

Maria Manuel Vidal

Disclosures

Financial

FCT

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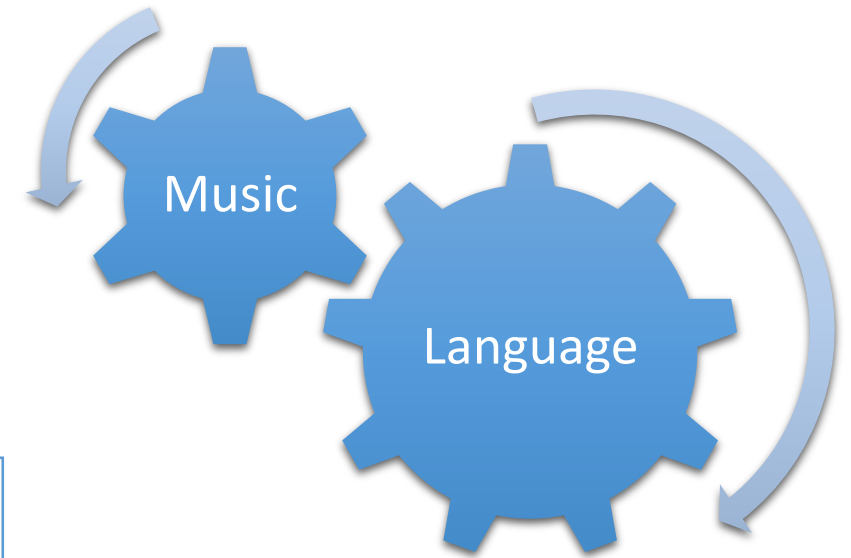
Music influence on phonologic development and phonologic awareness in 3 to 6 year-olds with typical development and primary language impairment

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² - Universidade de Aveiro; Escola Superior de Saúde; Centro de Investigação em Tecnologias e Serviços de Saúde (CINTESIS.UA)

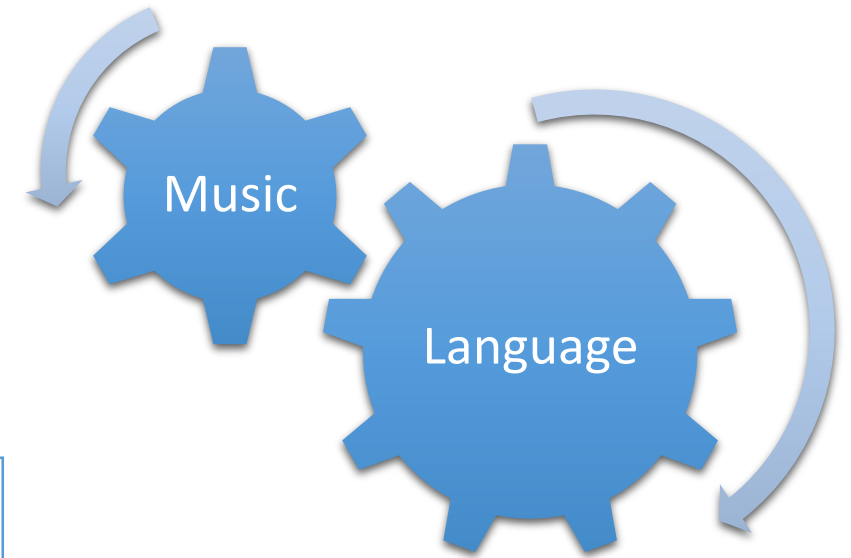
³ - Universidade de Lisboa; Faculdade de Letras; Centro de Linguística da Universidade de Lisboa



