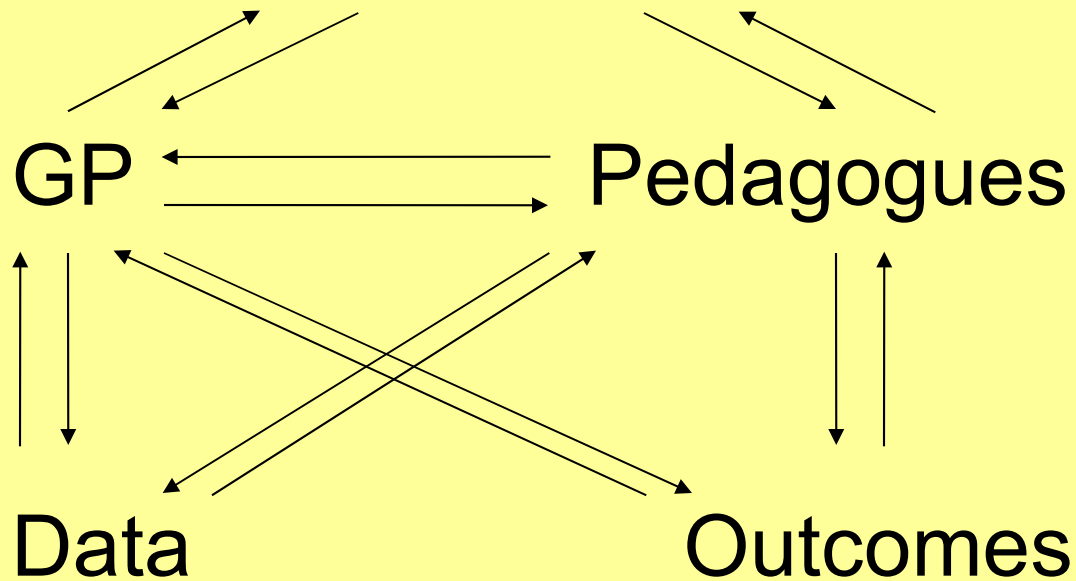
Other Medical Research Teams:

Japan (Hirata [?]), Australia/NZ (Lim), USA (Lederman), Spain, etc.

RESEARCH PATHWAYS

[opening]

Individuals



MUSIC COMMUNITY RESEARCH

Seth David Fletcher, 2008

*The Effect of Focal Task-Specific Embouchure Dystonia Upon Brass Musicians:
A Literature Review and Case Study*

- Thorough Literature Survey – Case Studies
- Present Basic Interdisciplinary Knowledge
- Record New Case Studies
- Identify Conflicting Behavioral Pathways

MUSIC COMMUNITY RESEARCH

Thomas, 2008

*Symptoms and Modern Pedagogical Treatment
of Focal Embouchure Dystonia*

- Study current models/theories of FTSED
- Record performer experiences
- Record teacher experiences & methods
- Connect methods to models

PRELIMINARY MEDICAL CONCLUSIONS

Required Background/Knowledge

1. Cortical Mapping
2. Neuroplasticity
3. Neuroplastic Cortical Re-mapping via
Sensory Input
4. Brain Scan Tech (fMRI, SEP, MEP)

PRELIMINARY MEDICAL CONCLUSIONS

Required Background Knowledge

- **Edward Taub (1960's)**
sensorimotor training and mapping rediscovered; neuroplastic
- **Amen (1998 + reprints)**
brain scanning tech + chemical imbalances discussed; applications to psychology, health; may induce neuroplastic response
- **Schwartz (2004), Sacks (2008)**
Neuroplasticity defined, discussed; applied to psychology, philosophy, stroke rehabilitation, injury rehabilitation, etc.
- **Schwartz “neuroplasticity” (p 95)**
Conscious, volitional decisions and changes in behavior alter the brain.

