

A Systematic Review of Music Intervention Studies for Remediating Reading Disorders in Children

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Background

- main deficits in people with reading disorders (Goswami, 2011; Hämäläinen, Salminen & Leppänen, 2013):
 - phonological cueing
 - phonological working memory
 - auditory attention
 - temporal processing
 - categorical perception
 - executive functions
- in previous intervention studies (Bhide et al., 2013; Flaugnacco et al., 2015; Habib et I., 2016)
 - <u>music</u> applied as intervention tool to improve underlying aspects of reading disorders (see above)

Previous Systematic reviews & Meta-analyses

Cochrane Review \rightarrow Cogo-Moreira et al. (2012)

• aim of review:

- investigation of effectiveness of music education on reading skills in children with dyslexia
- inclusion of Randomised Control Trials (RCTs)
- main conclusion:
 - no RCTs retrieved with focus on music education
 - further research is needed with use of RCTs including interdisciplinary collaborative research

Systematic Review → Rolka & Silverman (2015)

- aim of review:
 - identification of studies regarding music & dyslexia
- main conclusion:
 - music as remediation tool for children with dyslexia
 - o 'multisensory' → brain processes info which can transfer to multiple domains

Meta-Analysis \rightarrow Gordon et al. (2015)

- aim of analysis:
 - to investigate effectiveness of music trainings in literacy skills (children with dyslexia & T.D. children)
 - to synthesize results from previous interventions
- main conclusion:
 - o mixed results due to wide range of outcomes
 - total of training hours is important to literacy effects

Current systematic review

Our review question:

What types of music activities are most effective for remediating reading-related deficits in children with reading difficulties (or dyslexia)?

<u>Aims:</u>

- to create <u>specific categories</u> of past music interventions for children with reading disorders
- ✓ to examine the <u>efficacy</u> of such music activities for children with reading disorders
- ✓ to evaluate potential sources of bias
- ✓ how does <u>music compare to traditional interventions</u> for children with dyslexia?

Criteria for study selection

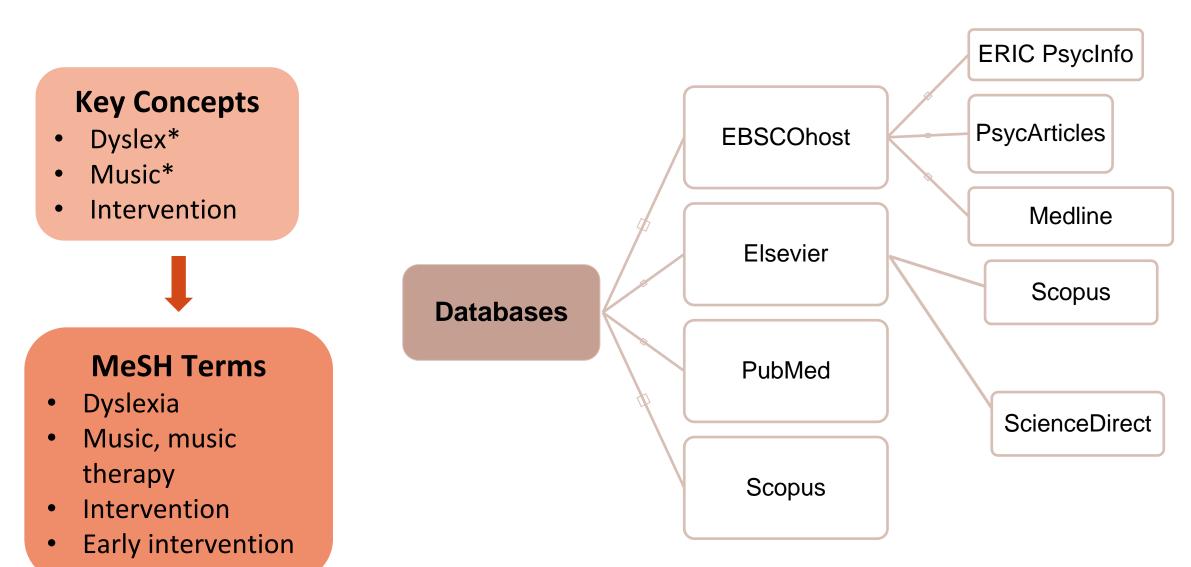
Inclusion Criteria

- Type of studies:
 - single-case studies, quasiexperimental studies & RCTs which use music interventions
 - studies with elementary/primary & early secondary school age children
- Publications:
 - only peer-reviewed
 - published in English & German
 - accessible in full text access

