



The effects of musical activity on academic achievement: *How to use music to develop a growth mindset*

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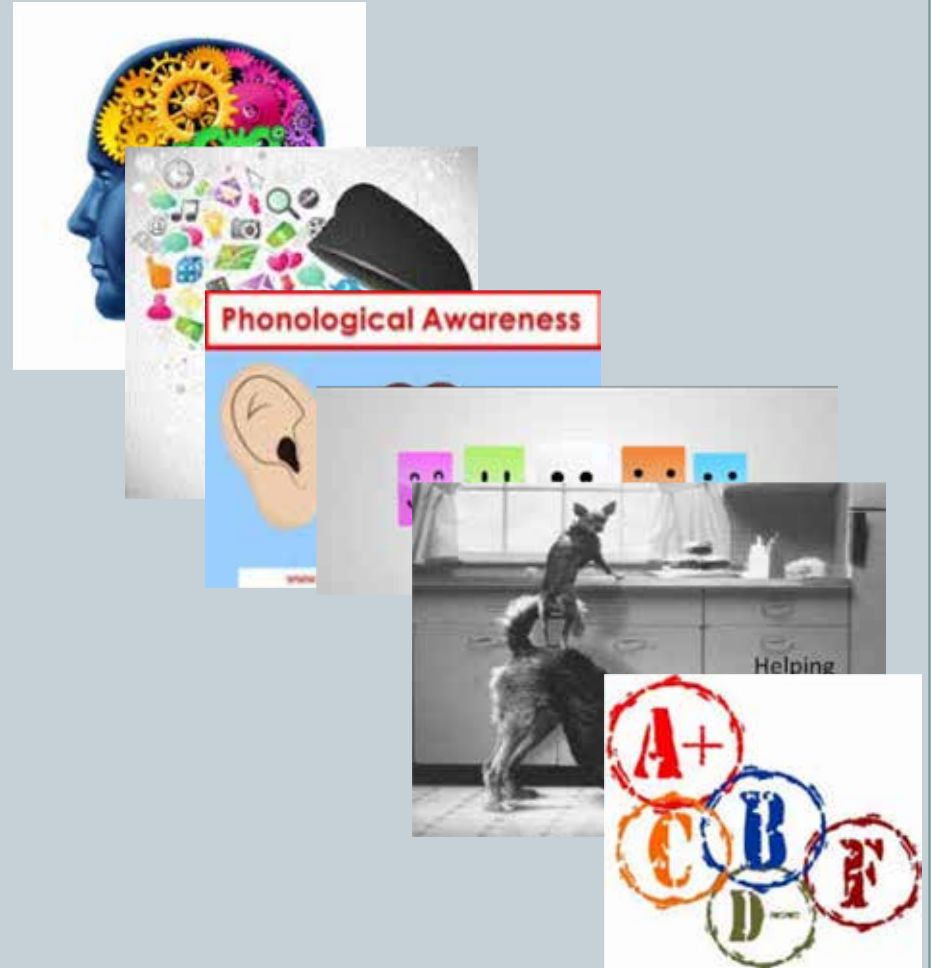
**What does music do to our
minds and brains?**

Music connects to other psychological factors



- **Well-documented positive associations between music and ...**

- **Intelligence** (Schellenberg, 2004; 2006; Ruthsatz et al., 2008)
- **(Verbal) memory** (Chan et al., 1998; Ho et al., 2003)
- **Phonological awareness** (Dege & Schwarzer, 2011)
- **Personality** (Greenberg et al., 2015)
- **Pro-social behaviour** (Kirschner and Tomasello, 2010; Williams et al., 2015, Gembris, 2015; Schellenberg et al., 2015)
- **Academic performance** (Gardiner et al., 1996; Hille & Schupp, 2014)



