

***Measuring the Facets of
Musicality: The Goldsmiths
Musical Sophistication Index***

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What is the Gold-MSI?

- A new self-report inventory
- A new battery of musical tests
- A lot of data
- A novel concept

The Concept

- Motivation:
 - No standardised questionnaire instrument to assess skilled musical behaviours
 - Over-reliance on formal (classical?) music training as proxy for musical abilities and understanding
 - Recognising multiple facets of musical expertise
 - Joining self-report questionnaire and ability tests into one research tool and make it freely available

A New Definition

- Musical Sophistication:
 - Psychometric construct comprising musical skills, expertise, achievements and related behaviours across a range of facets measured on different subscales.
- Assumptions:
 - Facets of musical sophistication can develop through active engagement with music in its many different forms.
 - Individuals vary in their level of sophistication on the different facets.
 - High levels of musical sophistication are generally characterised by
 - higher frequencies for exerting the musical skills or behaviours
 - greater ease, accuracy or effect of the musical behaviour when executed,
 - a greater and more varied repertoire of behaviour patterns associated with it.

Really a New Concept?

- **Self-report questionnaires:**
Cuddy, Balkwill, Peretz, & Holden (2005), Ollen (2006), Werner, Swope, & Heide (2006), MacDonald & Stewart (2008), Chin & Rickard (2012)
- **Musical ability tests:**
Seashore, Lewis, & Saetveit (1960), Wing (1962), Bentley (1966), Gordon (1989), Wallentin et al. (2010)
- **Conceptual suggestions:**
Hallam & Prince (2003), Bigand (2006), Levitin (2012), Law & Zentner (2012)

Missing:

(Focus on musical expertise) x (Covering wide range of skills) x
(Combining self-report and objective testing)

Components of the Gold-MSI v1.0

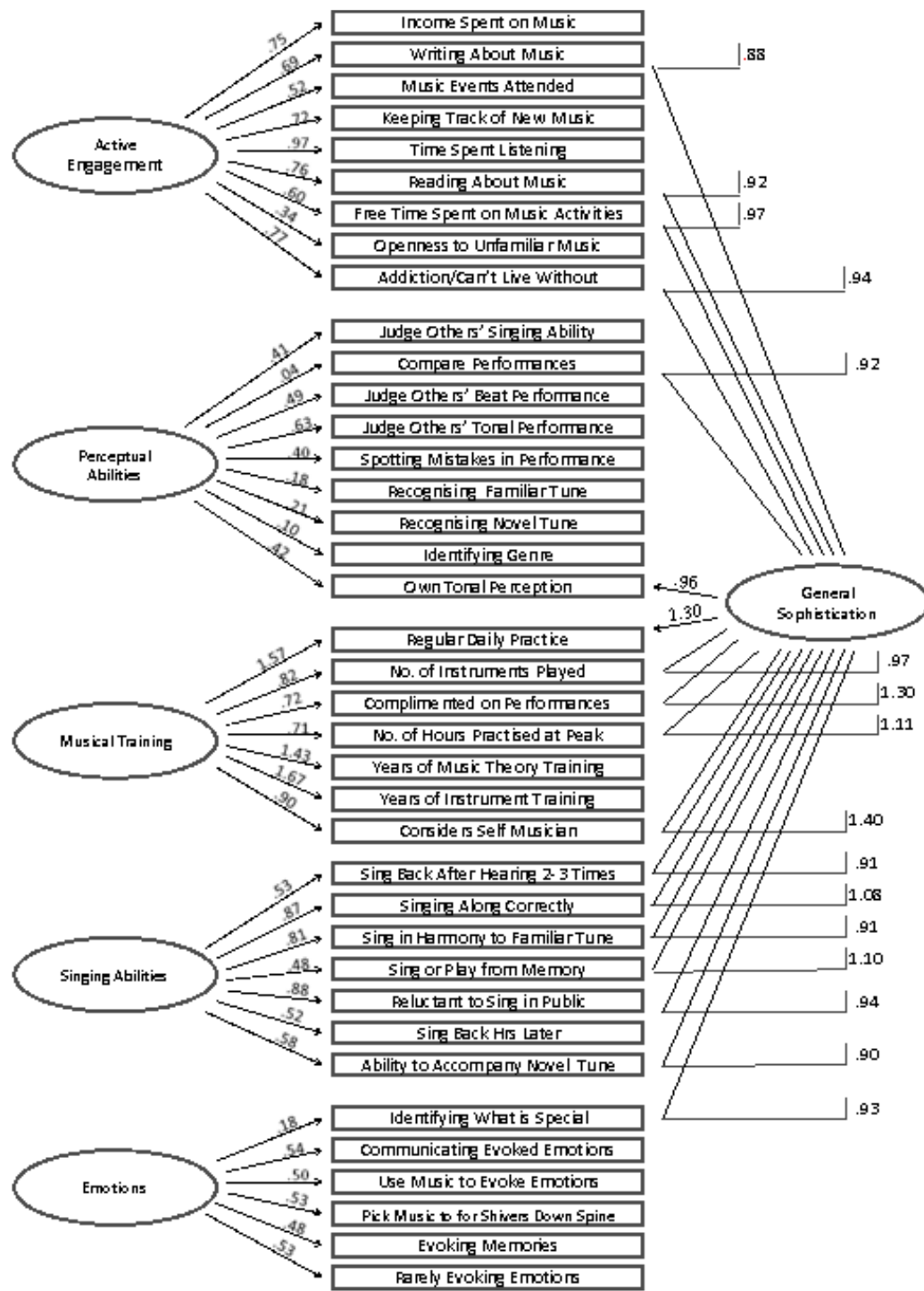
- 38-item Self-report Inventory covering 5 different facets of musical expertise
- 13-item Melodic Memory test:
 - AB comparison
 - novel folk tunes
 - akin to Dowling & Bartlett (1982) and Cuddy & Lyons (1981)
- 17-item Beat Perception test:
 - correct/incorrect judgement
 - unknown instrumental tunes from rock, jazz, popular classical
 - variant of Iversen & Patel's (2008) Beat Alignment Test
- 16-item Sound Similarity test:
 - 800ms audio excerpts from typical rock, pop, hiphop, jazz songs
 - Sorting paradigm similar to Gingras et al. (2011)
 - Inspired by Gjerdingen & Perrott (2008) and Krumhansl (2010)
- (Beat Production test)

