

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; Flaughnacco et al., 2015; Habib et al., 2016)
 - music applied as **intervention tool** to improve underlying aspects of reading disorders (see above)

Previous Systematic reviews & Meta-analyses

Cochrane Review → 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
 - 'multisensory' → brain processes info which can transfer to multiple domains

Meta-Analysis → 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:
 - 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)?

Aims:

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

Criteria for study selection

Inclusion Criteria

- **Type of studies:**
 - single-case studies, quasi-experimental 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

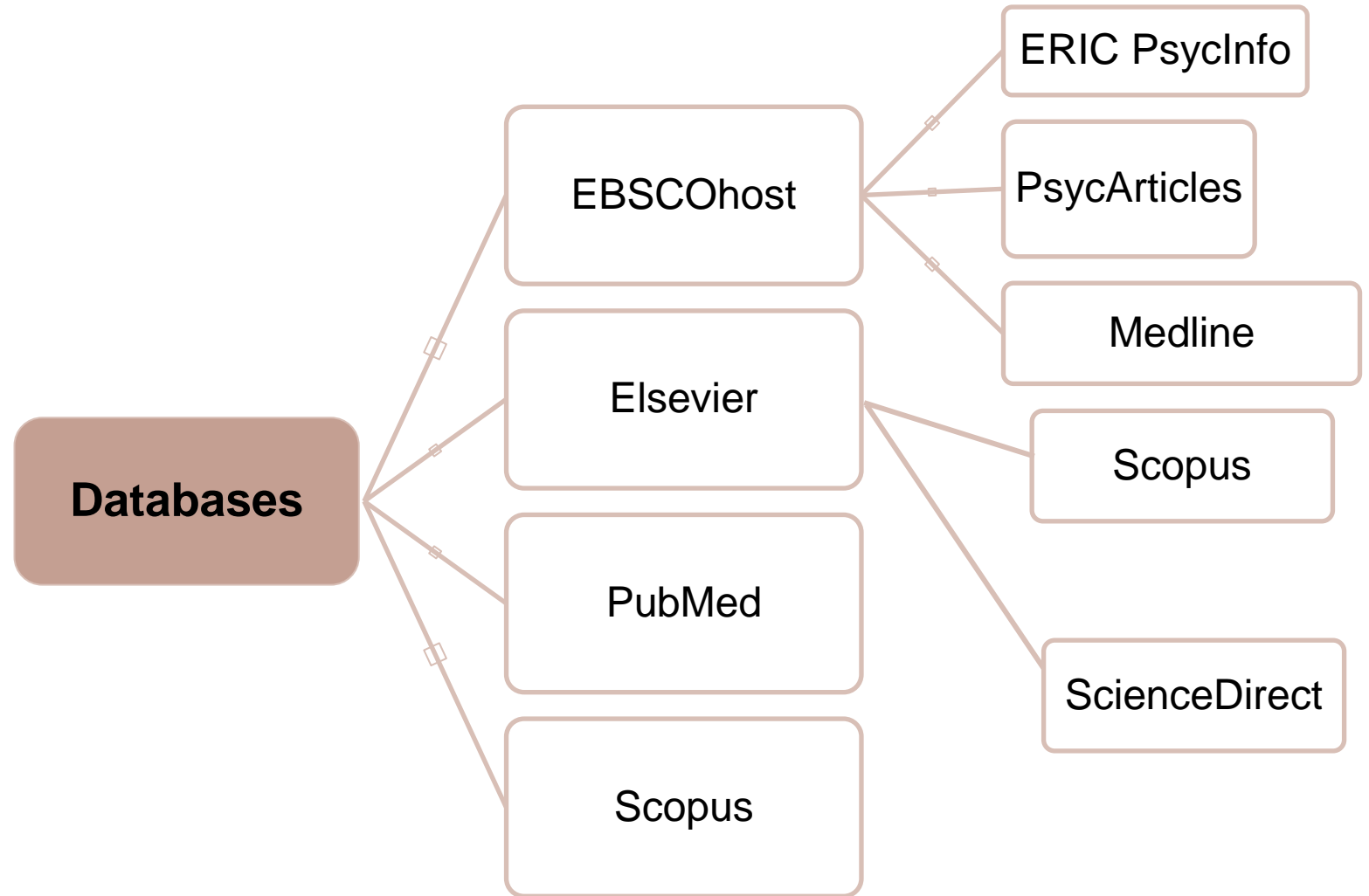
Key Concepts

- Dyslex*
- Music*
- Intervention



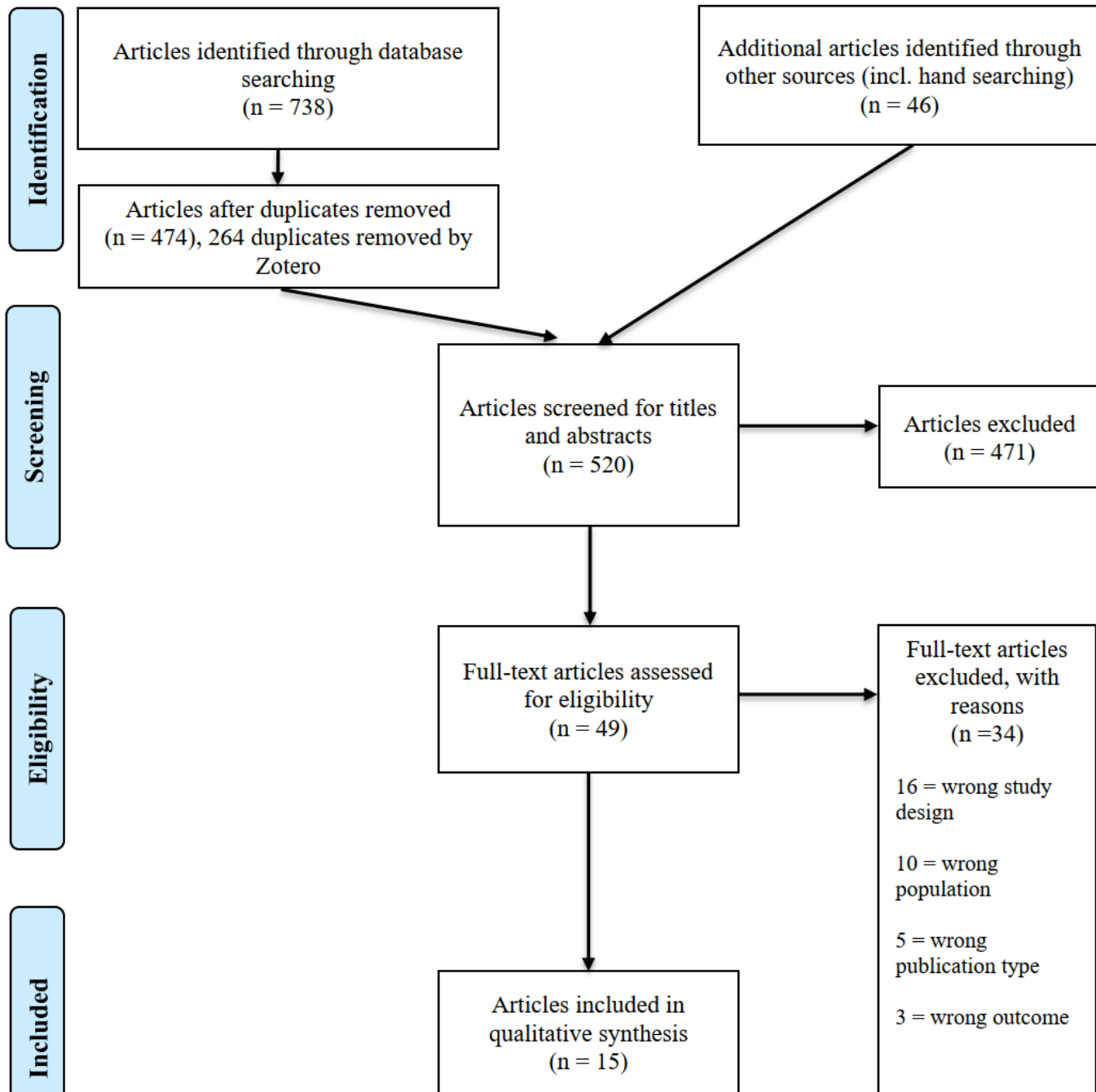
MeSH Terms

- Dyslexia
- Music, music therapy
- Intervention
- Early intervention



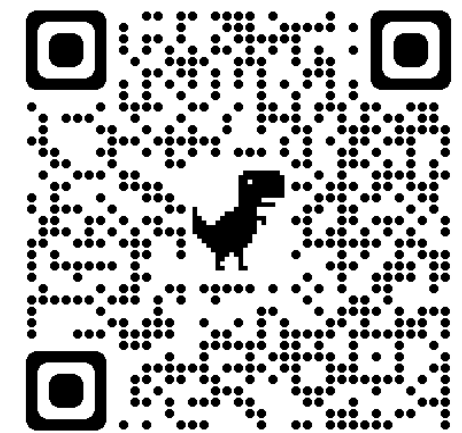
Screening Procedure

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



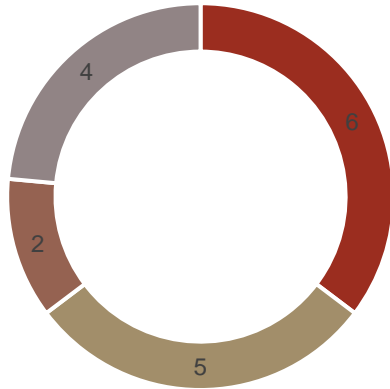
PRISMA flowchart

Prospero Protocol Registration (according to PRISMA 2015;2020)



