



Healthy musicianship: prevention, cures and challenges in musician's medicine

Eckart Altenmüller

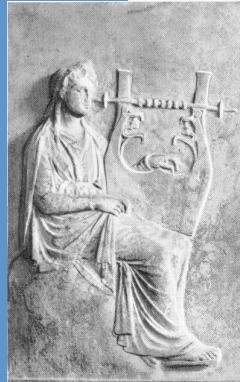
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Structure



1. *The facts – student`s complaints*
2. *The means - institutions and programs*
3. *The contents - How to practice?*
4. *The consequences – Prevention of Dystonia*
5. *Summary and Outlook*



Prevention in Music Academies



25% of beginner students start their studies with pain deteriorating their performance

68-88% of music students have at least once during their studies medical problems caused by music making

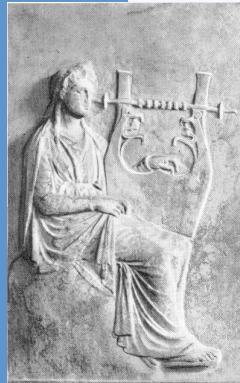
45% of music students seek professional help because of these medical conditions

From: Spahn C. et al. 2002, 2004, MPPA





Structure



1. *The facts – student`s complaints*
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4. *The consequences - Avoidance of pain*
5. *Summary and Outlook*



The Institute of Music Physiology and Musician 's Medicine today



www.immm.hmt-hannover.de





Teaching
activities

Research
programs

Outpatient
Clinic





Lecture: Music Physiology



Feldenkrais

Stage fright
coaching

Outpatient clinic for
music students

Counseling

External
Physiotherapy

Health Program
for Music Students
concept
Winter-Term
2013/2014

Mental
Training

Breathing-/ Voice-
Speech education

Yoga
body awareness

Auditions-Training

External: Sports/
Psychological Counseling



Courses and Tutorium this semester:

Lectures for students: Music Physiology (weekly)

- obligatory for students in instrumental pedagogy (later teachers)
- obligatory for all performing musicians
- elective for BA / MA in Musicology and Music education

Tutorium for students: (2 hours weekly)

- obligatory for students in instrumental pedagogy (later teachers)
- obligatory for all performing musicians

Voluntary seminars on: Helps Brain Science Musicians?
„Neurosciences of music“



DIE KÖRPERLICHEN UND GEISTIGEN GRUNDLAGEN DES MUSIZIERENS



(Prof. Dr. med. Altenmüller, Dr. med. Andre Lee)

17. 10. Einführung in das Fachgebiet und körperliche Grundlagen des Musizierens

24. 10. Muskeln, Nerven, Sehnenscheidenprobleme

31. 10. Sensibilität und Körperwahrnehmung

7. 11. Muskelphysiologie und Trainingseffekte durch Übung

14. 11. Senso-Motorik bei Musikern

21. 11. Senso-Motorisches Lernen bei Musikern

28. 11. Mentales Üben

5. 12. Übetechniken

12. 12. Schmerzen beim Üben: Ursachen, Vorbeugung und Behandlung

29. 12. Physiologie des Gehörs

9. 1. Ursachen und Vorbeugung von Gehörschäden bei Musikern

16. 1. Psychologie für Musiker – Selbstvertrauen, Wettbewerb und Ängste

23. 1. Lampenfieber: Ursachen

30. 1. Lampenfieber: Vorbeugung und Behandlung

6. 2. Klausur (wird benotet und ist Grundlage der Abtestate)

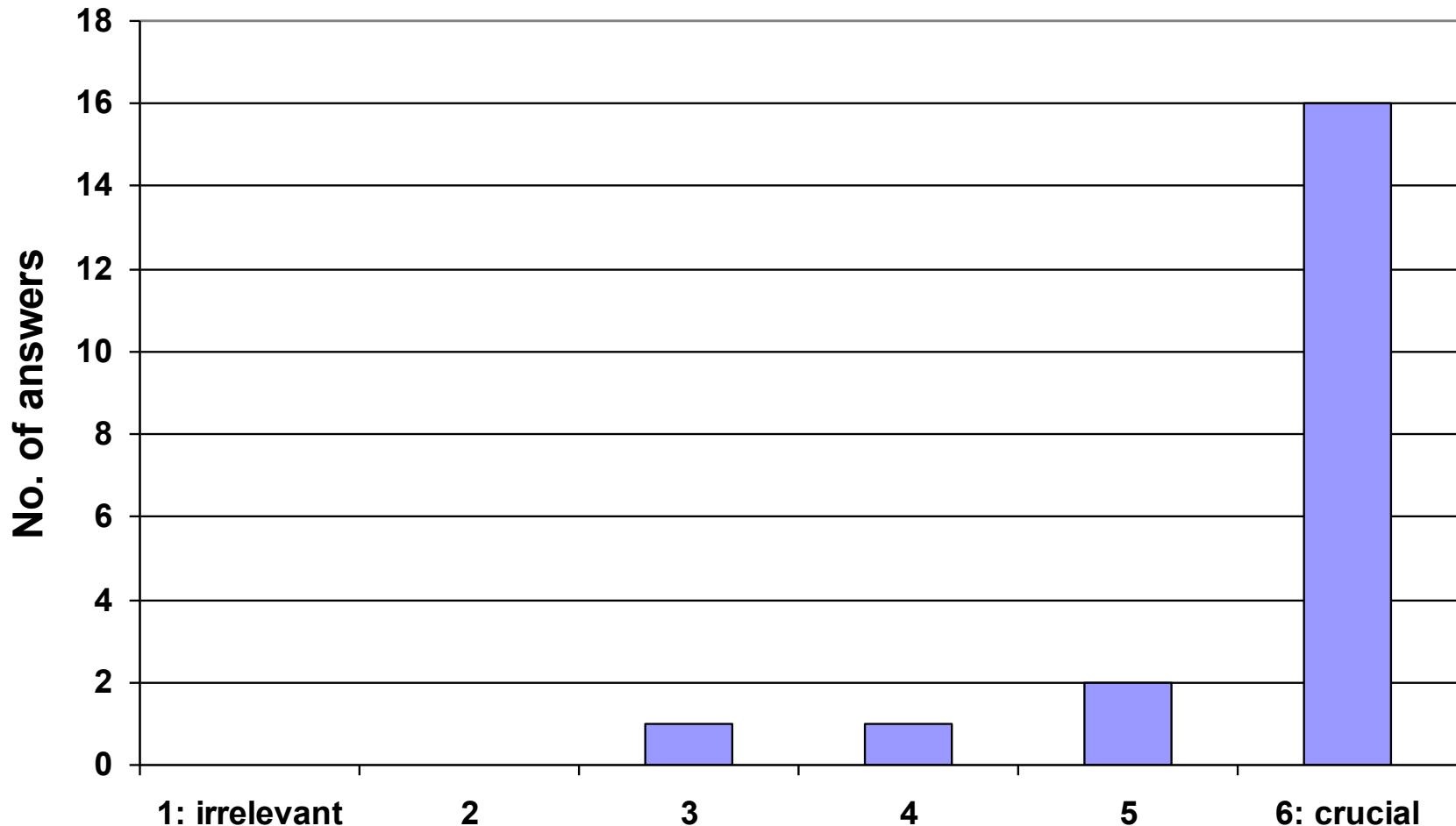
13. 2. Schlußbesprechung: die 10 Weisheiten zum Semesterabschluß