A Lot of Data

- Pilot study self-report inventory with BBC LabUK (n=488)
- **BBC LabUK online implementation *How Musical Are You?* (n~148,000)**
- 5 extended lab studies for optimisation of listening tests (together: n~600)
- 2 Questionnaire studies for external validity of self-report inventory (n=214, n=144)
- Online implementation for Channel 4's *Hidden Talent Show* (n= 3,793)
- **Lab study testing reliability and correlation with cognitive abilities (n=51)**

The Dimensions of Musical Sophistication

- Data: 147,633 participants responding to 70 question items;
- Analysis goals:
 1. Identify latent factor structure and 'cluster' items into subscales
 2. Refine and shorten subscales
- Techniques: Factor analysis, item response models, structural equation modelling



Result 1: There is a strong general factor of musical sophistication

- Evidence: High eigenvalue of 1st factor, high inter-factor correlations, high $\omega_{\text{hierarchical}}$

Result 2: There are 5 distinct dimensions of musical sophistication. They can be measured by 6-9 items each

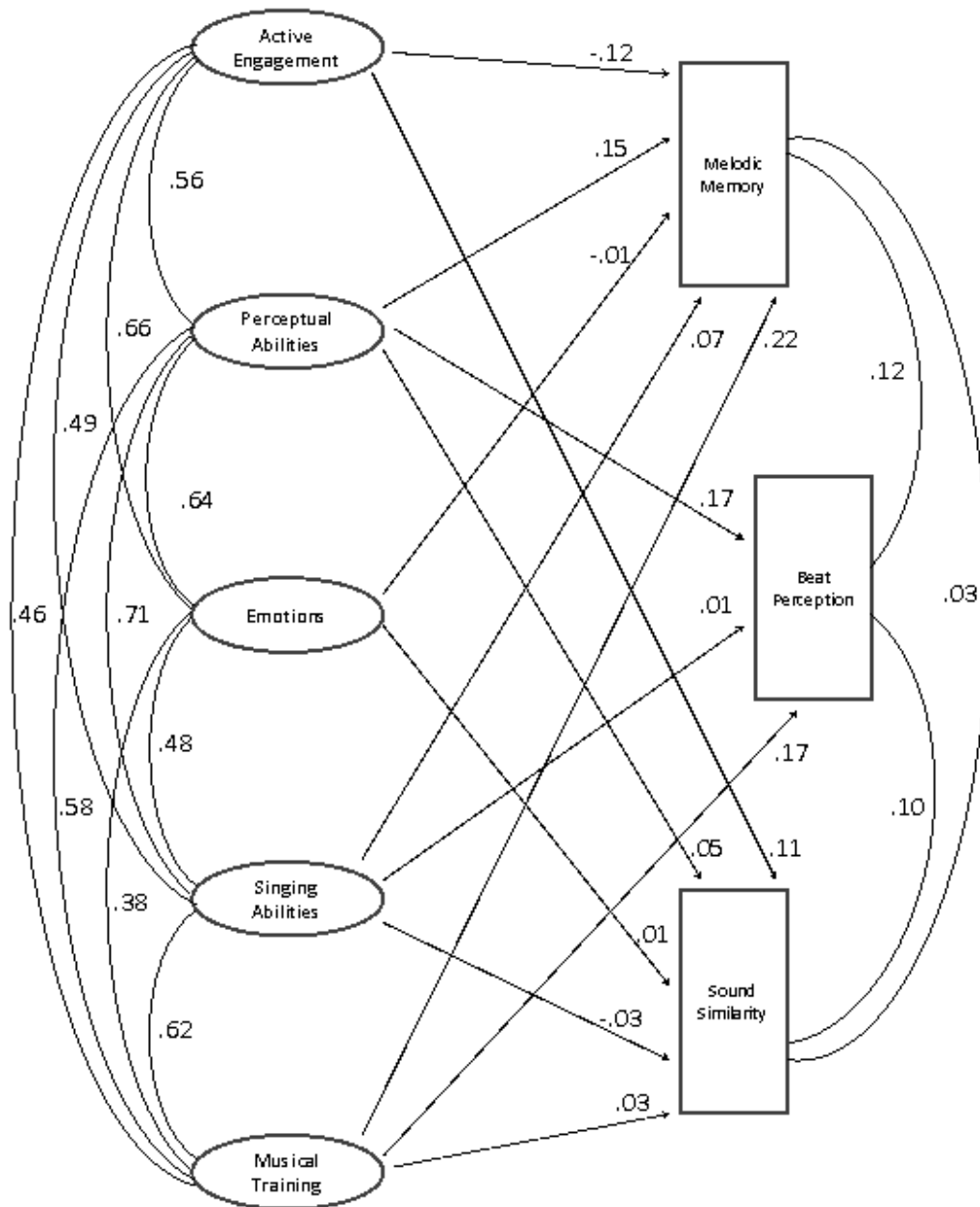
- Evidence: Good model fit of SEM: AGF: .84, RMSEA: .06
- Evidence: High internal reliabilities of subscales ($\alpha > .79$)