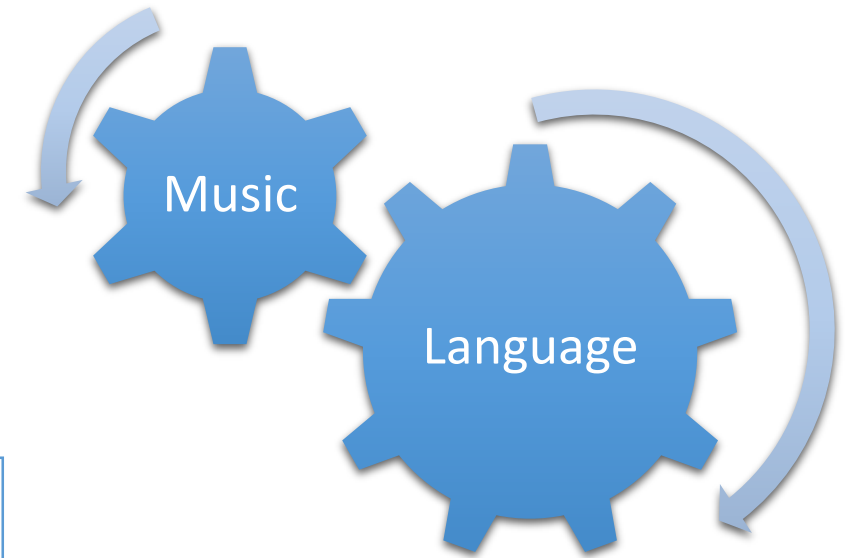
- Share Cognitive processes and resources
- Activate the same brain structures and create the same representations
- Developing highly related abilities

Near Transfer Theory

Hannon & Trainor (2007)



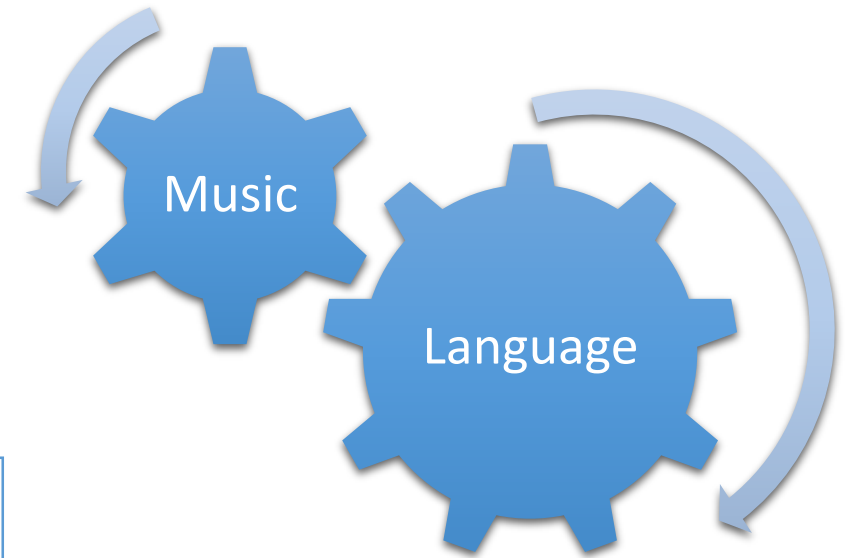
- Share mechanisms to learn language and musical categories
- Helping to understand why musical development influences language development



“Musical structure is complex, consisting of a small **set of elements** that combine to form **hierarchical levels** of pitch and temporal structure according to **grammatical rules**.”

As with language, different systems use different elements and rules for combination.”

Hannon & Trainor (2007: 466)



Suprasegmental properties (Prosody)