Practice strategies

Evaluation



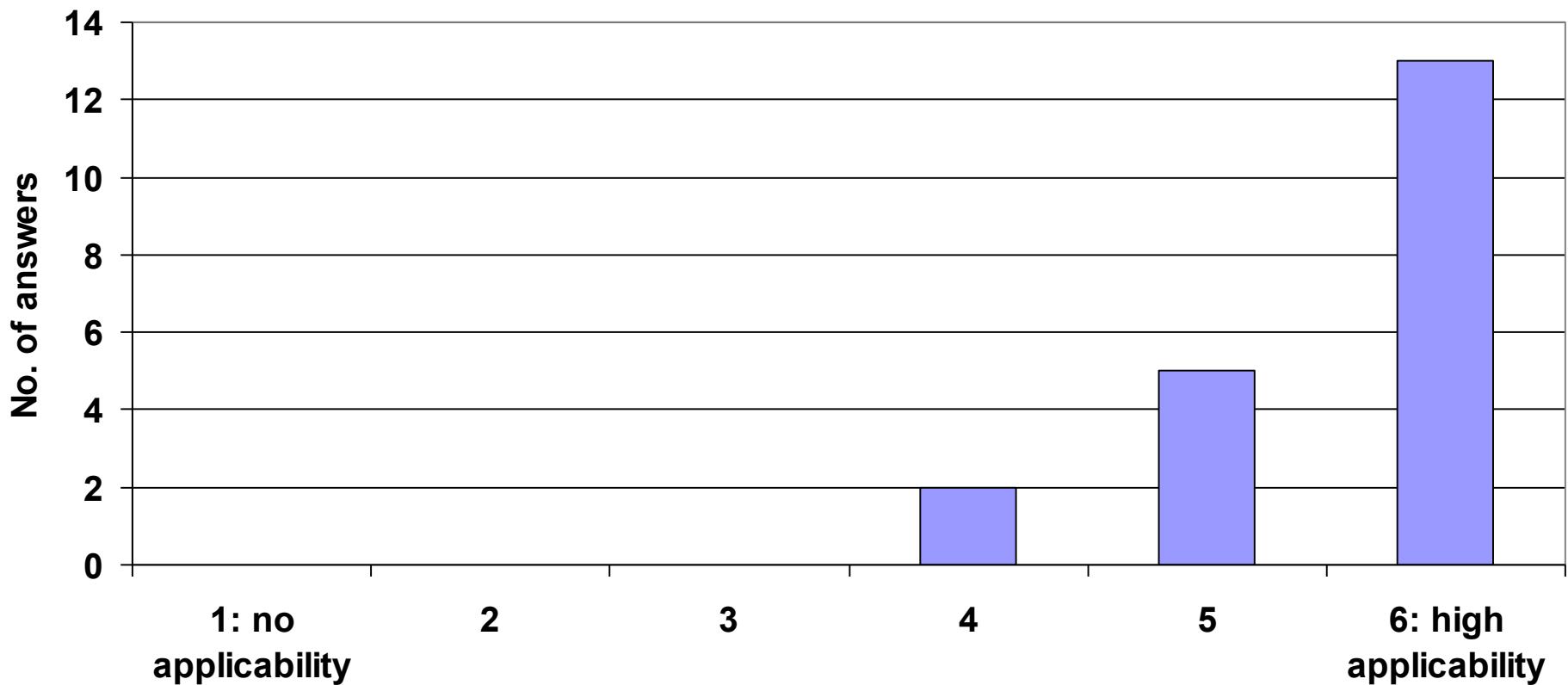
Lecture "Music Physiology": Relevance of topics



Evaluation

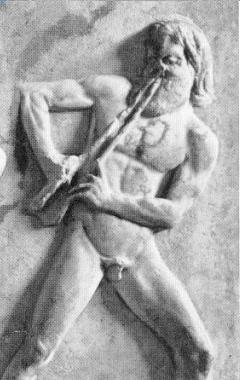
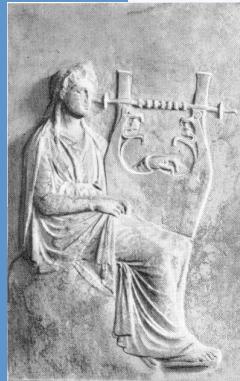