Reliability and Validity

	Test-Retest Reliability: Correlations (n=53, mean time lag= 64 days)	External Validity: Correlations with relevant dimension from MEQ (Werner et al., 2006, n=141)	External Validity: Correlations with Gordon's AMMA (n=44)
Active Engagement	.90**	.20*	.41**
Perceptual Abilities	.89**	.32**	.51**
Musical Training	.97**	.40**	.43**
Singing Abilities	.94**	.42**	.43**
Emotions	.86**	.19*	.32*
General Musical Sophistication	.97**	.45**	.50**

Interim summary

- Gold ~~M~~ self report inventory is a valid and reliable measure of different facets of musical sophistication
 - It comprises 5 factors and 1 general factor
 - It is based on self ~~ass~~essed skills and self ~~re~~ported behaviours
- ⇒ *How does self-reported sophistication compare to performance in listening tests?*

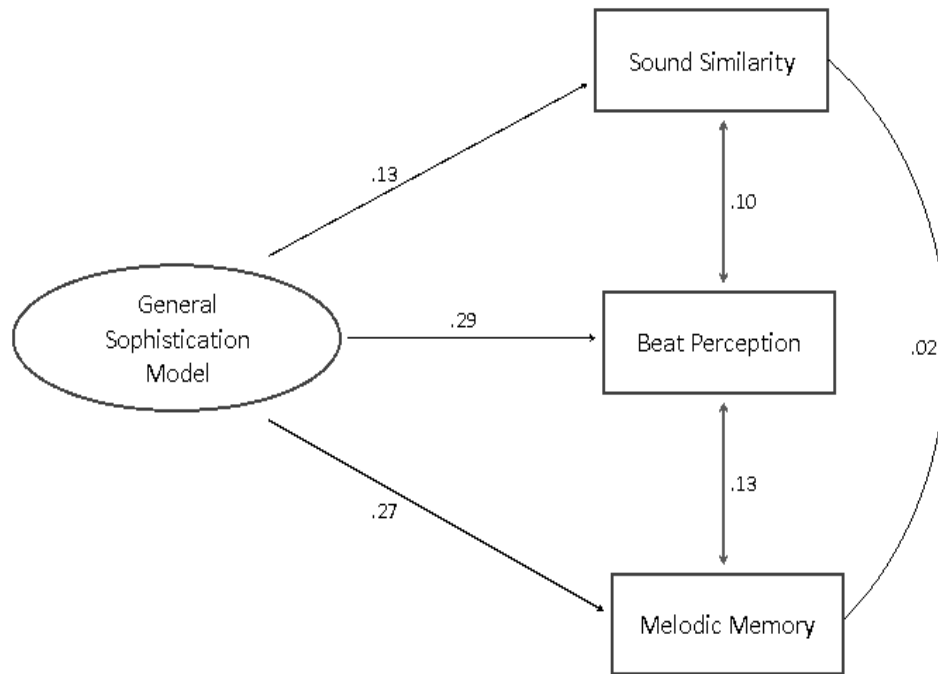


- Result 1: Musical Training benefits melodic memory and beat perception performance

- Evidence: $\beta = .22$ and $.17$

- Result 2: Active (listening) Engagement (but not Musical Training) benefits sound similarity judgements

- Evidence: $\beta = .11$ and $.03$



Result 3: General Musical Sophistication indexes all three test scores best

- Evidence: $\beta = .27, .29$ and $.13$

Result 4: The three listening tests measure different abilities

- Evidence: Low inter-test correlations ($< .15$)

Where does musical sophistication come from?