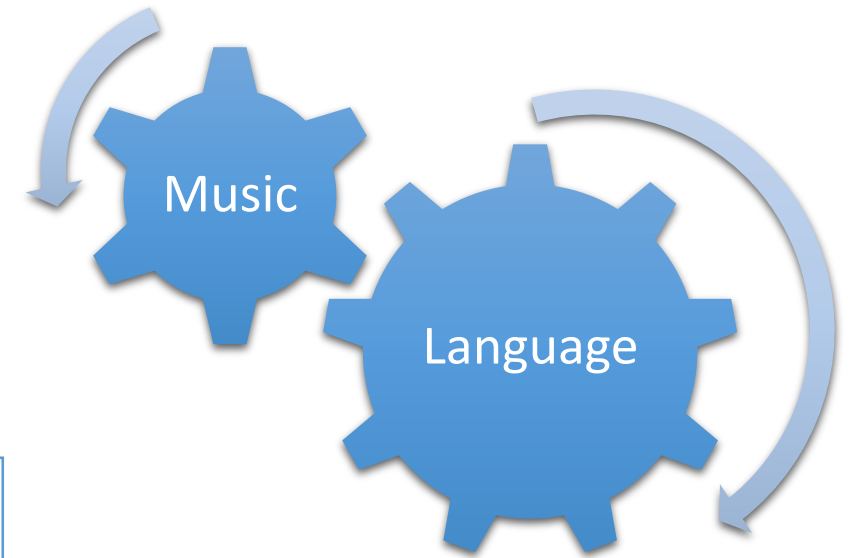
Duration

Intensity

F_0

Used to

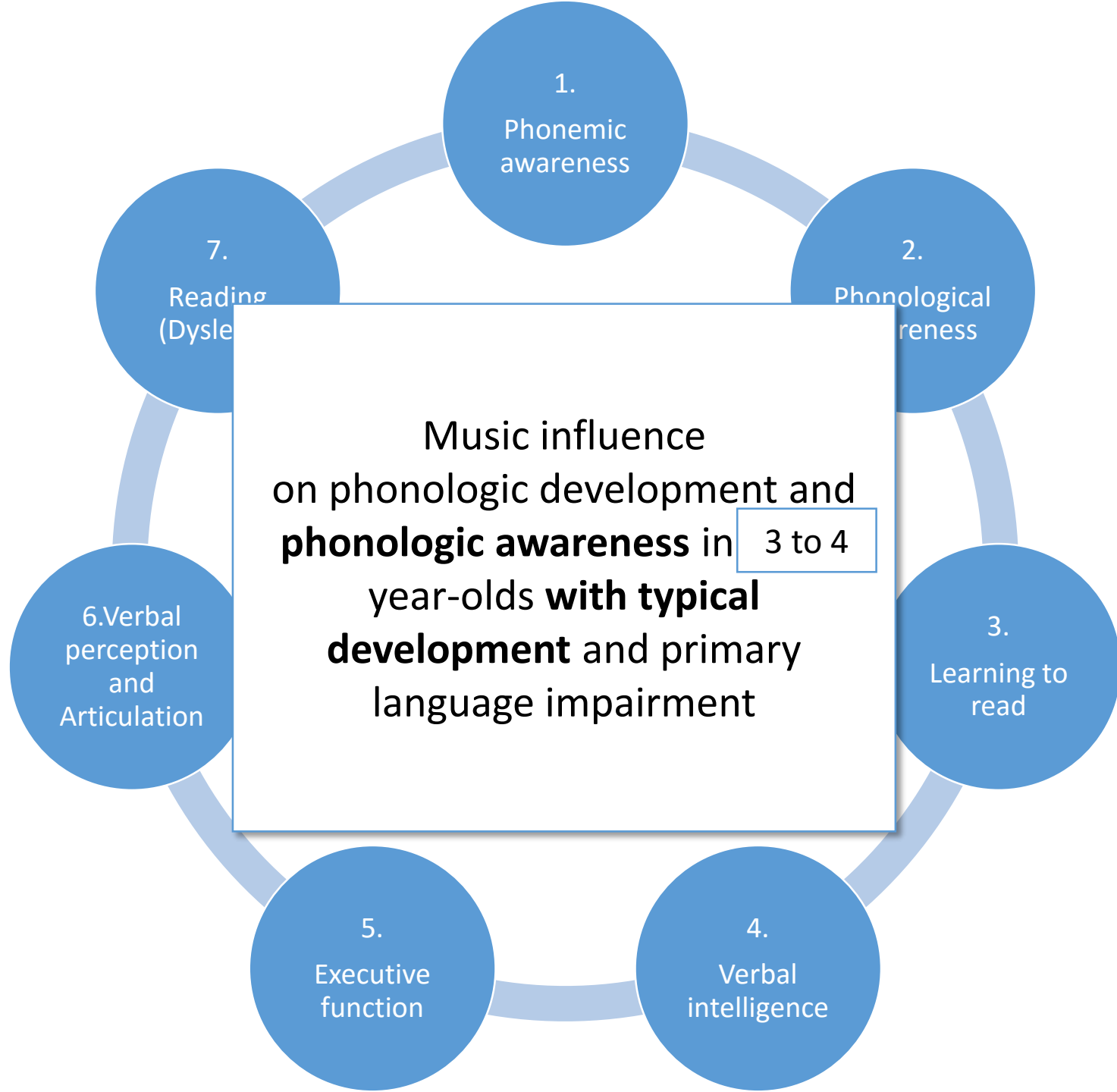
- Broadcast information
- Sound material organization