Lecture "Music Physiology": Applicability in everyday practicing



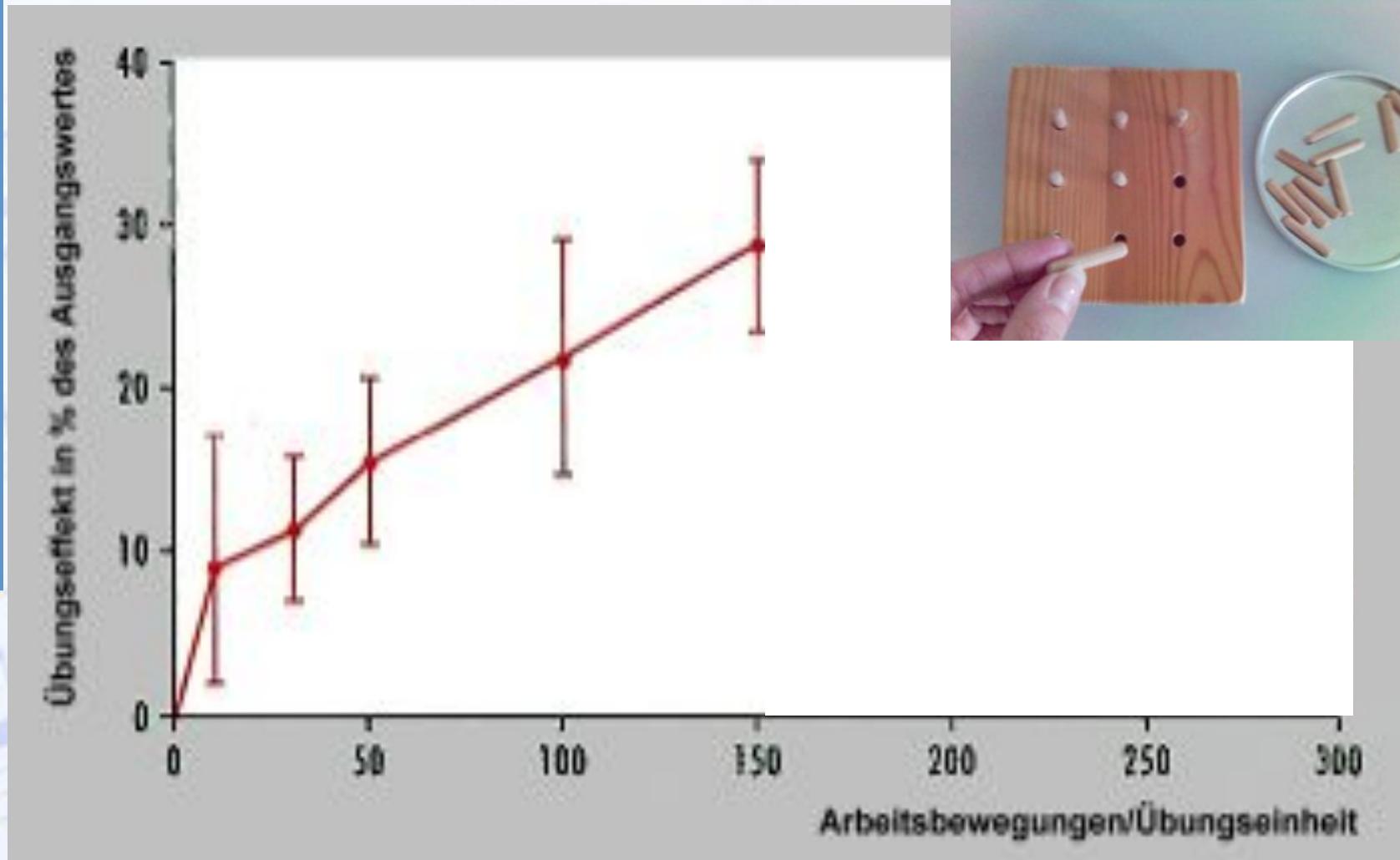


Structure



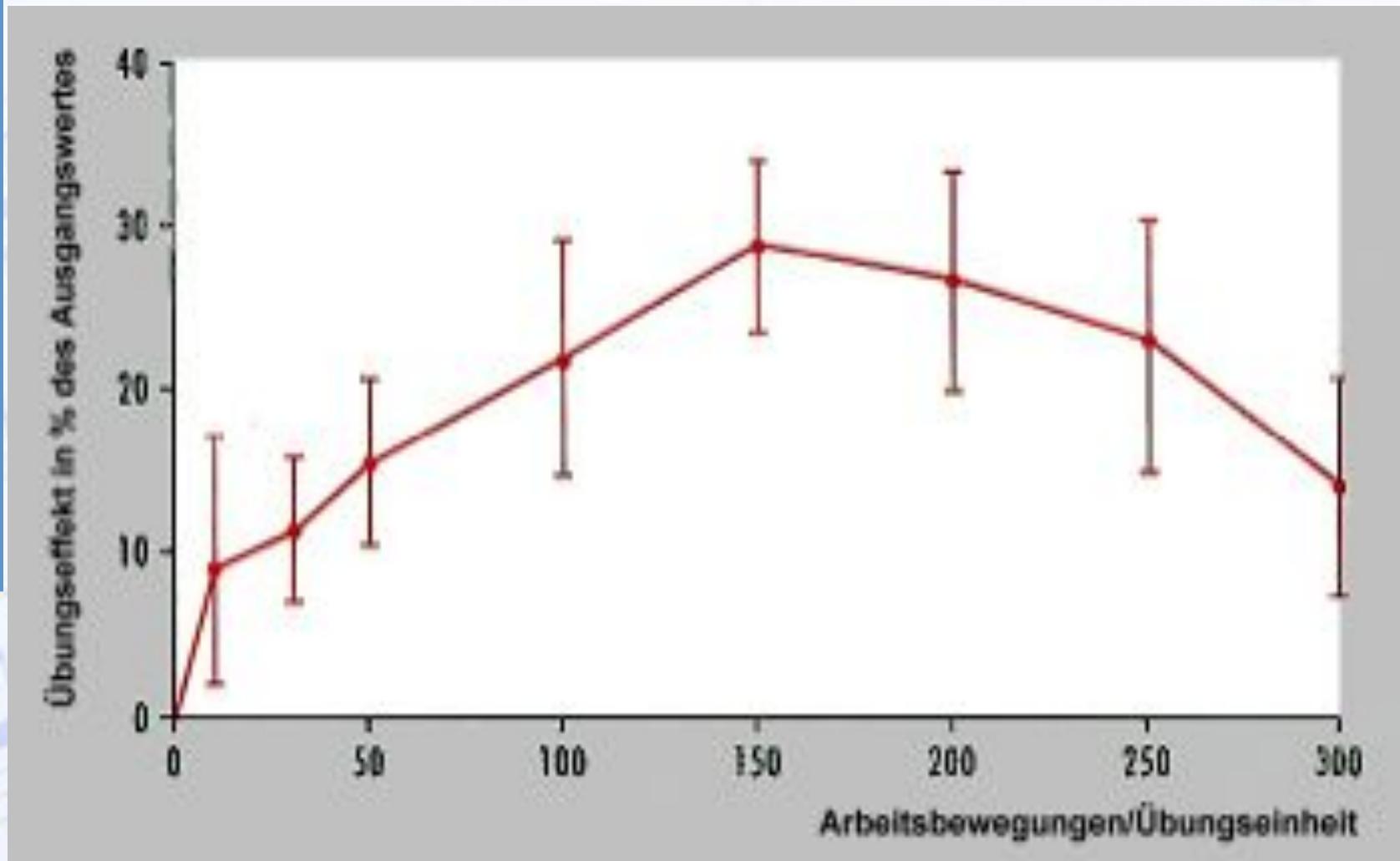
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Relation between the amount of daily practice trials of skilled finger movements and improvement



(Hettinger et al. Geschicklichkeit und deren Übbarkeit. Z.Arbeitswiss.1975;29:223)

The Penelope-effect



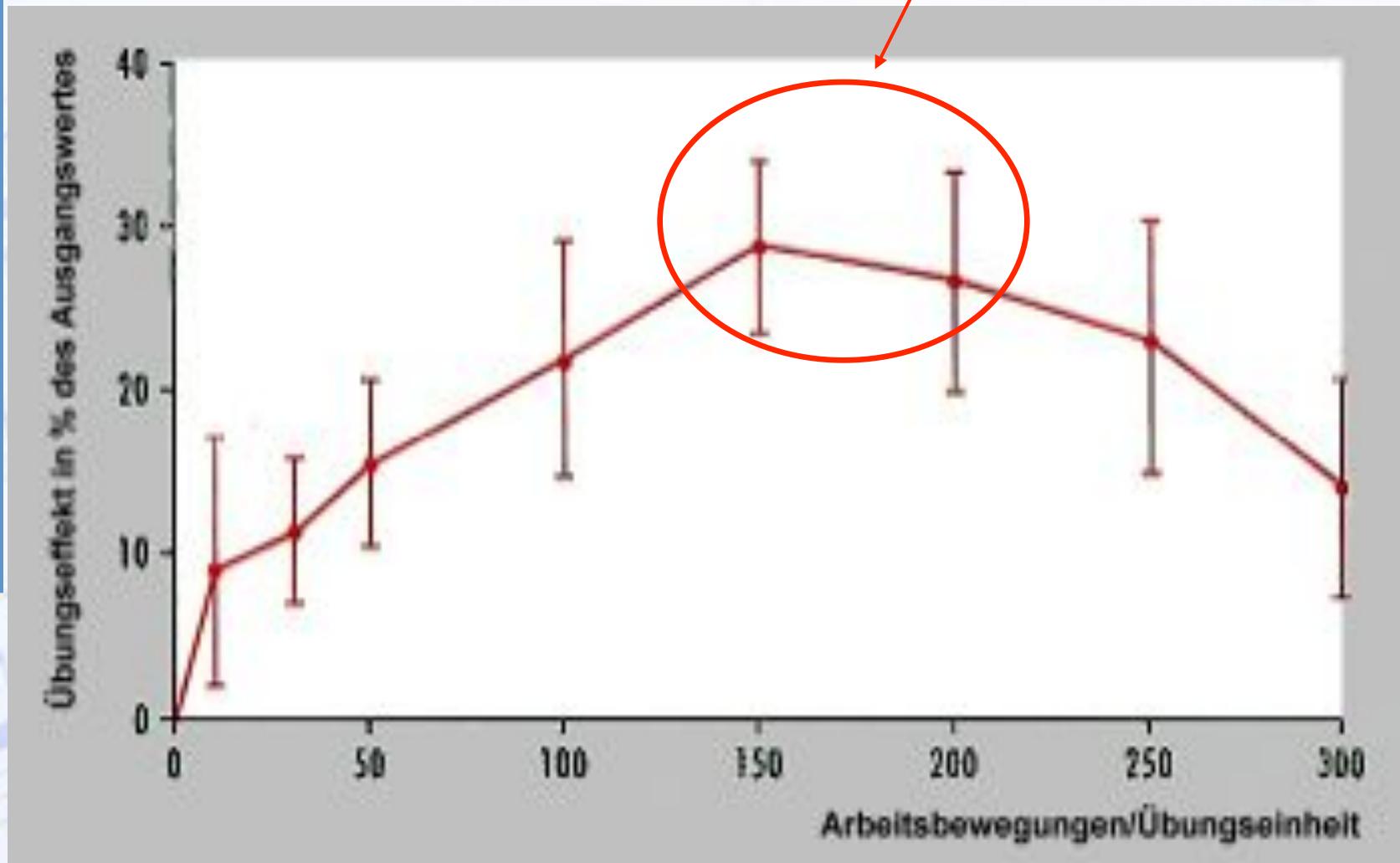
(Hettinger et al. Geschicklichkeit und deren Übbarkeit. Z.Arbeitswiss.1975;29:223)



John Williams Waterhouse: Penelope and the suitors (1912)