What are socio-economic conditions for a sophisticated relationship with music?

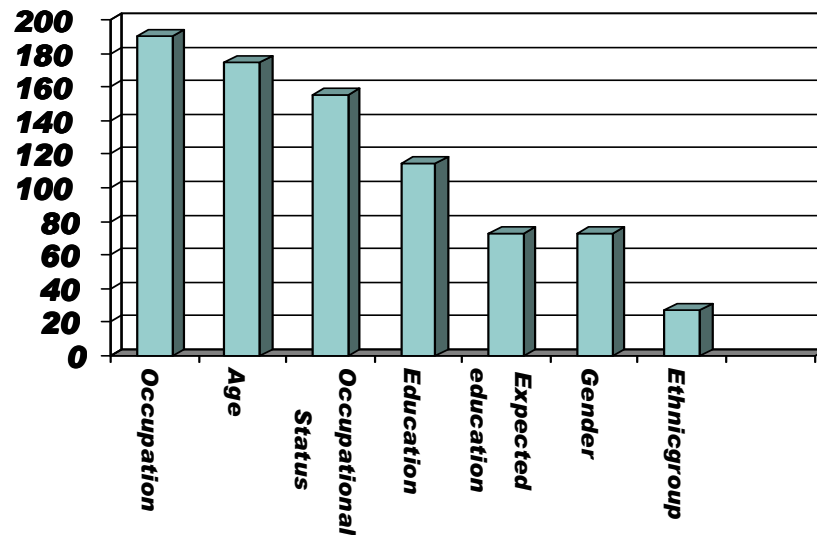
Conditions of Musical Sophistication

*How does **self-reported musical sophistication** relate to socio-economic variables?*

- Data: 90,474 Brits from *How Musical Are You?* sample
- Analysis:
 - Identify most important socio-economic variables from random forest regression model
 - Post-hoc analysis based on permutation tests

SES Affecting Self-reported General Musical Sophistication

Variable Importance



- ↑ Occupation: 'Creative' (media, music) and educational professions
- ↑ Age: Younger people
- ↑ Occupational status: People in education
- ↓ Occupational Status: retired People
- ↑ Education: (Only) A-Levels

But: Socio-economic variables account only for small proportion (4.5%) of variance in General Musical Sophistication

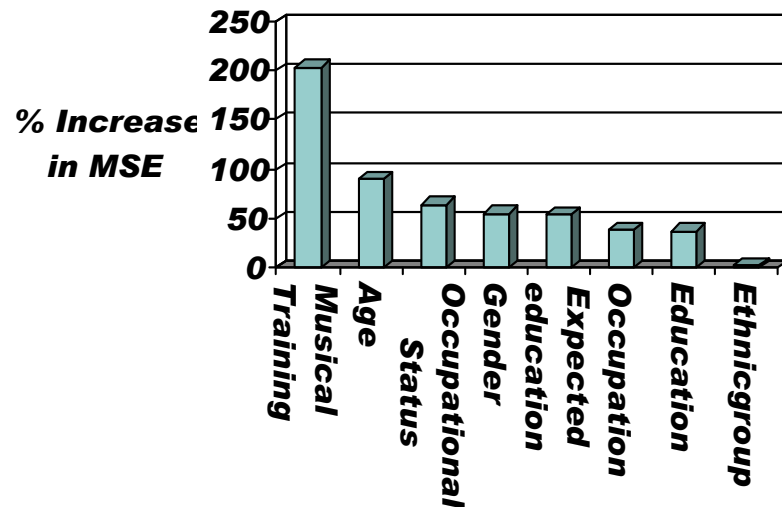
Conditions of Musical Sophistication 2

*How do **test scores** relate to socio-economic variables and musical training?*

- Data: 90,474 Brits from *How Musical Are You?* sample
- Analysis:
 - Identify most important variables from random forest regression model
 - Post-hoc analysis based on permutation tests

SES Affecting Performance on Listening Tests

Variable Importance for Combined Testscore from 4 Tests



- ↑ Musical Training
- ↑↓ Age
- ↑ Occupational Status: Self-employed
- ↑ Occupational status: In FT employment

- Only 3% of variance explained by socio-economic variables
- 11% explained when Musical Training included
- Musical Training necessary condition for perfect listening skills?
- ⇒ Only 85 Brits with no musical training among 7902 Top10 test takers.

The Role of Wealth

How does wealth of local area affect test scores and self-reported Musical Sophistication?