Exclusion Criteria

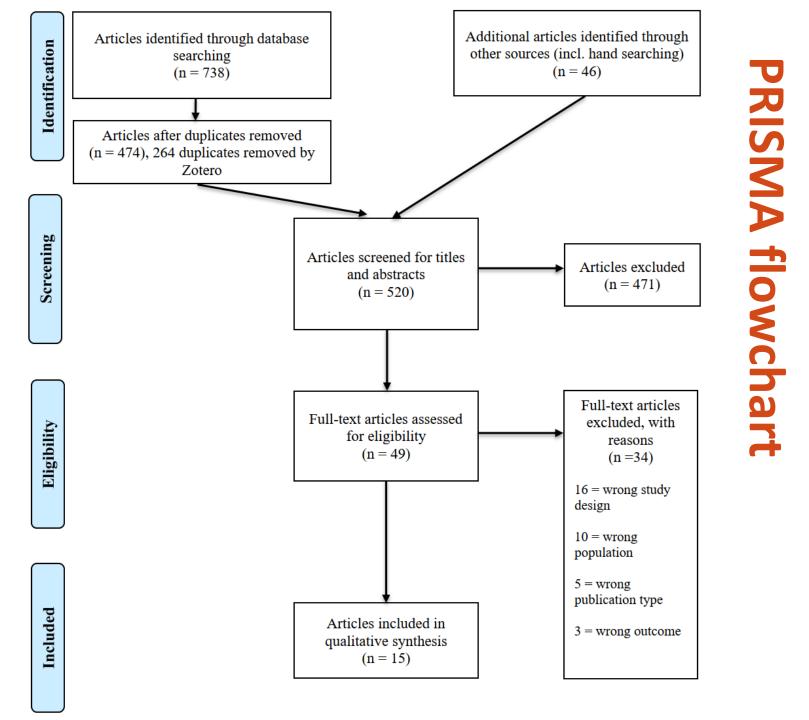
- Type of studies
 - reviews & meta-analyses, studies with mixed interventions
 - studies with no report of empirical data
 - studies with focus on children with low IQ or hearing loss
- Participants:
 - children with family risk for reading difficulties or dyslexia
 - pre-literacy children, adolescents & adults

Search Strategy

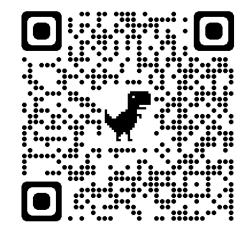


Screening Procedure

- 1. Zotero \rightarrow removing duplicates
- 2. Rayyan.ai \rightarrow article screening
 - a. Title & Abstract screening
 - articles were checked in groups of 2 (i.e., 4 reviewers)
 - blinded
 - when conflict \rightarrow group decision
 - b. Full text screening
 - articles were checked in groups of 2
 - c. Hand searching



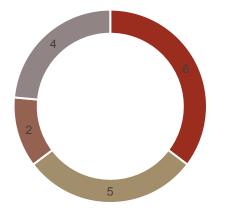
Prospero Protocol Registration (according to PRISMA 2015;2020)

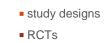


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What do intervention studies report in general?

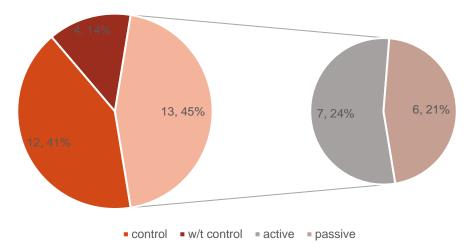
study designs



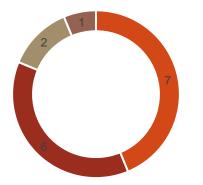


- Quasi experimental
- Single-case
- Anec. Reports





mode of intervention



means of intervention



in-presence telerehabilitation

What do intervention studies report in general?