The Penelope-effect

Teach the art to stop
practicing in the right moment



(Hettinger et al. Geschicklichkeit und deren Übbarkeit. Z.Arbeitswiss.1975;29:223)



Reasons for Deterioration

- 1.) Loss of motivation
- 2.) Loss of attention
- 3.) Fatigue of the muscles

Conclusion:

Never practice un-attentively

Never practice when fatigued

Include pauses in your practice schedule

Organize your practice schedule interestingly



The Art of Mental Practice:



Leimer K, Giesecking W:
The shortest way to pianistic perfection.
1932

Giesecking W, Leimer K:
Piano Technique. Dover: 1972



The five pillars of mental training:

Work conducted together with Nicolo Bernardi,

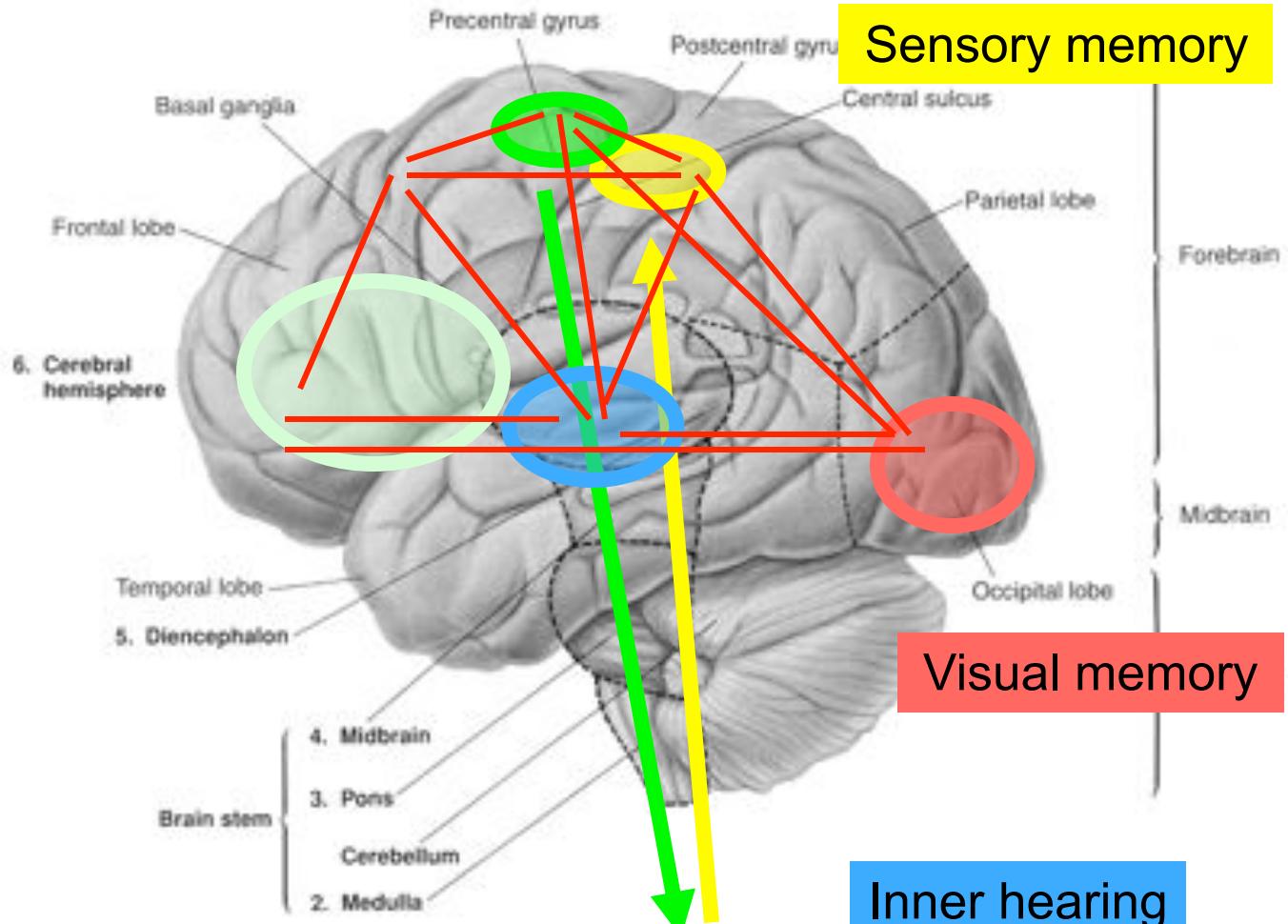
Structural
memory

Motor memory

Sensory memory

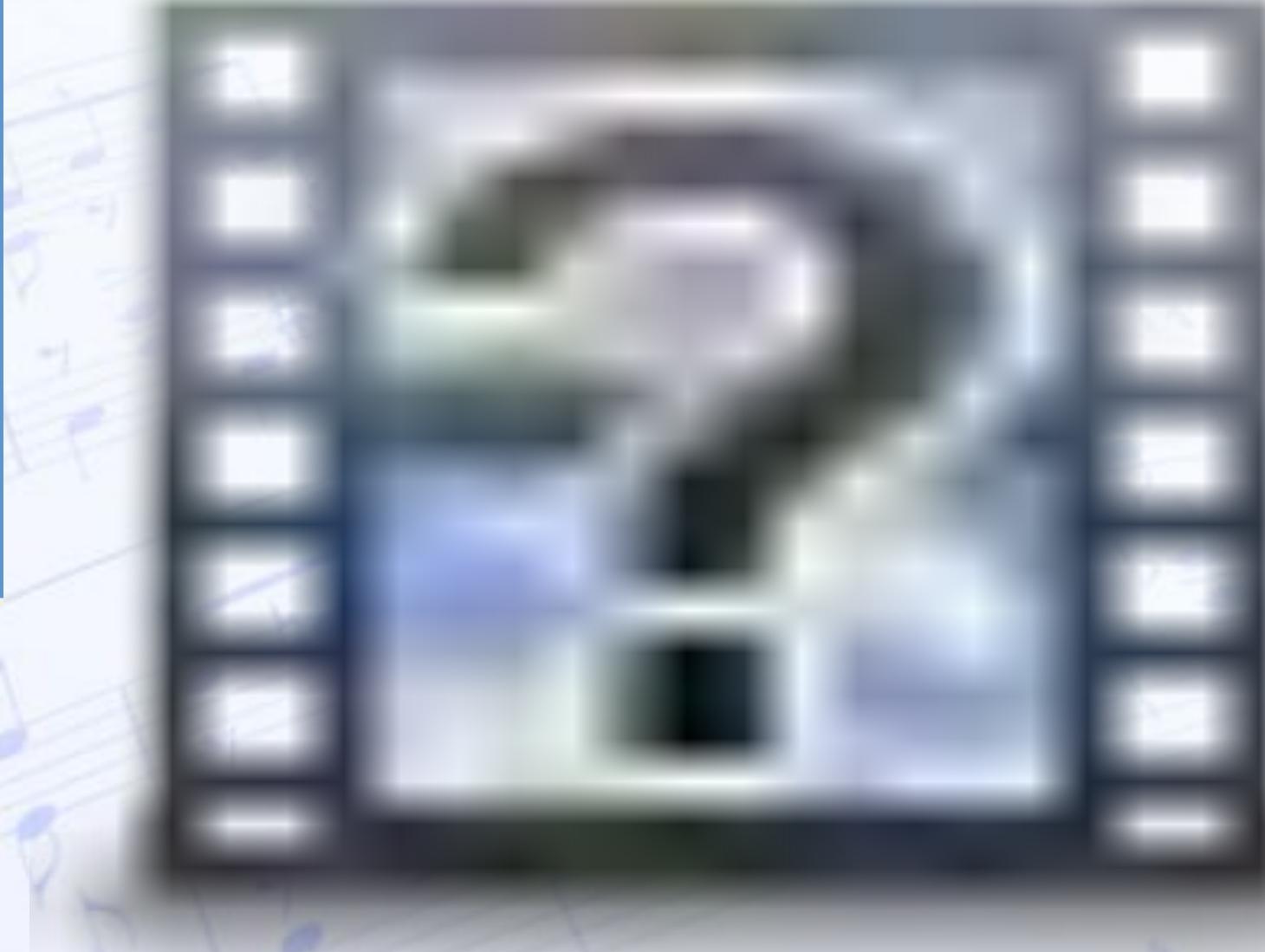