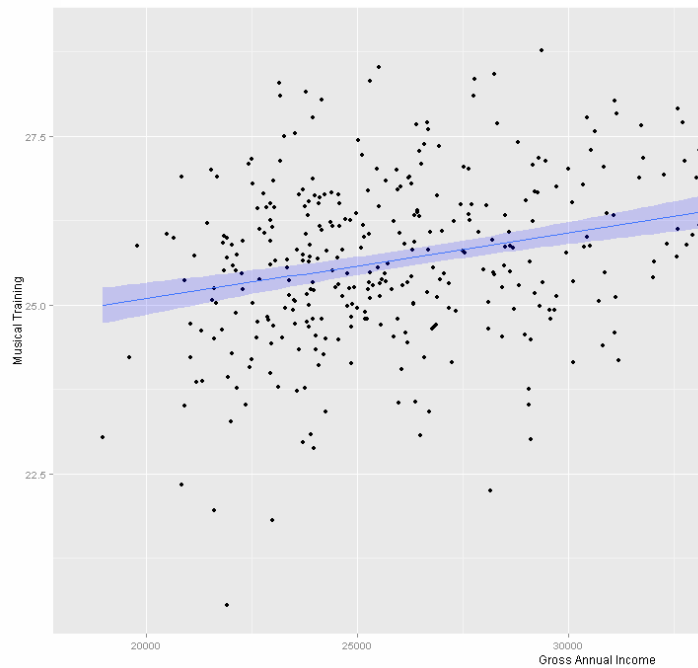
- Data:
 - Averages (self-report, test scores) by local authority of ~60,000 Brits from *How Musical Are You?* Sample
 - Median income by local authority from 2011 *Annual Survey of Earnings* (National Office of Statistics and Ordnance Survey)

Correlations with Income

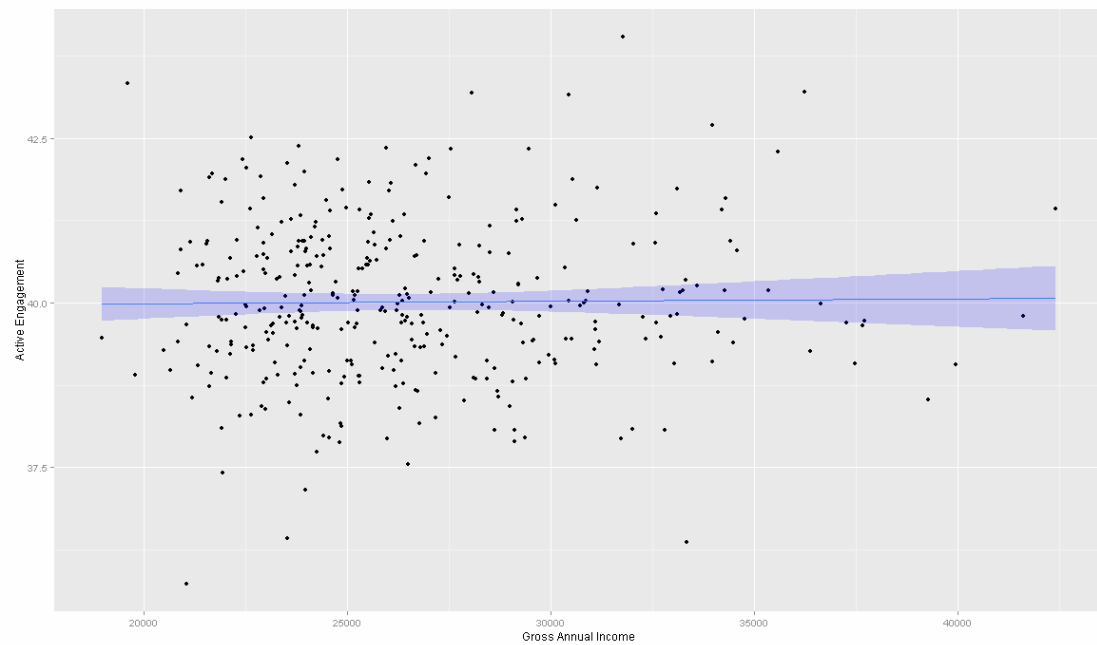
	Weekly Gross Income (n=375)	Annual Gross Income (n=365)	R ² (Percentage of variance explained)
Active Engagement	.05	.01	.002
Perceptual Abilities	.17**	.13*	.028
Musical Training	.34**	.31**	.113
Singing Abilities	.15**	.16**	.021
Emotions	.03	-.04	.001
General Musical Sophistication	.16**	.14*	.021
Melody Memory	.30**	.29**	.088
Beat Perception	.32**	.34**	.102
Sound Similarity	.30**	.26**	.09
Combined test score	.41**	.40**	.171

Correlations with Income

Musical Training ~ Annual Income ($r = .31$)

