



Benefits of Childhood Music Training on Learning a Second Language

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Introduction

Transfer of Knowledge For over a century it has been questioned whether the knowledge gained through studying particular topics might transfer to the acquisition of knowledge in other domains¹ - a *cognitive benefit*

NEW QUESTION: Does early and maintained childhood *Music* training benefit adults learning a second *LANGUAGE* (L2)?

NEW QUESTION: Does early and maintained childhood *Music* training lead to cognitive benefits in other domains, like *ATTENTION*?

BACKGROUND

Widely reported research asserts that music exposure leads to general cognitive advantages across a broad range of cognitive domains. Research examining this view is controversial (the Mozart Effect²), and good studies are scarce³

Methods

PARTICIPANTS

Students enrolled in an introductory university Spanish or Italian class (mean age 18.6 years)

- Not exposed to any language other than English prior to the important developmental age of 7^{4,5}
- Not proficient in any other language but English at time of testing
- Only rare usage of another language; none were in/from bilingual contexts

| Group | n | English Language Proficiency | SAT |
|---------------------------|-----|------------------------------|---------|
| Monolingual Musicians | 12* | > 80% | p > .05 |
| Monolingual Non-Musicians | 12* | | |

* 5+ years continuous music training, started before age 9, professional performances, finds pleasurable (on personal scale)

+ < 4 years of TOTAL Arts training (Dance, Music, Theater), not pleasurable

PROCEDURE

Two Testing Sessions - Beginning of Term (T1); End of Term (T2)

T1 Beginning of Academic Term

- Screening Language/Music Screening Academic Performance-SAT
- Language Proficiency in English
- Language Proficiency in L2 (Spanish or Italian)^{6,7}

T2 End of Academic Term

- Language Proficiency in L2
- Attention
- Self-Evaluation

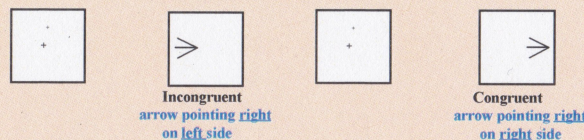
TASKS

1. Language Proficiency – L1 (English) and L2 (Spanish or Italian)



Task: Watch 1.5s silent cartoon and describe what happened in the cartoon.
Evaluates language *competence*/expressive *proficiency*.

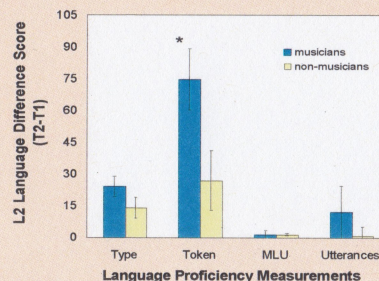
2. Attention - Stimulus Response Compatibility⁸



Task: DIRECTION Arrow Pointing or POSITION of Arrow on the Screen
Evaluates attentional abilities when faced with *interference* (congruency) and *task switching* (direction/position)

Results

1. Language Proficiency – L2 (Spanish or Italian)



Musicians showed overall greater achievement in their L2 than Non-musicians $p < .05$

Language Proficiency Measurements

Type - # of unique words produced by the participant in the target language

Token - Total # of words produced by the participant in the target language

Mean Length of Utterance (MLU) - # of words per phrase produced by the participant in the target language

Utterances - # of utterances produced by the participant in the target language

2. Attention - Stimulus Response Compatibility

-No accuracy difference between groups $p > .05$

Self-Evaluation - All participants reported an equal level of enjoyment, effort and performance in language classes

Discussion

Musicians with early and maintained training show *cognitive benefits*

• *Musicians'* L2 language proficiency improved more than Non-musicians

• Similar global measure of **ACADEMIC** performance (SAT), **COGNITIVE** performance (SRC task) and **LANGUAGE** competence in L1 (L1 proficiency task) suggest that participants were comparable in intelligence

Conclusions

Extensive training in the Arts may afford long-term advantages to other higher cognitive abilities

Why?

Cognition & Music: Difference in SRC predicted across groups, but no difference found

Language & Music: Difference in L2 language achievement predicted, and **FOUND**

Suggests

Aspects of the computational demands and/or systematic patterning shared by music and language may also share neural mechanisms^{9,10}

These findings of cognitive benefits from extensive training in the Arts have implications for designers of educational curricula



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