Visual memory

Inner hearing

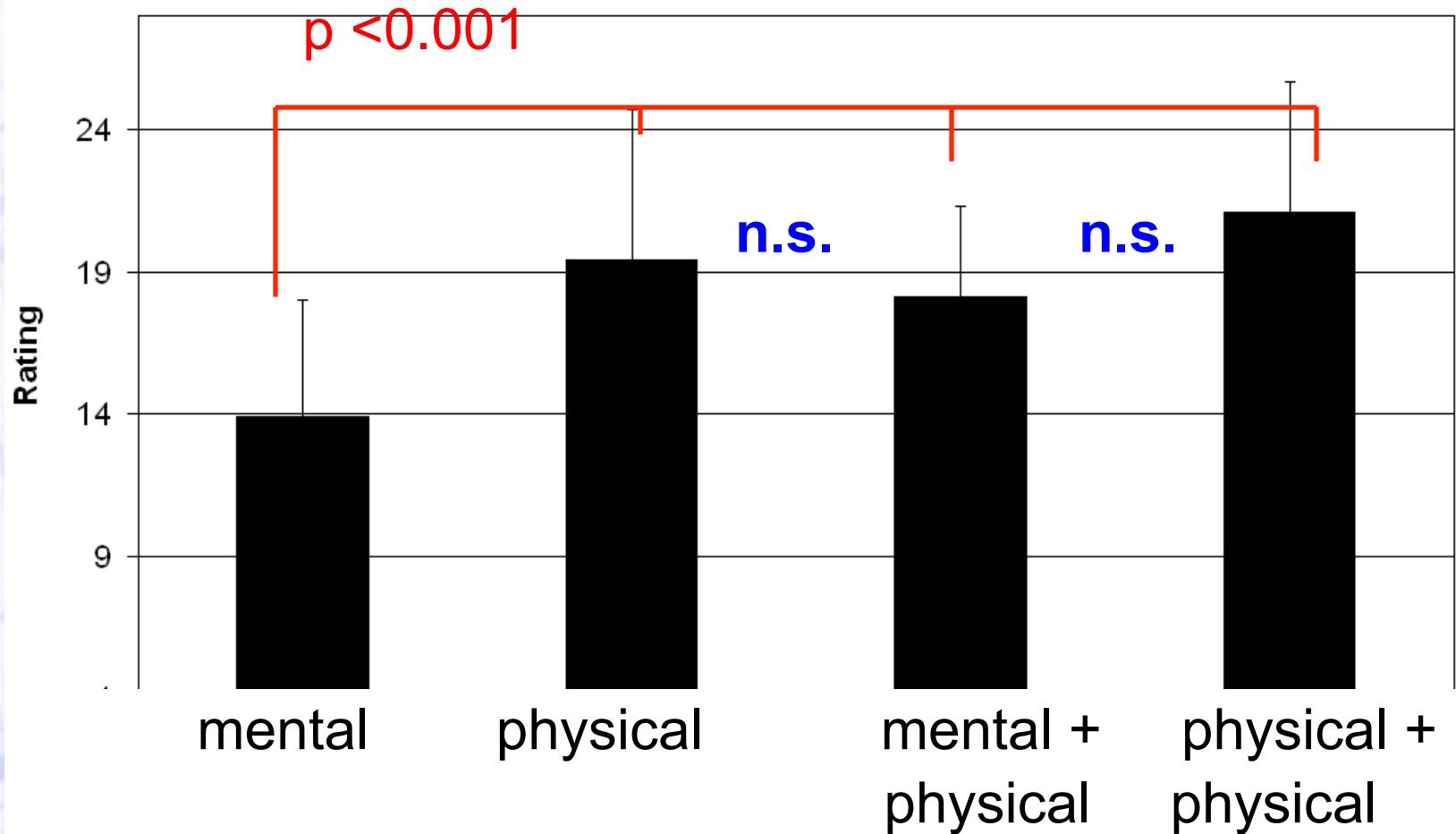




„Mental Super-Experts“: 30 Minuten reading music of Scarlatti



Mental practice is effektive!



From: Bernardi et al. *Music Perception* 2013



Ecossaise

2 4 3 1 2 3 4

f

Fine

3

5

ff

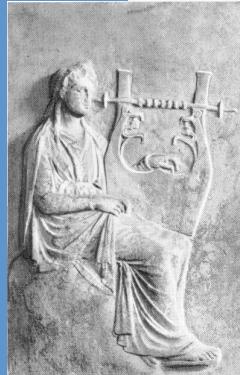
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D.C. al Fine

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Definition



Musicians' Dystonia is a loss of motor control of skilled movements necessary for instrumental playing.
It occurs usually without pain.

Prevalence amongst musicians: 1-2 %

It is still an unresolved problem.
It remains difficult to treat.
It is highly disabling.





Risk factors: short summary

(n = 356 musicians with dystonia) :