PRELIMINARY MEDICAL CONCLUSIONS

Predisposition



Neuroplastic Response



Retraining

PREDISPOSITION

- Munte, Altenmuller et al (2002)
 - musicians are unusually plastic
 - Thomas F. Munte, Eckart Altenmuller, and Lutz Jancke. “The Musician’s Brain as a model of neuroplasticity.” *Nature Reviews* 3 (2002): 473-478.
- J Pujol et al. (2000)
 - fMRI of focal hand dystonia shows cortical over stimulation
 - J Pujol et al. “Brain cortical activation during guitar-induced hand dystonia studied by functional MRI.” *NeuroImage* 12 (2000): 257-267
- Haslinger, Altenmuller et al (2010)
 - fMRI in FED shows high excitability (leads to hyper plasticity?)
 - Haslinger B, Altenmuller E, Castrop F, Zimmer C, Dresel C. Sensorimotor overactivity as a pathophysiologic trait of embouchure dystonia. *Neurology*. 2010;74:1790-1797.

NEUROPLASTIC RESPONSE

- **Nancy Byl Model (1996)**
adaptive plasticity possible
- **Hodzic Model (2004)**
maladaptive plasticity possible
- **Rosenkranz et al Model (2007)**
professional musicians are unusually/highly plastic
- **T Elbert et al. (2002)**
Musician's hand dystonia shows maladaptive representations
- **Hirata, Altenmuller et al (2004)**
Musician's embouchure dystonia shows maladaptive representation

NEUROPLASTIC RESPONSE

Abnormal Somatosensory Reorganization Confirmed
in both FTSHD and FTSED (pic – Altenmuller 2002)

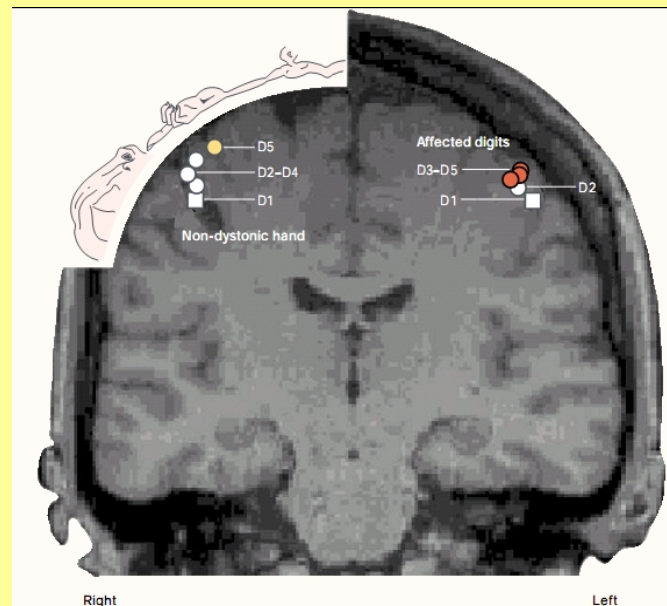


Figure 4 | Fusion of the somatosensory representation of single digits of the hand in a musician suffering from focal dystonia. The best-fitting dipoles to explain the evoked magnetic fields after sensory stimulation of single digits (D1–D5) are shown projected on the individual's magnetic resonance imaging scan. Whereas for the non-affected hand, the typical homuncular organization (inset) reveals a distance of ~2.5 cm between the sources for the thumb and the little finger (yellow circle and square on the right of the brain), the somatosensory representations of the fingers on the dystonic side are blurred, resulting from a fusion of the neural networks that process incoming sensory stimuli from different fingers (red circles). Modified, with permission, from REF. 13 © 1998 Lippincott, Williams and Wilkins.

NEUROPLASTIC RESPONSE

Abnormal Somatosensory Reorganization Confirmed
in both FTSHD and FTSED

- T Elbert et al. “Alteration of digital representations in somatosensory cortex in focal hand dystonia.” Neuroreport 9 (1998): 3571-3575.
- Yoshihiro Hirata, Matthias Schulz, Eckart Altenmuller, Thomas Elbert, and Christo Pantev, “Sensory Mapping of Lip Representations in Brass Musicians with Embouchure Dystonia,” NeuroReport 15, no. 5 (April 2004): 815-818.