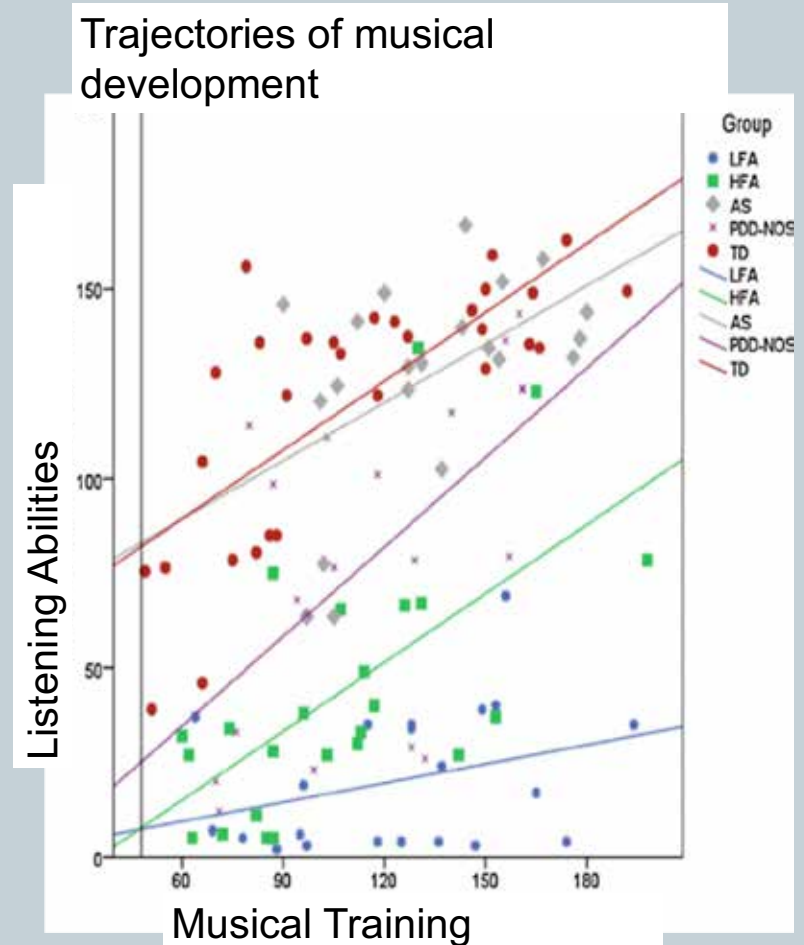
Open Questions



- ***Where do musical abilities come from?***
- ***Chicken or egg: Is musical ability cause or effect wrt intelligence and social skills?***

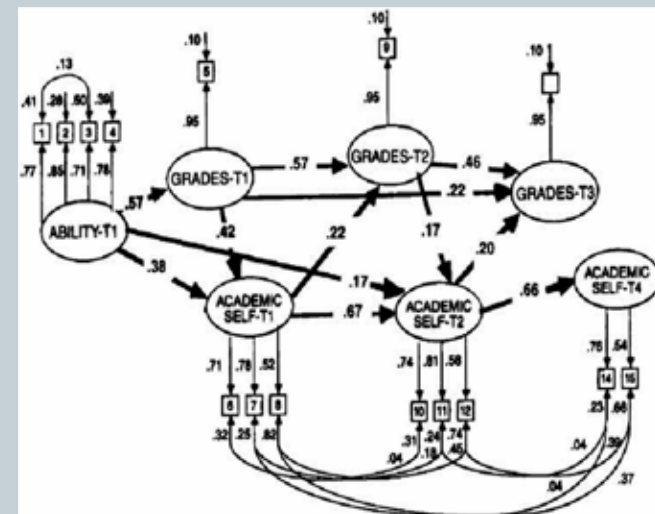
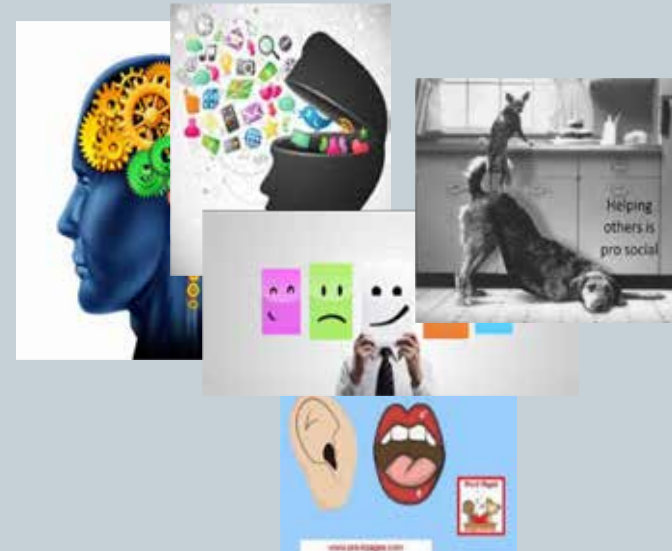
The LongGold study

- No quantitative study on musical development across teenage years yet
- Track musical development across teenage years
- What are causal factors driving musical development?
 - => *Who will take up music seriously?*
 - => *Who will give it up again?*



The LongGold study

- How do personality, cognitive and social skills co-develop with musical abilities?
=> *Answers to causal questions on transfer effects from longitudinal design*
- How does academic achievement benefit from engagement with music?
- How does music compare to sports and other leisure activities?