- The observed relations between both areas can also be due to the development of general, non related abilities

Far Transfer Theory

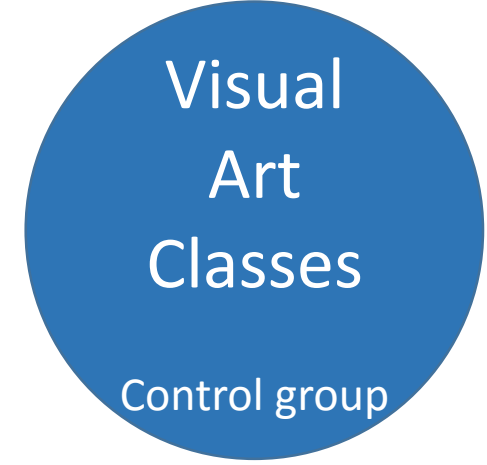
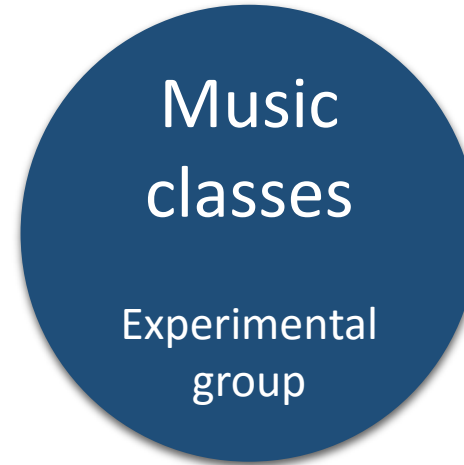
Corrigan & Trainor (2011)



| | Ages | Authors |
|--------|-----------------|--|
| 1. | 4-7 3-6 | Peynircioglu, Durgunoglu & Kusefoglu (2002); Gromko (2005); |
| 2. | 4-5 5 4-5 | Stanley & Hughes (1997) Degé & Schwarzer (2011); Register (2011) |
| 3. | 4-5 | Anvari, Trainor, Woodside & Levy (2002); |
| 4. | 6-9 | Corrigan & Trainor (2011); |
| 4 e 5. | 4-6 | Moreno, Bialystok, Barac, Schellenberg, Cepeda & Chau (2011) ; |
| 6. | 4-5 | Cutieta (1996) ; |
| 7. | 10 | Overy (2002); Forgeard, Schlaug, Norton, Rosam & Iyengar (2008) |

Music influence on phonologic development and **phonologic awareness** in 3 to 4 year-olds **with typical development** and primary language impairment

METHODOLOGY



September 2015

30 classes

June 2016



Pre-evaluation



Post-evaluation

Castro, Alves & Correia (2015)

CONF-IRA

Music influence
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METHODOLOGY

11 tasks applied

1. Lexical awareness
2. Syllable segmentation of words
3. Syllable segmentation of non-words
4. Word Synthesis
5. Non-words Synthesis
6. Final syllable omission
7. Initial syllable omission
8. Syllable inversion
9. Rhyme identification
14. First Phoneme Identification
15. Last Phoneme Identification

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METHODOLOGY

Music
classes

Experimental
group

- 10 Children
- Mean age: 42,4 / 3:6

Visual
Art
Classes

Control group

- 8 Children
- Mean age: 42,38 / 3:6

Randomized in Random.org;
Timestamp: 2015-10-15 15:31:12 UTC

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PRE-EVALUATION RESULTS

Tests of Normality

| Actividade | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|----------------------|---------------------------------|----|-------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| TotalConfiraB Música | .255 | 10 | .064 | .888 | 10 | .161 |
| Artes Visuais | .169 | 8 | .200* | .959 | 8 | .804 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