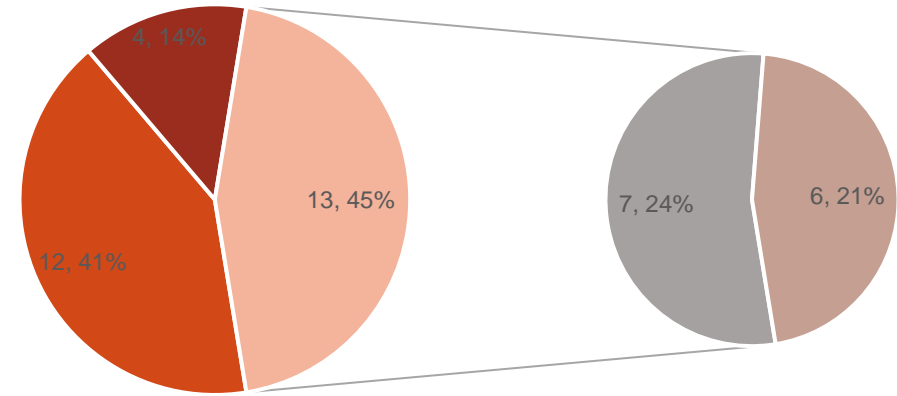
What do intervention studies report in general?

study designs



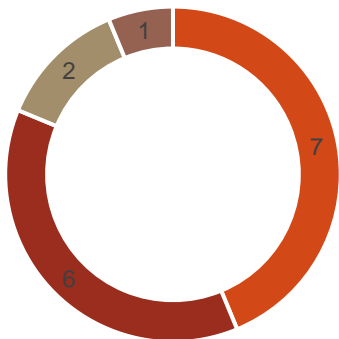
- study designs
- RCTs
- Quasi experimental
- Single-case
- Anec. Reports

use of control groups



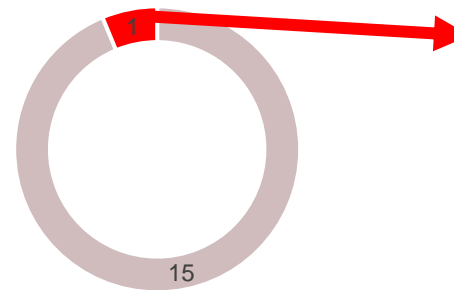
- control
- w/t control
- active
- passive

mode of intervention



- group
- individual
- classroom
- NA

means of intervention



Cancer et al., (2021) -> [pandemic](#)

- in-presence
- telerehabilitation

What do intervention studies report in general?