Study Design



- Repeated testing of same pupils across 7 years
- Secondary schools in the UK and in Germany
- Online testing in class under supervision of researchers (90min, once a year)
- Questionnaires and efficient adaptive listening tests
 - No formal music knowledge required
 - Stylistically unbiased
 - Short and adaptive towards individual abilities
 - Test scores comparable across age groups

Results Wave 1 (2015)

- *Queen Anne's School, Reading*
- 312 girls, 10 to 18 years



Results:





- Growth mindset attitudes and musical ability closely connected
- Chain from attitudes to conscientiousness to academic performance

ORIGINAL RESEARCH ARTICLE

Front. Psychol., 05 November 2015 | <http://dx.doi.org/10.3389/fpsyg.2015.01702>



Investigating the importance of self-theories of intelligence and musicality for students' academic and musical achievement

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Results Wave 2 (2015-16)



- Queen Anne's, Sutton Valence School
- 540 pupils, 9 to 18 years
- 2 schools
- 188 pupils tested both years

Question:

Are changes in musical activity associated with academic performance and beat perception from year 1 to year 2?

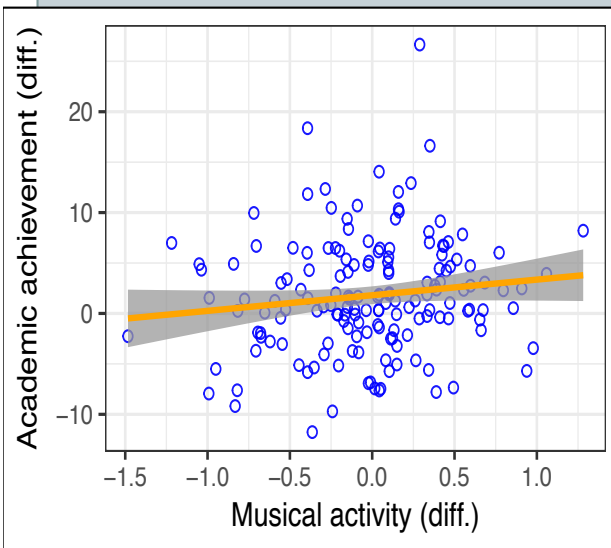
Results Wave 2: Changes in musical activity and their associations



Academic performance and musical activity grow together but changes in **beat perception ability** happen on longer time scale

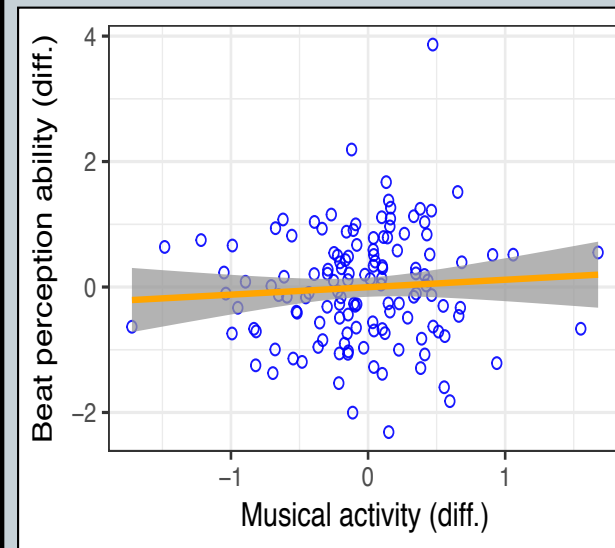
Increase in academic achievement is associated with increase in musical activity

Change in beat perception ability is not associated with change in musical activity (and negatively related to age)



Standardized OLS regression coefficients:

Coefficient	Estimate ± SE
Musical activity (diff.)*	0.20 ± 0.09
Starting IQ	-0.12 ± 0.09



Standardized OLS regression coefficients:

Coefficient	Estimate ± SE
Age***	-0.36 ± 0.10
Musical activity	0.07 ± 0.08
Starting IQ	0.03 ± 0.08

** $p < .05$ ** $p < .01$ *** $p < .001$

Results Wave 3 (2017)