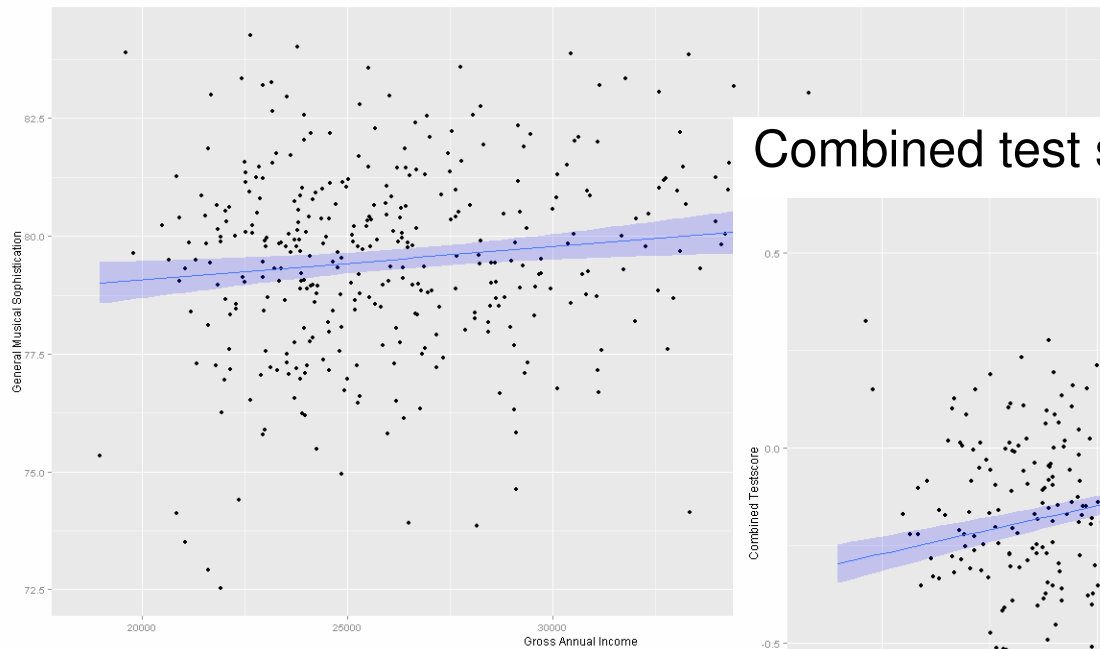


Active Engagement ~ Annual Income ($r = .01$)

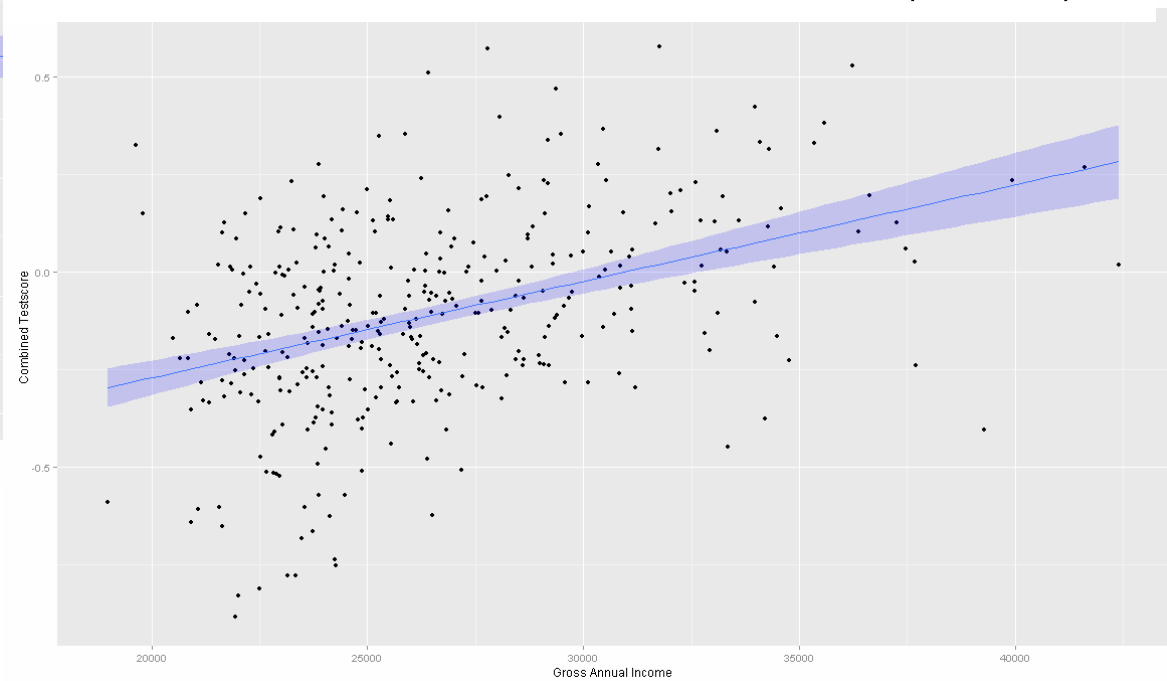


Correlations with Income

General Sophistication ~ Annual Income ($r = .14$)



Combined test score ~ Annual Income ($r = .40$)