- different language contexts are covered
 - British English (United Kingdom): 6 studies
 - Italian: 5 studies
 - French: 3 studies
 - Brazilian Portuguese: 1 study
 - Greek: 1 study
 - American English: 1 study

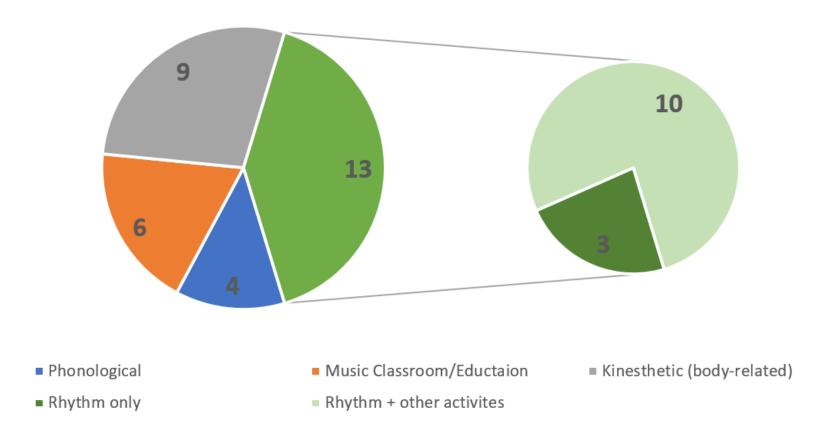


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- age range of the study interventions:
 - 6 14 years old

Which type of music interventions are applied?

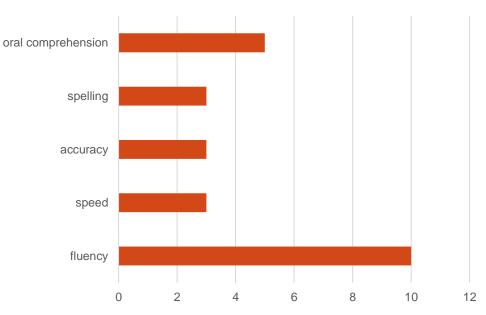
Music Activities used in Interventions (Nr. of Studies)



What outcomes are measured?

Transfer outcomes - A variety of outcomes are measured:

- reading performance
- phonological processing
 - phonological awareness \rightarrow 10 outcome measures
 - phonological working memory \rightarrow 1
- auditory perception \rightarrow 9 outcome measures
- rhythmic perception \rightarrow 4 measures
- other skills
 - executive functions \rightarrow 4
 - academic achievement \rightarrow 2
 - self-esteem \rightarrow 1



reading performance

Effectiveness & multimodality of interventions

- Level of effectiveness:
 - studies reported <u>mixed effects</u> of the applied music interventions

- Multimodality of interventions:
 - being different on many levels (i.e., age, mode, outcomes, training activity, duration)

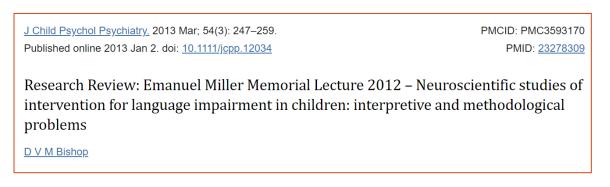


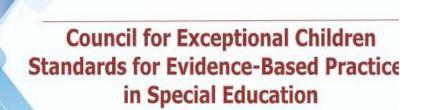
activities hard to categorise

Factors for Potential source of Bias: <u>How to conduct & report a clinical</u> <u>study</u>

- Poor quality of data:
 - poor description of interventions (i.e., unclear info on intervention design)
 - lack of data regarding intervention: no mention of use of control groups
 - not enough report on assessment outcomes







Quality Assessment of Selected Studies (Council for Exceptional Children, CEC)

"Quality indicators" :

- ✓ context & setting
- participants (e.g., participants' demographic data)
- ✓ intervention agent (e.g., teachers, psychologist)
- ✓ description of practice (e.g., nr of sessions)
- ✓ implementation fidelity
- ✓ internal validity (e.g., report of dropouts)
- ✓ outcome measures (e.g., reading performance, fluency)
- ✓ data analysis (e.g., analysis of effect sizes)





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