Classical musicians: 84 %

Males: 78 %

Young: start prior age 40 85 %

Soloists: 51 %

Certain instruments: Guitar>Piano>Flute

Speed and accuracy of movements

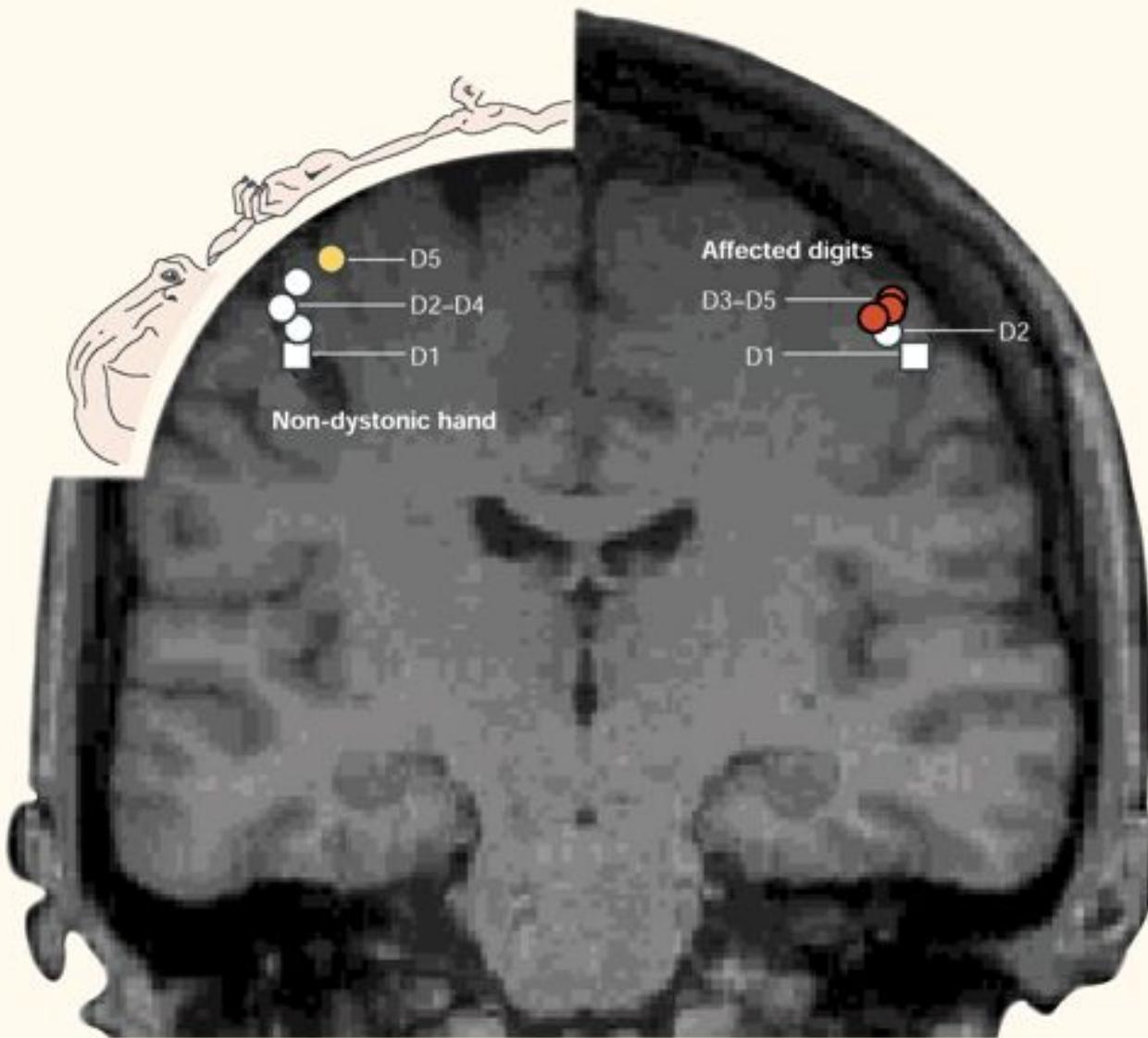
Anxiety and exaggerated perfectionism

Unfavourable biomechanics, chronic pain, “fine motor load”

Genetics (35% of musicians)

Late start of training

Blurring of sensory-motor “representations” in the brain may be one possible cause of focal dystonia



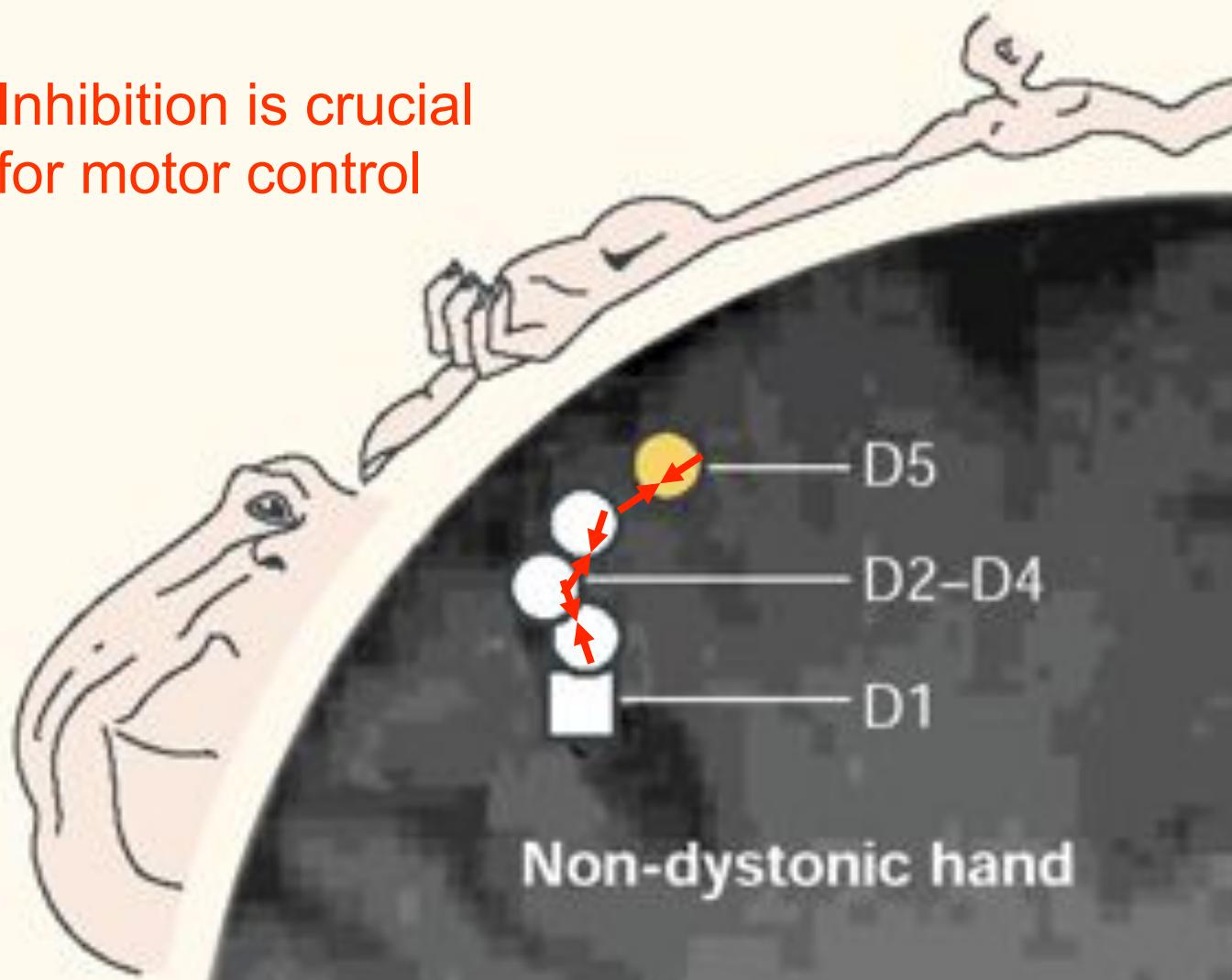
Elbert T, Candia V,
Altenmüller E. et al.
NeuroReport 1998
9: 3571-3575

Münte TF, Altenmüller E,
Jähnke, L,
Nat. Neurosc. Rev. 2002,
3: 473-478

Blurring of sensory-motor “representations” in the brain may be due to lack of lateral inhibition



