

# Handedness and musical abilities in secondary school students

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## Introduction

*Handedness: difference in performance and preference between the hands*

Prior research has found:

- non-right-handedness to be associated with cognitive deficits,<sup>1</sup> heightened creativity and superior musical talent<sup>2</sup>
- improved pitch and rhythmic memory for left-handed subjects<sup>3,4</sup>
- a higher incidence of left-handedness in musicians<sup>5</sup>

However, conflicting studies have found:

- non-right-handedness to have no correlation with musical ability<sup>6</sup>
- similar incidences of left-handedness in musicians and non-musicians<sup>7</sup>

This study aims to resolve some of the uncertainty, whilst addressing limitations of previous work, including:

- a much larger participant group assessed through their developmental years
- greater diversity of relevant musical and non-musical covariates

## Participants

2,902 secondary school students from thirteen schools

- aged 10 to 18
- mean age: 12.85 years ( $SD = 2.00$ )
- schools in the UK and Germany



All participant data taken from the international longitudinal study of educational development in adolescents: the LongGold project<sup>8</sup>

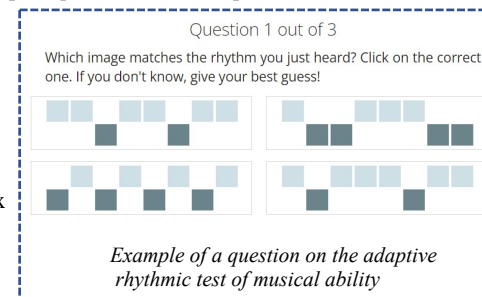
## Methods

The LongGold project assesses students' musical, academic and personal skills annually through repeated measures design.

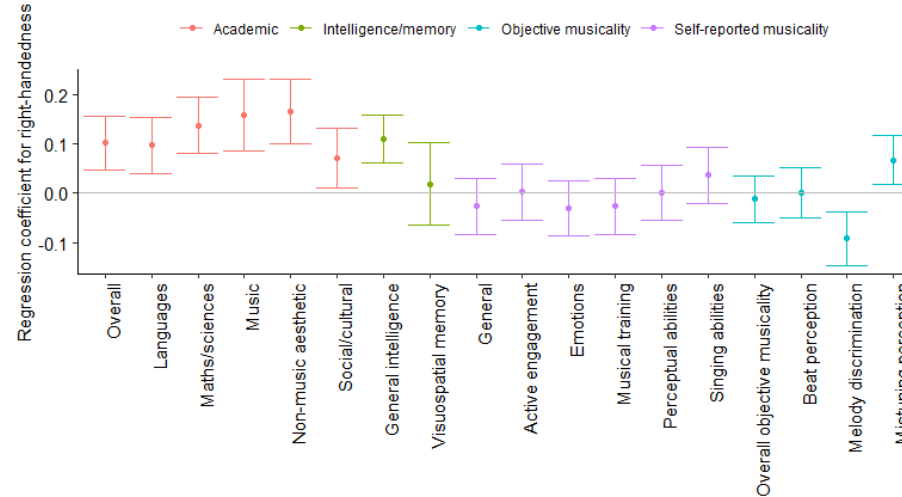
Handedness is measured using two self-report questions on hand preference.

Four main response variables from the test battery used:

1. Objective musicality: average of three adaptive tests of musical ability
2. Self-reported musicality: Gold-MSI self-report inventory
3. General intelligence: score on a Matrix Reasoning Test
4. Overall academic performance: summary of students' school grades



## Results



Standardised regression coefficients ( $\beta$ ) for right-handedness:

Response variable	$\beta$	95% CI	p-value
Overall academic performance	0.10	[0.047, 0.16]	.063
General intelligence (IQ)	0.11	[0.060, 0.16]	.026
Overall objective musicality	-0.012	[-0.059, 0.035]	.80
Overall self-reported musicality	-0.027	[-0.083, 0.029]	.63

Multiple linear regression analysis, controlling for potential confounds of gender, age and school, found:

- No significant relationship between handedness and both objective and self-reported musicality
- An association between right-handedness and both general intelligence and overall academic performance

Comparison benchmarking age analysis:

- Difference in intelligence between being right- and non-right-handed equivalent to becoming 1.9 years older
- Highlights small effect of handedness

## Discussion

- Present study contradicts prior research that found a relationship between non-right-handedness and musicianship<sup>2,3,4,5</sup>
- Idea that non-right-handed people have an innate proclivity for music due to greater interhemispheric interaction for music perception was not borne out by findings
- Dispelling misconceptions of innate differences for left-handers
- Reverse causal explanation that musicians become more mixed-handed over time cannot yet be discounted
- Tendency for right-handers to academically outperform non-right-handers suggests a stronger association than the negligible relationship of recent meta-analyses<sup>9</sup>
- Limitations: reductionist and binary measure of handedness, lack of generalisability to students with lower socioeconomic status
- Future research: compare samples of adults and children or conduct an extended longitudinal study to explore how the adolescent sample could explain conflict with previous research through a speculative theory of changing dexterity in musicians

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