

The Effect of Monaurally versus Binaurally Presented Music on Reading Comprehension

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Disclosure Statement

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Introduction Reading

- Reading relies on the understanding of visual symbols in the writing system and the pronunciation of words.
- Phonemic awareness is a key skill the reader must develop before becoming proficient.
- Once this skill is acquired the reader will be able to identify the phoneme in individual sounds, in different words, in blends, in segments, and after deletion)
- The reader must then be able to identify each grapheme (written letter) as belonging to a particular phoneme (sound representation).

Introduction Reading Comprehension

- Reading comprehension requires decoding written language into a speech code, extracting semantic meaning, holding meaning in the working memory, integration, inference, and self monitoring.
- In order to comprehend text, the reader must create a mental picture, remember facts of the text, and rely on prior knowledge to make inferences.

Introduction Language Impairment and Reading

- Two types of reading disorders are commonly seen in children : dyslexia and comprehension difficulties
- Dyslexia is difficulty with decoding which causes poor fluency and accuracy in reading tasks that are not in line with the person's age, education, or intelligence.
- Comprehension deficits involves the inability to interpret text.
- However, you must be able to decode in order to interpret so the two processes are interrelated.
- It has been found that the phonological decoding deficits in children with reading disorders are associated with hyperactive right hemisphere brain regions and hypoactive left hemisphere regions.

Introduction Reading and Music

- Research has proven that music and reading share many parallel skills such as "phonological awareness, phonemic awareness, sight identification, orthographic awareness, cueing systems awareness and fluency".
- A music intervention known as melodic intonation therapy utilizes the right hemisphere's involvement in music processing in order to compensate for the language areas of the left hemisphere that are damaged.
- In one study, music was played binaurally while third grade children with dyslexia read comprehension passages.
- It was found that the music was potentially converted into a speech-based code that assisted the children in comprehension because their use of phonological codes were interrupted. Therefore, the children were required to use less impaired information.

(Frasher, p.3, 2014)

Purpose

- The purpose of this study was to determine the effects of binaural vs. monaural music presentation on the reading comprehension of a child with a reading disorder

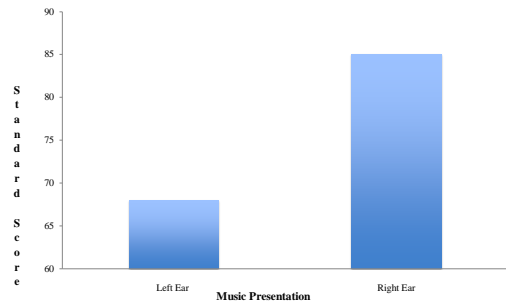
Methods

- Participant
 - One 9 year old female in the fourth grade identified with a reading disorder
- Experimental Procedure
 - Silent reading tasks were adapted from the Woodcock Reading Mastery Tests - Third Edition (WRMT-III)
- The participant wore headphones connected to an audiometer and was presented with a familiar tune during reading tasks
- Form A of the test was administered while music was presented to the right ear only.
- Form B of the test was administered while music was presented to the left ear only.

Results

- The participant obtained a higher standard score when music was presented in the right ear versus the left ear.
- Right ear music presentation revealed a standard score of 85 (85-115 average) and a percentile ranking of 16.
- Left ear music presentation revealed a standard score of 68 (<69 well below average) and a percentile ranking of 2.
- There was a difference of 17 between the standard scores.

Results



Discussion

- This study has demonstrated that children with reading comprehension deficits may benefit from music playing in the right ear while comprehending passages.
- Children with dyslexia have been found to have hypoactive left hemisphere activity in language processing centers.
- Therefore, insufficient activation occurs in the left hemisphere during reading activities when there should be more.
- Music played to the right ear may have engaged the left hemisphere language areas which were previously hypoactive, adjusting left hemisphere activation levels to more appropriate levels

Discussion

- Children with dyslexia present with overactive right hemispheres.
- The music played to the left ear further engaged the already hyperactive right hemisphere, causing an extreme over abundance of activation in the right hemisphere.
- Thus the child performed poorly on passage comprehension in the left ear versus the right possibly due to overstimulation.

Limitations

- Only one comprehension test was used for the study.
- Due to a limitation in time :
 - Results were not compared to a control of no music.
 - The monaural scores were not be compared to binaural music presentation comprehension scores.

Recommendations

- In a future study, two different tests with one form per side (left or right) of monaural listening should be used.
- Researchers should also assess whether comprehension changes based on the type of music played.
- Additionally, the results of reading comprehension binaurally should be compared to right ear only stimulus in another study.

References

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