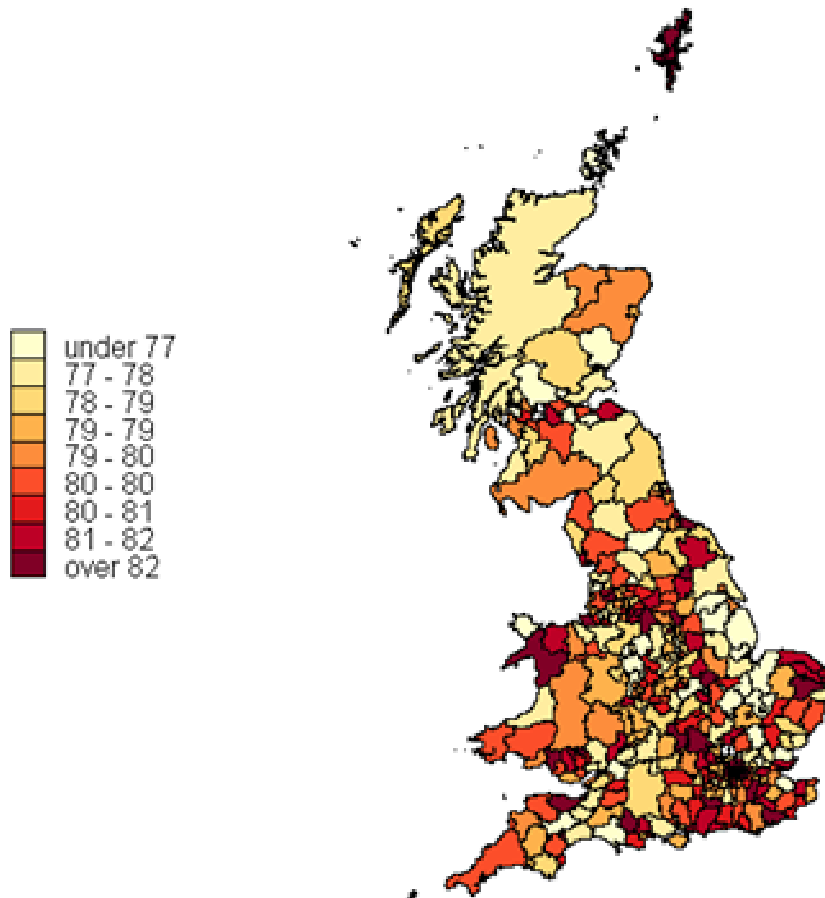
Where Britain is most musical

The Top 5

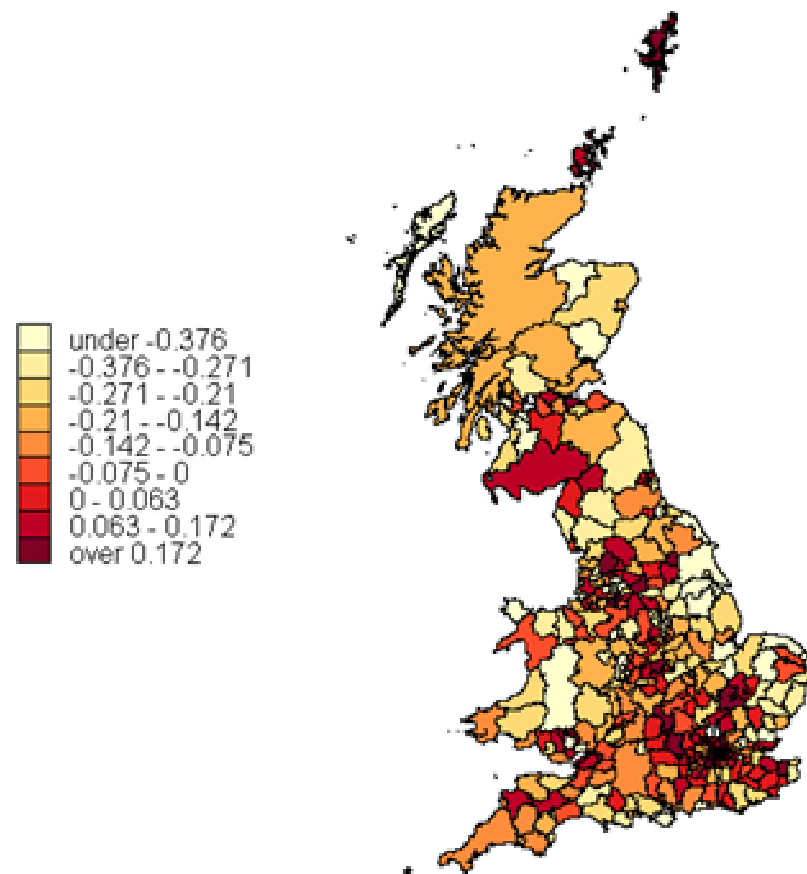
Musical Training	Combined Test score	General Musical Sophistication
City of London	City of London	Hastings
Cambridge	Hackney	West Somerset
York	Oxford	North Dorset
Cherwell	Islington	Bleanau Gwent
Oxford	Brent	Haringey