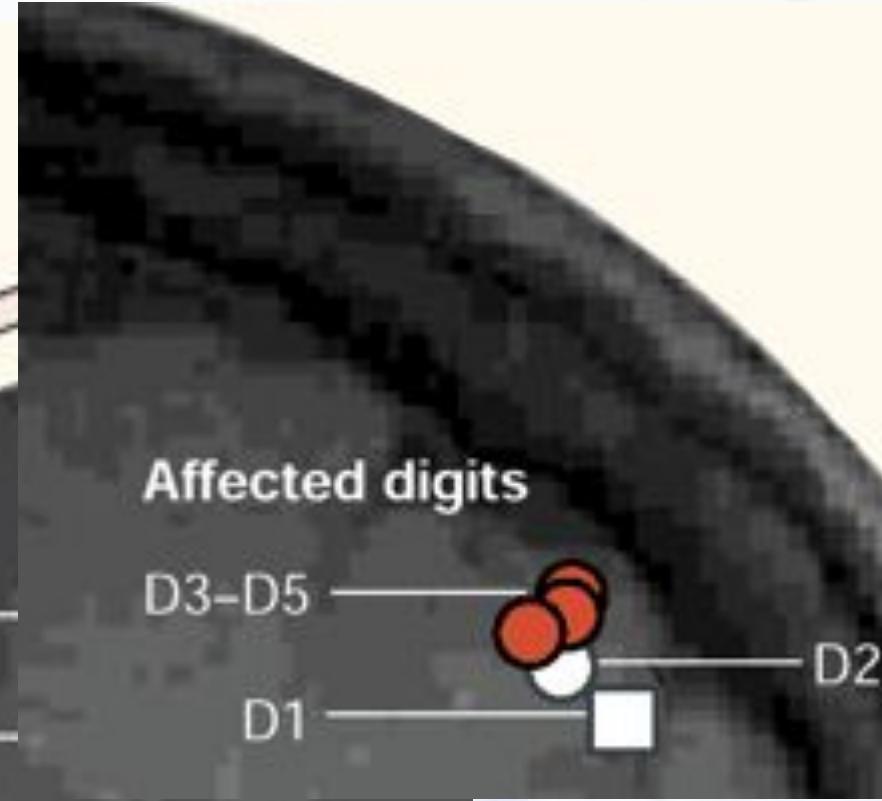
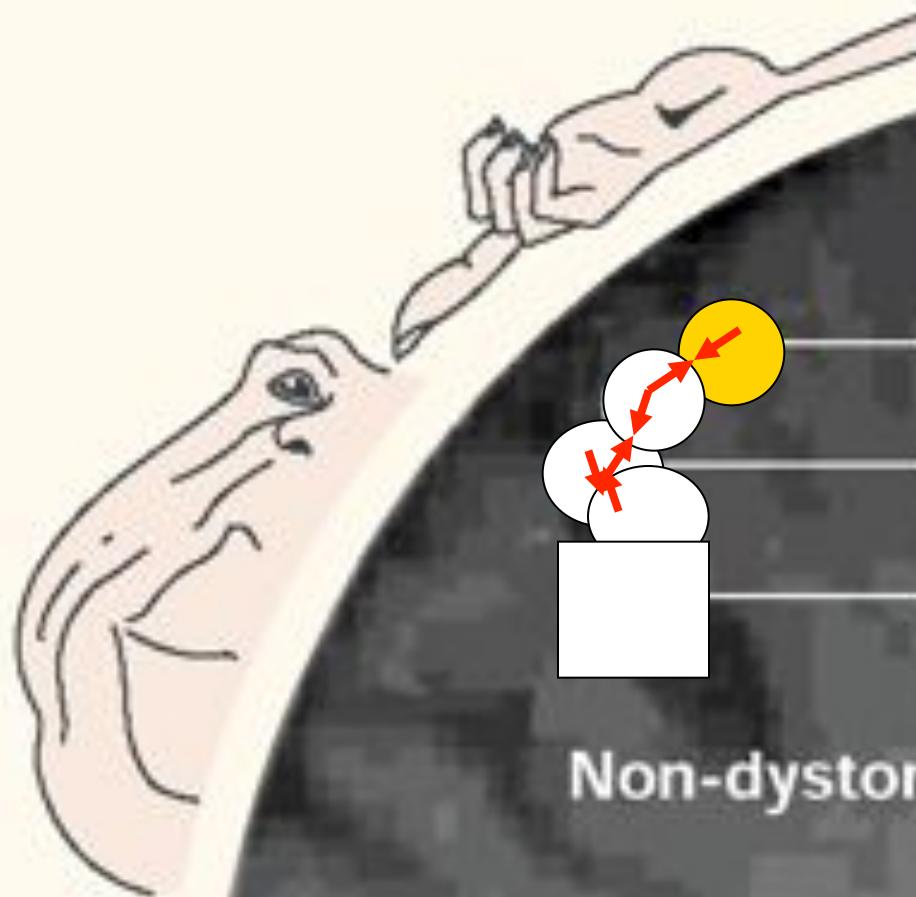
Inhibition is crucial
for motor control



Blurring of sensory-motor “representations” in the brain may be due to lack of lateral inhibition



Effects of plasticity





Treatment of Musicians' Dystonia



Ergonomic Adaptations



Pedagogical Retraining,
e.g. L. Boullet,
R. Fogel, H. Wind

Electrophysiological
Stimulation



Botox-
Injections



Sensorimotor Retuning
e.g. V. Candia,
J. Roset y Llobet



Pharmacology



Outlook: Controlled Trial with THC (Dr. med. Andre Lee)



Substance used:

Sativex®: - THC and Cannabidiol (CBD)

- Oromucosal application

- Tincture of cannabis plant

- Admitted for spasticity (in Multiple Scler.)