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PRE-EVALUATION RESULTS

T-Test

Group Statistics

| | Actividade | N | Mean | Std. Deviation | Std. Error Mean |
|---------------|---------------|----|------|----------------|-----------------|
| TotalConfiraB | Música | 10 | 9.60 | 5.211 | 1.648 |
| | Artes Visuais | 8 | 9.75 | 5.148 | 1.820 |

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---------------|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|-----------------------|---|-------|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| TotalConfiraB | Equal variances assumed | .118 | .736 | -.061 | 16 | .952 | -.150 | 2.459 | -5.362 | 5.062 |
| | Equal variances not assumed | | | -.061 | 15.224 | .952 | -.150 | 2.455 | -5.376 | 5.076 |

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POST-EVALUATION RESULTS

Tests of Normality

| Actividade | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|--------------------------|---------------------------------|----|-------------------|--------------|----|------|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| ReAvTotalConfiraB Música | .139 | 10 | .200 [*] | .927 | 10 | .416 |
| Artes Visuais | .166 | 8 | .200 [*] | .937 | 8 | .581 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

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POST-EVALUATION RESULTS

T-Test

Group Statistics

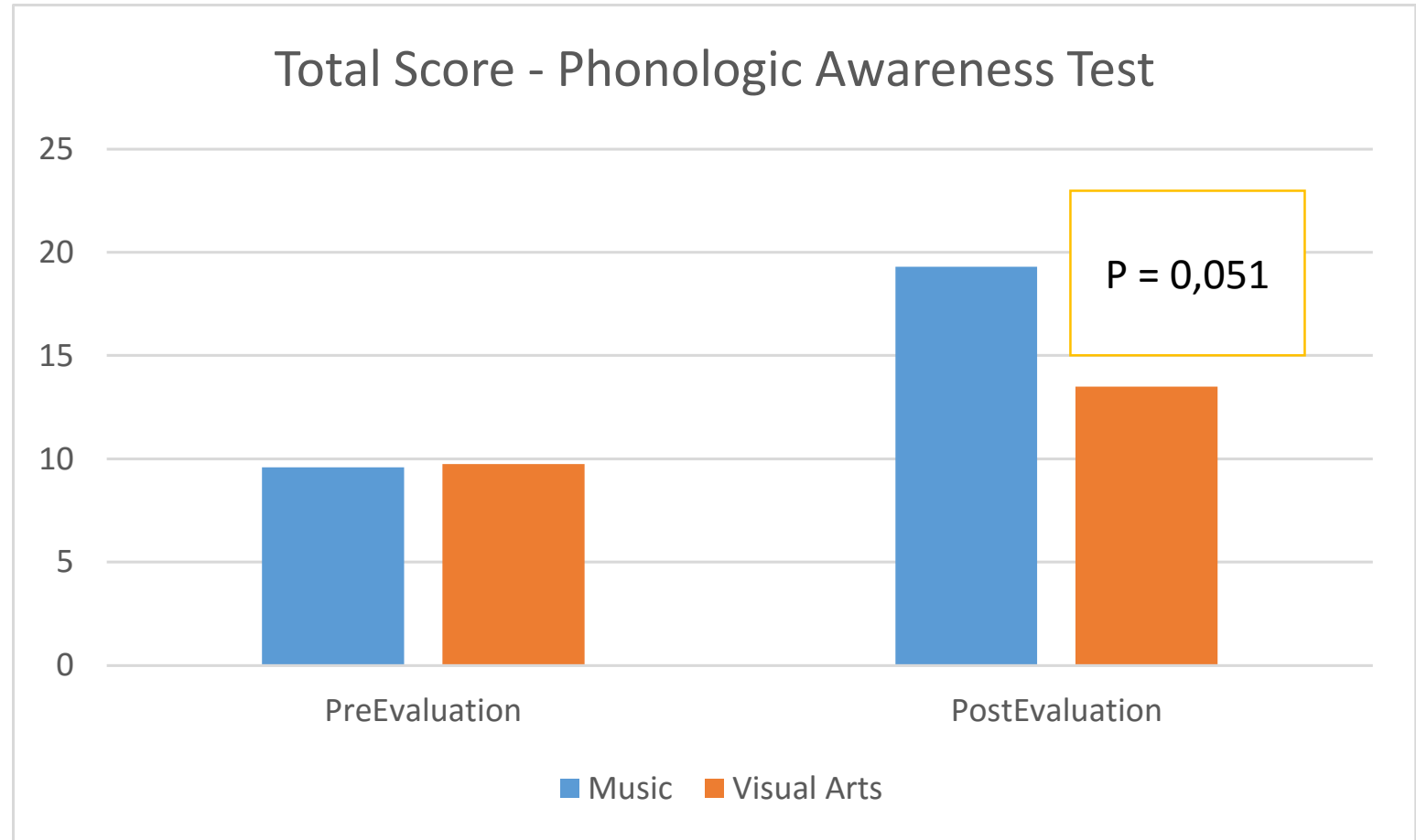
| | Actividade | N | Mean | Std. Deviation | Std. Error Mean |
|-------------------|---------------|----|-------|----------------|-----------------|
| ReAvTotalConfiraB | Música | 10 | 19.30 | 6.447 | 2.039 |
| | Artes Visuais | 8 | 13.50 | 4.840 | 1.711 |

Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|-------------------|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|-----------------------|---|--------|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| ReAvTotalConfiraB | Equal variances assumed | .487 | .495 | 2.108 | 16 | .051 | 5.800 | 2.751 | -.031 | 11.631 |
| | Equal variances not assumed | | | 2.179 | 15.962 | .045 | 5.800 | 2.662 | .156 | 11.444 |

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POST-EVALUATION RESULTS

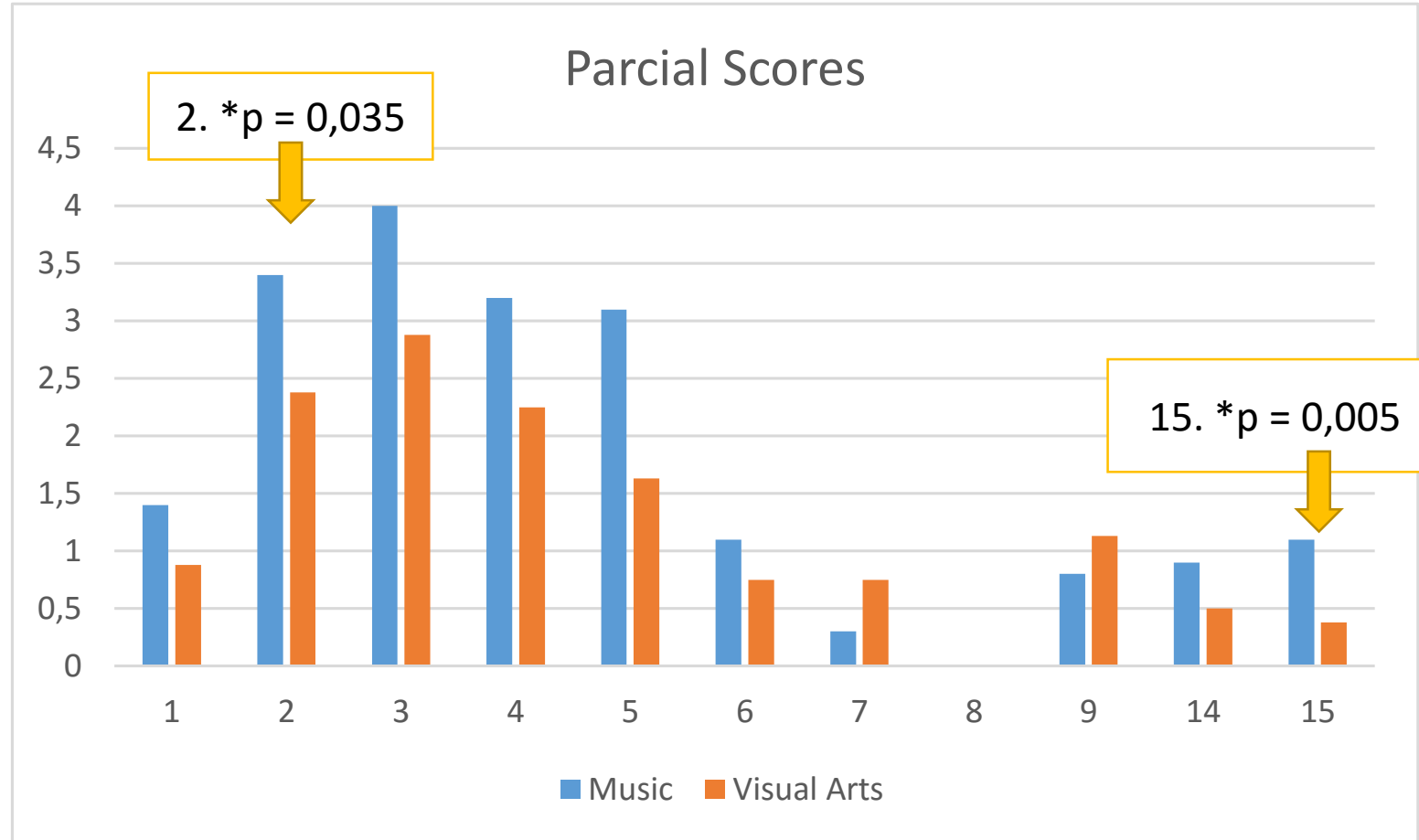


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2. Syllable segmentation of words

15. Last Phoneme Identification

POST-EVALUATION RESULTS



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CONCLUSIONS

- After 30 sessions, Music Group behaves above Visual Art Group – Differences are not statistically significant ($p = 0,051$)
- Almost in every proves, Music Group has an higher result – differences are not statistically significant
- In initial syllable omission and identification of rhyme, the results are inverted
- Dividing words in syllables and identifying last phoneme have significant and very significant differences

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FUTURE WORK

- Analyse the data related to:
 - Phonetic and phonological development
 - Prosodic development
 - Primary Language Impairment Group
- Repeat the project with a larger sample

References

- Anvari, S., Trainor, L., Woodside, J., e Levy, B. (2002). Relations among musical skills, phonological processing, and early reading in preschool children. *Journal of Experimental Child Psychology*, 83, 111-13.
- Castro, A., Alves, D., Correia, S. (2015). Consciência Fonológica – Instrumento de Rastreio e Avaliação (no prelo)