‘Musical Landscapes’

UK General Musical Sophistication

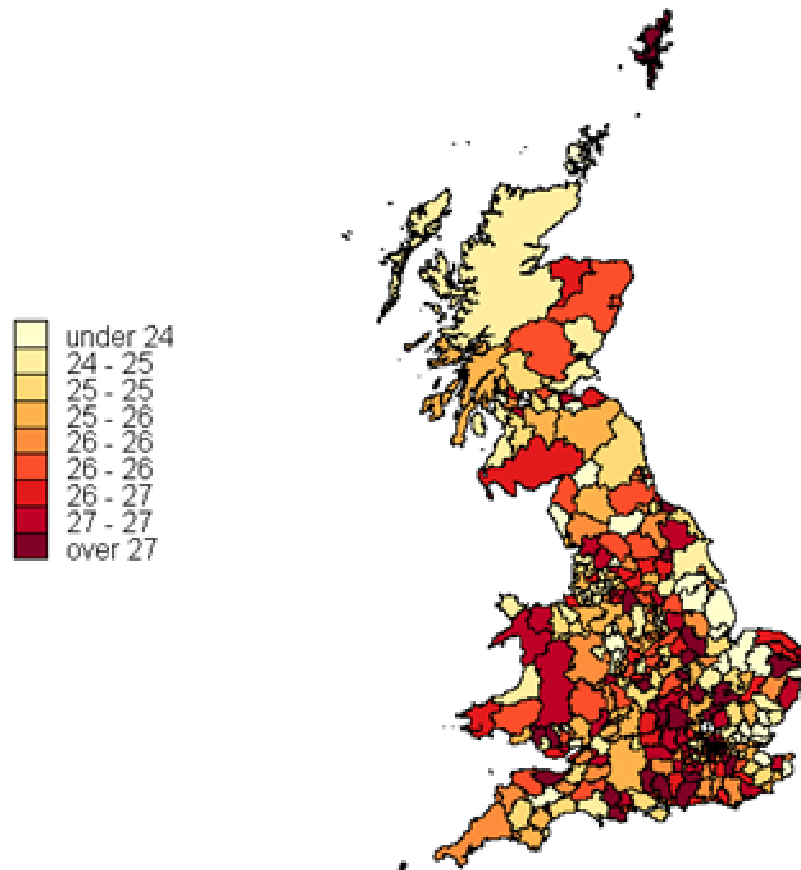


UK Combined Testscore from Listening Tests

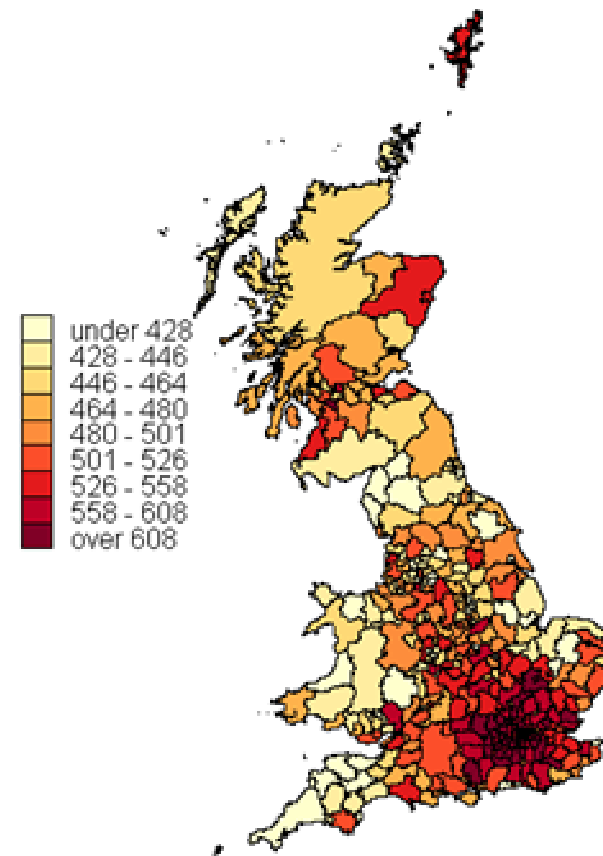


Musical Training ~ Income

UK Amount Musical Training



UK Weekly Median Income



Summary

- Gold-MSI is valid and reliable self-report inventory and test battery for musical skills and expertise.
- It relates musical behaviours to listening skills
- Occupation and Education have little influence on sophisticated musical behaviour and listening skills
- Income has surprisingly stronger impact (at collective level)

- All components of the Gold-MSI:
 - Are freely available for research purposes
 - Are fully documented
 - Have data norms derived from an adult population

Go to: <http://www.gold.ac.uk/music-mind-brain/gold-msi/>

... to get *Gold-MSI v1.0 of self-report inventory and audio materials*

Thank you!

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- Jason Musil
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 - Bruno Gingras
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 - Thenille Braun
 - Monika Ruscynski
 - Naoko Skiada



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