Before THC



30 minutes after intake

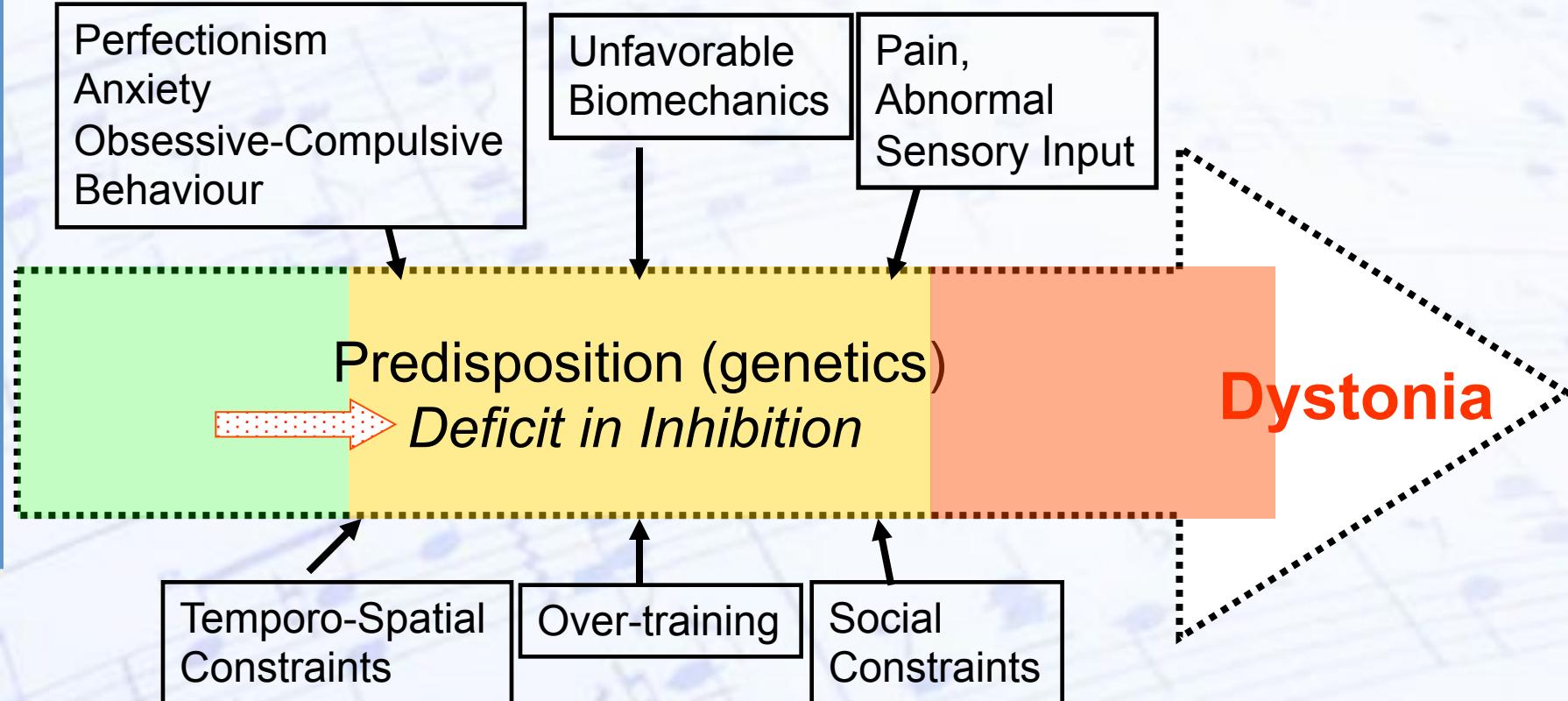




A heuristic model on the genesis of musicians' dystonia



Intrinsic Triggering Factors



Extrinsic Triggering Factors

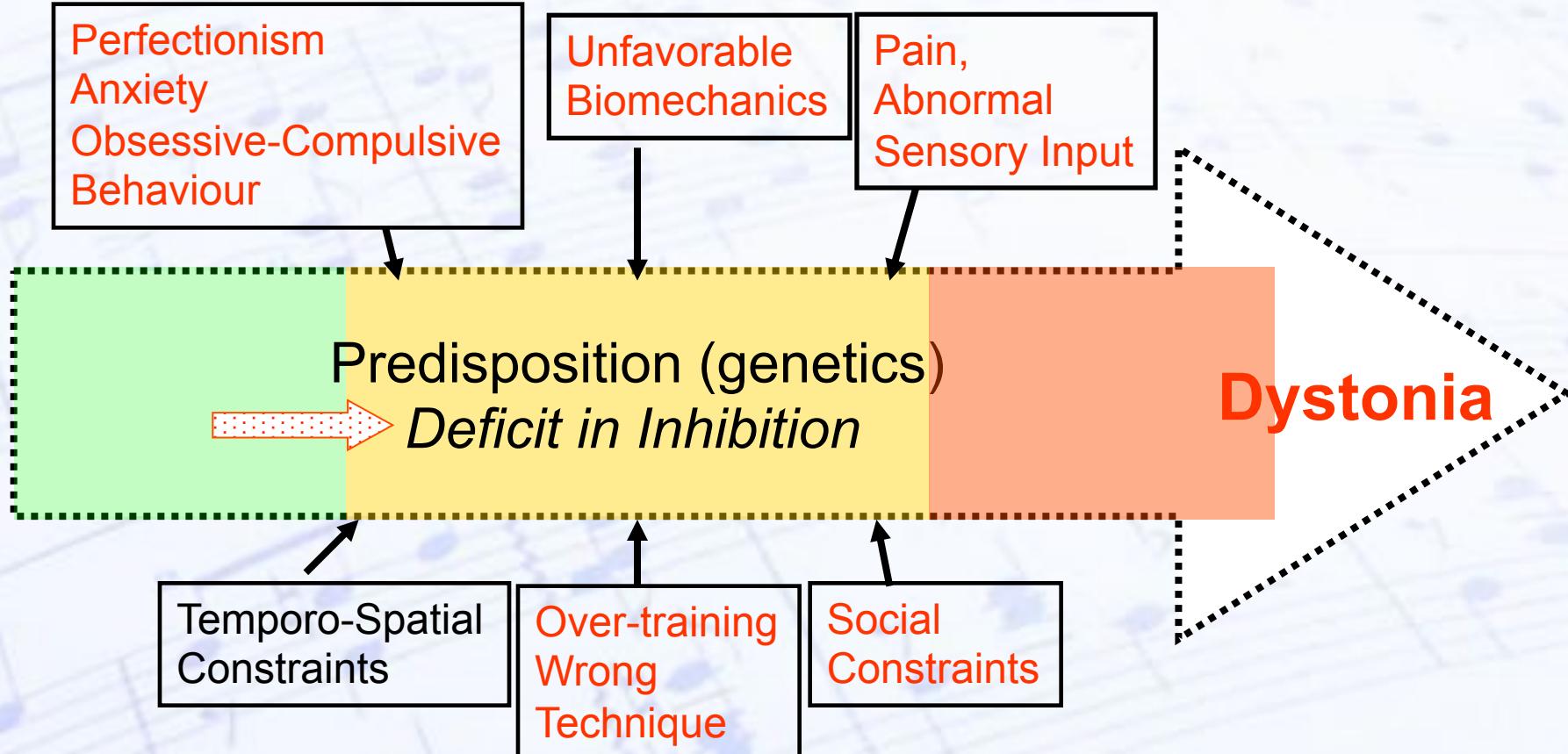
Modified from Altenmüller and Jabusch: J. Neurol. 2010



Consequences for prevention



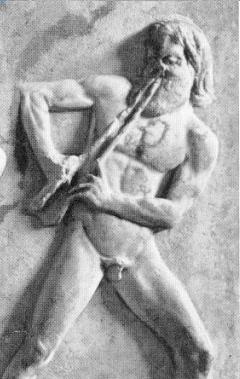
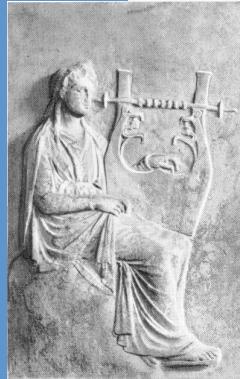
Intrinsic Triggering Factors



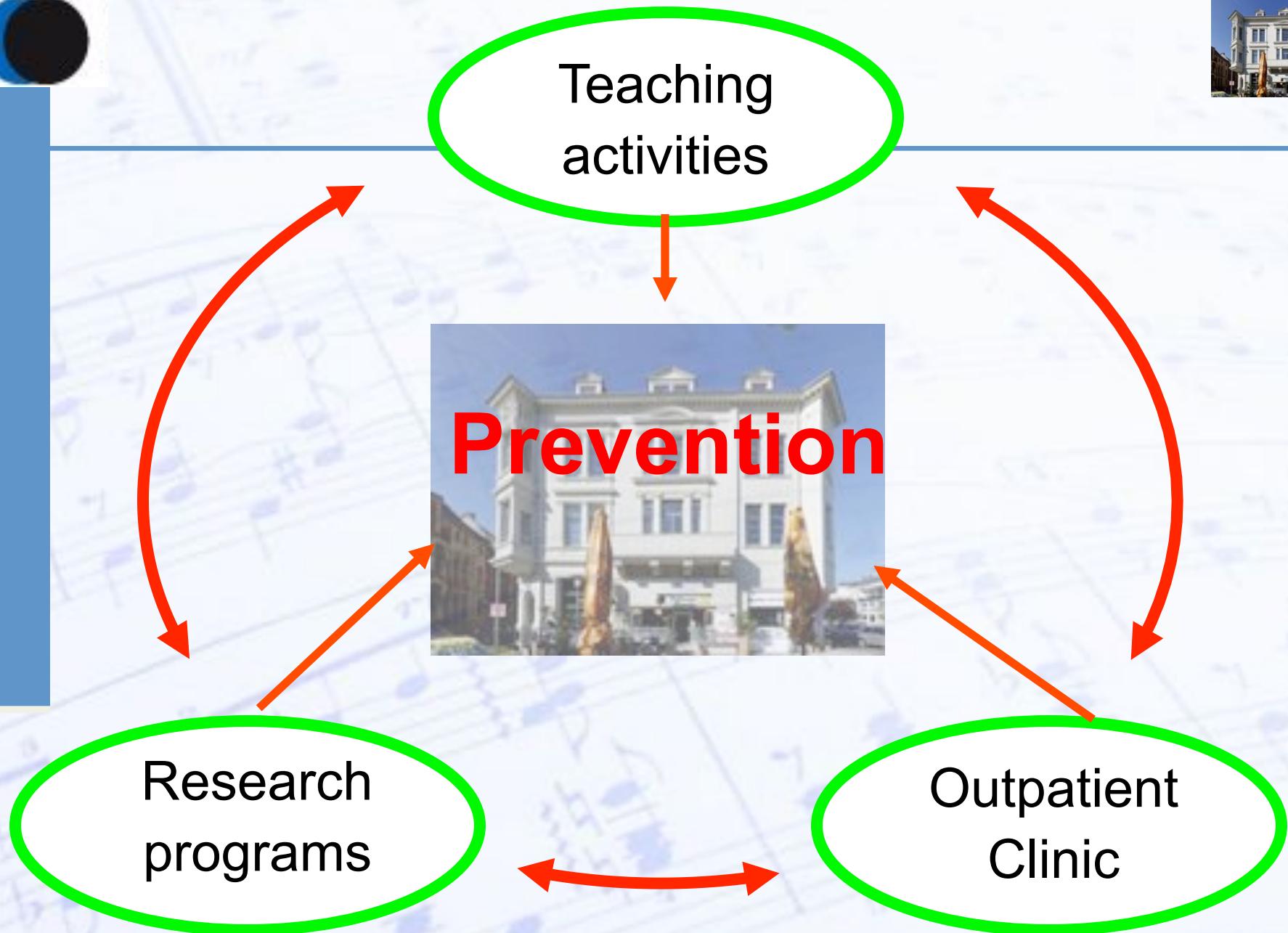
Extrinsic Triggering Factors



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