THE 'OTHER' UNIQUENESS

- Musically severe temporal and spatial discrimination deficiency
- temporal action != temporal recognition
- Generalized to cervical dystonia (Tinazzi et al, 2004)
- Applicable from FHD to FMD? (Lim, Altenmuller 2008)

RETRAINING

CONNECT MODELS W/ METHODS FOR RETRAINING EMB. DYSTONIA

- Chemical Treatments (Altenmuller, 2006)

- Burtis, 2007 + Thaut, 2003

Rehabilitative restoration of timing; entrainment

- London, 2003 + Thaut, 2003

Meter & rhythm affect focus of attention, attendance, expectation.

- Kagarice/Vining, 2007 + Thaut 2003 +
London, 2003 + Candia re Godde 2003

Focus of attention is a filter, multiplier? (but not *required* for plasticity)

RETRAINING

Calls for interdisciplinary assistance

Lederman (1988)

“The degree of success and its ultimate duration remains uncertain at the present time. Perhaps, as seems most likely, some combination of measures is most sensible, utilizing various treatment modalities for temporary help while searching for and modifying the triggering technical flaw(s) or other predisposing factor.”

RETRAINING

Calls for interdisciplinary assistance

Hans-Christian Jabusch and Eckart Altenmuller (2006)

“There is a pressing need for novel therapies for musician’s dystonia. Several new methods have been described, such as immobilization therapy. These have to be investigated in larger numbers of patients in order to confirm beneficial effects. Behavioural therapies and interdisciplinary strategies combining pharmacological and pedagogical methods are promising, but the different approaches need to be evaluated. Since phenomenological and epidemiological data and results from electrophysiological and follow-up studies imply a behavioural component in the development as well in the treatment of musician’s dystonia, future research is required to identify ‘beneficial behaviour’ on the instrument. This might, possibly, also be of help for finding strategies with the particular aim of prevention of musician’s dystonia.”

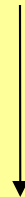
STATUS QUO

[disad form: brink, link, impacts]

Prevalence, Definitions, Tradition



Ambiguity



Confusion

PREVALENCE

“Buried” in the Libraries

Popular “Disinterest in achievement” : 95% (Thomas/Yeung, 2010)

Injury in Musicians: 85% (Fishbein et al, 1986)

All musician's dystonias: 1% of all musicians (Altenmuller, 2003, 2006)

Writer’s cramp amongst writers < musician’s dystonia (Altenmuller, 1998)

MD 8-10x more common than FD in general population (Warner, 2000)

DEFINITIONS

Terminology & Experiences

Medical & musical ambiguity (Klein, 2005)

Musician's meaning: symptoms (Thomas, 2008)

Other labels [handout] (Thomas, 2007/2010)

Variety of Symptoms

[VISUAL MEDIA]

TRADITION

1. Low understanding in affected population

Fletcher surveys, Thomas interviews, etc.

2. Experience supports behavioral causes

3. History of Diagnosis

Alexander Muntz, Peter Koehler. "How Psychogenic is Dystonia? Views from Past to Present." *Brain* 133, No. 5 (2010). Available online (Medscape login)

1. Diagnosis & reception of the unknown reflects trends within the community.
2. "In the past, many victims of dystonia and their families have been caused anguish and hardship over and above that caused by the disease itself owing to the frequent misdiagnosis of the symptoms as manifestations of a psychiatric ailment." (Eldridge and Fahn, 1976)

BREAKING SQ PATHWAY

Prevalence, Definitions, Tradition

Ambiguity

(link!) 

Confusion

BREAKING SQ PATHWAY

1. Increase Awareness

In a significant sample, 1% will have a dystonia (e.g. 1% of ITF attendees)
95% rule does not apply to advanced populations

2. Re-definition

Preferred definition: Painless incoordination; (Altenmuller & Jabusch, 2006)

3. Limit the Field

1. Limit to Embouchure Dystonias
2. Open the “symptom” box
3. Discard psychogenesis

COMMUNITY CHALLENGES

- Break SQ Pathway
 - Establish Awareness Education
 - Distribute Resources
- Behavioral Retraining Development

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ACKNOWLEDGEMENTS

- Primary Instructors and Community
- Contributors
 - Pedagogues
 - Interview Subjects
 - Research Assistance
 - Esp. Jeff Arredondo, David Gonzalez
- ABODA, CGS, Vic DoE, Monash Univ
- Family

- Q/A -