- Corrigan, K.A., e Trainor, L.J. (2011). Associations between length of music training and reading skills in children. *Music Perception*, 29, 147-155.
- Cutietta, R.A. (1996). Language and music programs. UPDATE: *The Applications of Research in Music Education* 9 (1996): 26-31.
- Degé, F., e Schwarzer, G. (2011). The effect of a music program on phonological awareness in preschoolers. *Front. Psychol.* 2:124. doi:10.3389/fpsyg.2011.00124.
- Forgeard, M., Schlaug, G., Norton, A., Rosam, C., e Iyengar, U. (2008). The relation between music and phonological processing in normal-reading children and children with dyslexia. *Music Perception*, 25 (4), 383-390.
- Gromko, J. E. (2005). The Effect of Music Instruction on Phonemic Awareness in Beginning Readers. *JRME*, 53 (Vol3), 199-209.
- Hannon, E., e Trainor, L. (2007). Music acquisition: effects of enculturation and formal training on development. *Trends in Cognitive Sciences*, 11, 466-472.
- Moreno, Bialystok, Barac, Schellenberg, Cepeda & Chau (2011). Short-Term Music Training Enhances Verbal Intelligence and Executive Function. *Psychological Science* 22 (11), 1425-1433.
- Overy, K. (2002). *Dyslexia and music: From timing deficits to music intervention*. Unpublished doctoral dissertation, University of Sheffield.
- Peynircioglu, Z., Durgunoglu, A., e Kusefoglu, B. (2002). Phonological awareness and musical aptitude. *Journal of Research in Reading*, 25 (1), 68-80.
- Register, D. (2011). The effects of an early intervention music curriculum on prereading/writing. *Music Therapy Perspectives* 38 (3), 239-248
- Stanley, J. & Hughes, J. (1997). Evaluation of an early intervention music curriculum for enhancing prereading/writing skills. *Music Therapy Perspectives* 15 (2), 79-86