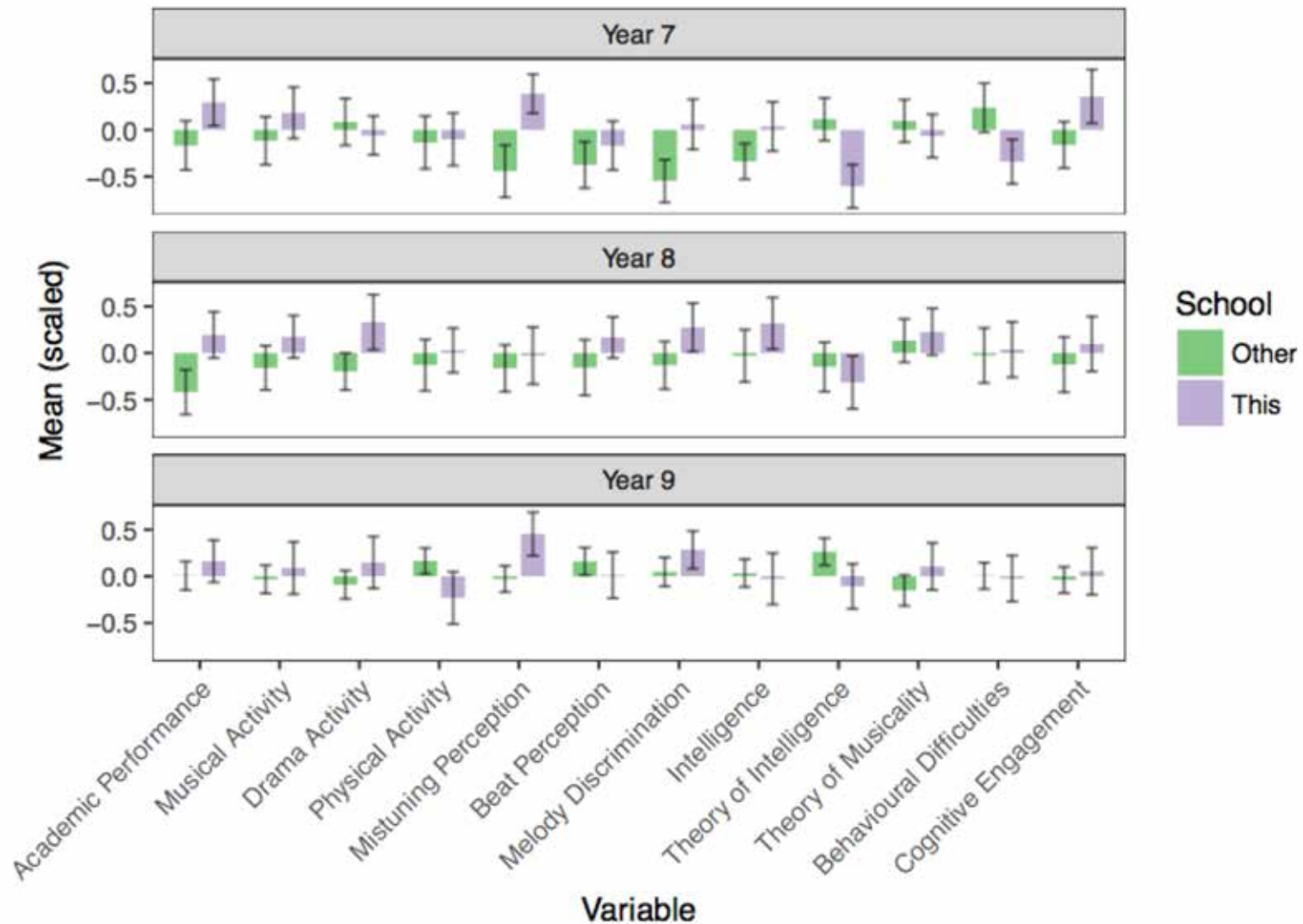


- Queen Anne's, Sutton Valence, Canford School
- 574 pupils, 11 to 18 years
- 3 schools

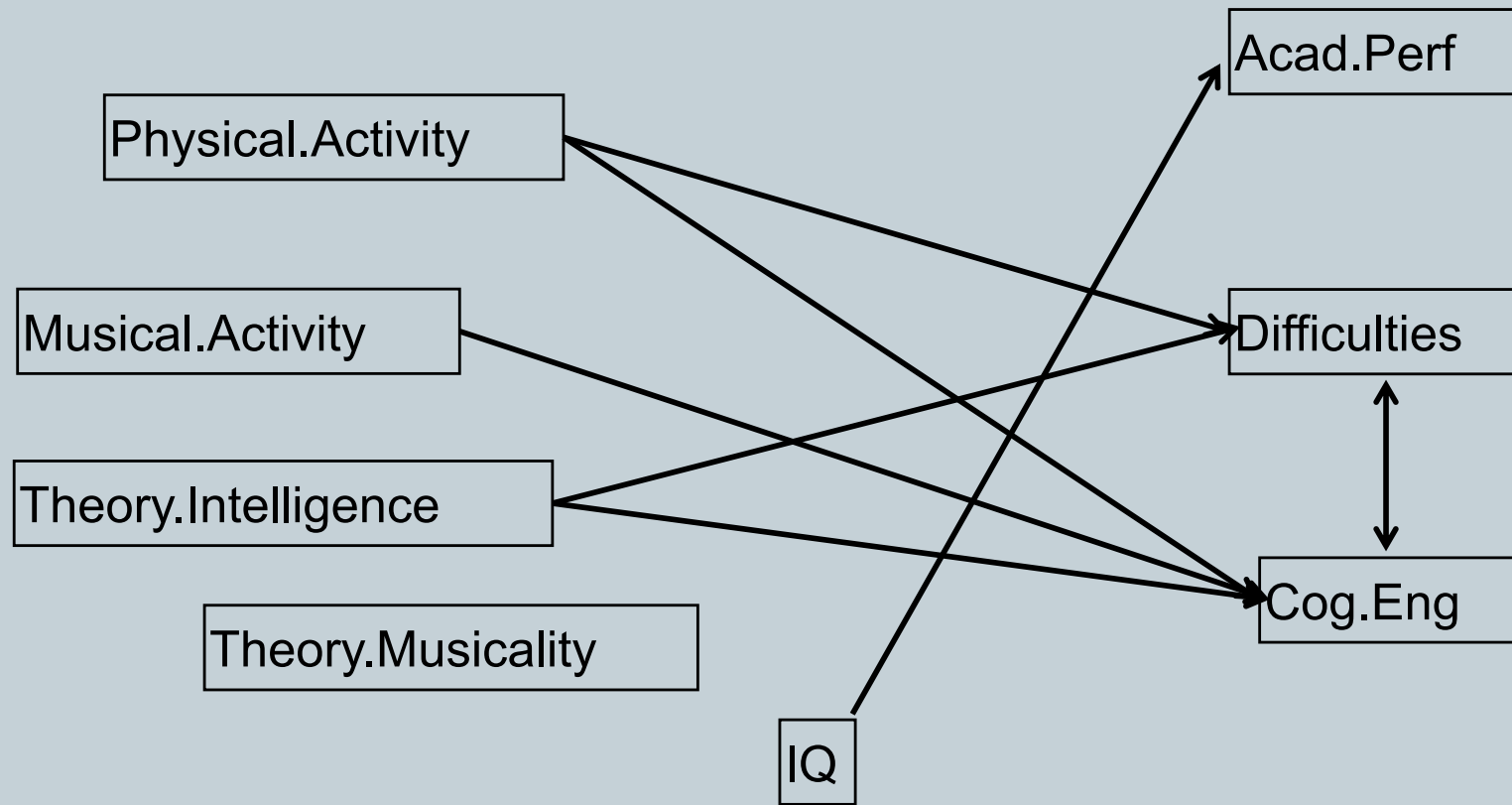
Focus Wave 3:

1. Automatically generated individual report for schools
2. Main predictors for academic success, mental well-being, and school engagement

Automated report: How does profile of core variables look like?



Important outcome measures and potential causes



Next Steps



1. Analysis of developmental trajectories
2. Data collection in Germany
3. Grant applications with Children's Society (UK), DFG (Germany)
4. **Design growth mindset intervention using *Musicality* concept**

Musicality



1. Attitudes towards own musicality closely linked to Theory of Intelligence (Growth Mindset, learning attitude) and academic performance
2. Initial effects of musical training not on neuroplasticity but through attitudes?
3. 'Music' good teaching vehicle



**Growth mindset intervention ↔
Learning unit on musicality**

Examples: Growth Mindset interventions



1. **Bedford (2017): Growth mindset for science subjects**
 1. Lesson on how the brain works
 2. Workshop and lessons on personal value of science
 3. Workshop and lessons on how science can help to achieve own goals in life

2. **Aronson, Fried & Good (2001): Changing Theory of intelligence**
 1. Students answer pen pal letter from younger pupil with difficulties in schools and give speech to at-risk children
 2. Learned material that intelligence is changeable and different types of intelligence exist
 3. Encouraged to include examples from own life experience

3. **Blackwell & Dweck (2007): Changing brain teaching**
 1. Science readings on neurophysiology, brain plasticity, anti-stereotype thinking and changing intelligence

Elements for a musical intervention



- Explain music as model of brain plasticity
- Discover unknown musical skills in yourself
- Reflect on musically sophisticated behaviour in own life
- Encourage adaptive goal setting in musical production and music making



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