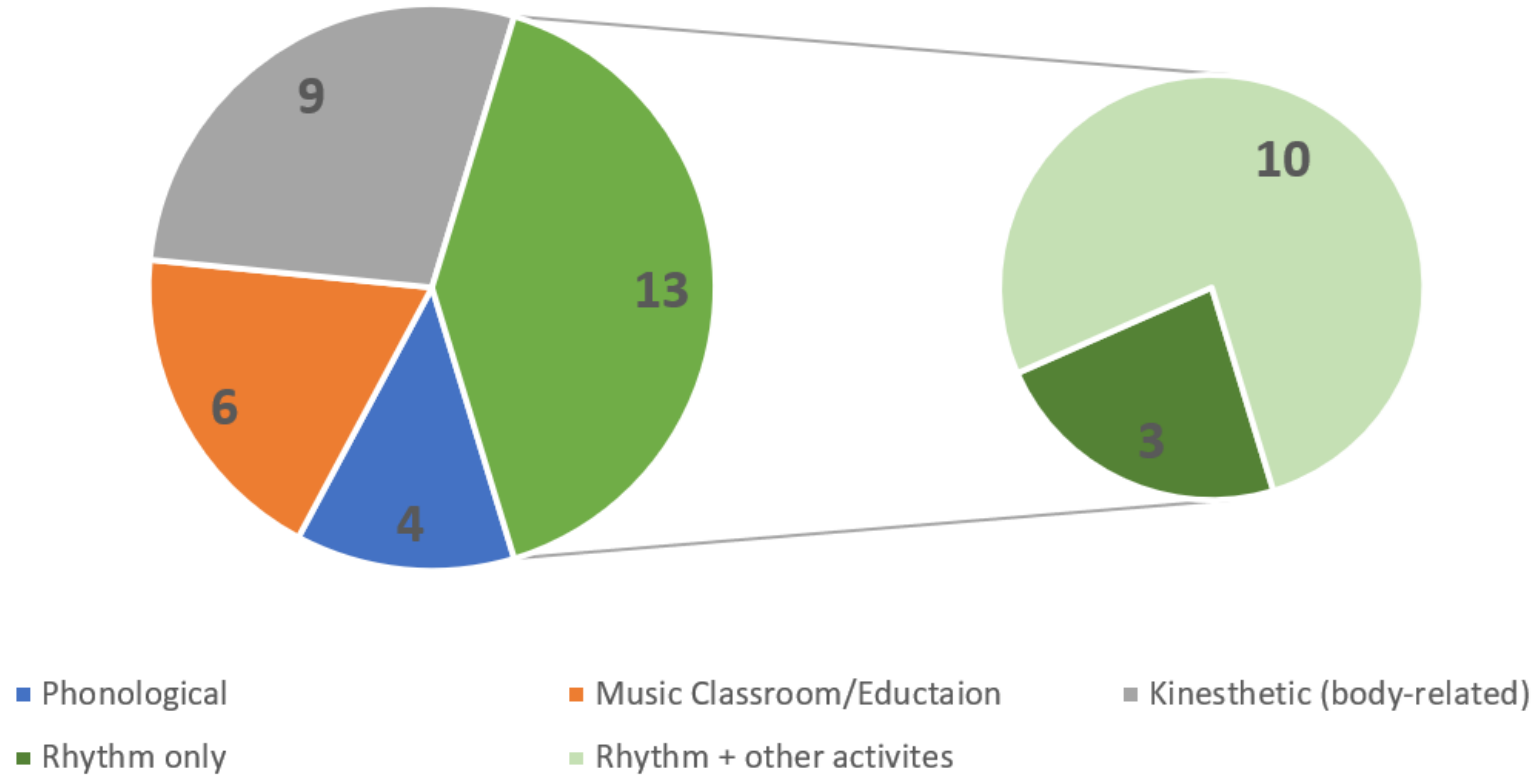
- different language contexts are covered
 - British English (United Kingdom): 6 studies
 - Italian: 5 studies
 - French: 3 studies
 - Brazilian Portuguese: 1 study
 - Greek: 1 study
 - American English: 1 study

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



Which type of music interventions are applied?

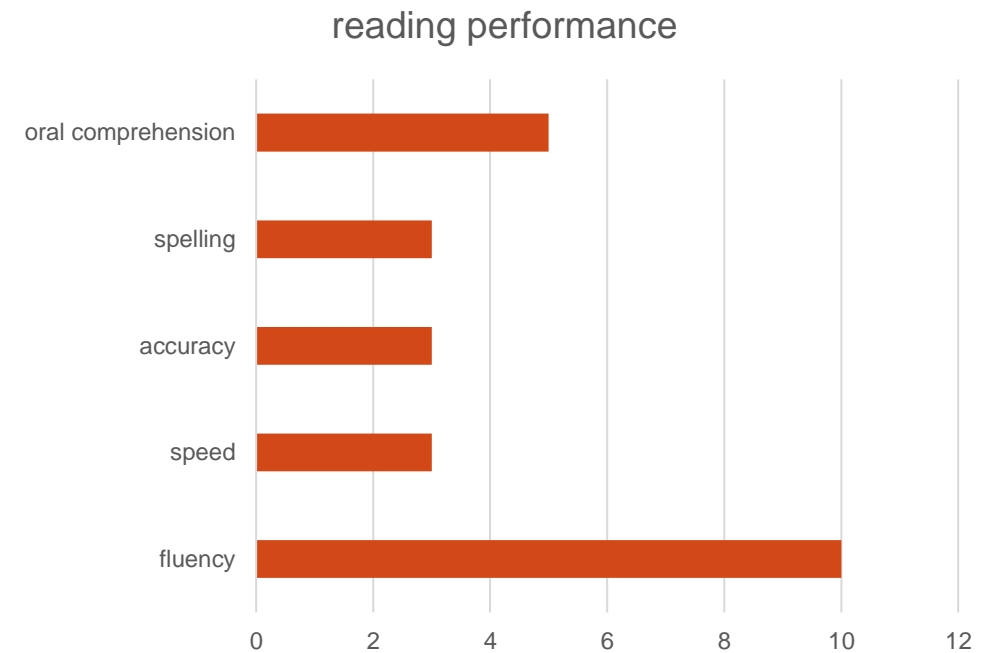
Music Activities used in Interventions (Nr. of Studies)



What outcomes are measured?

Transfer outcomes - A variety of outcomes are measured:

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



Effectiveness & multimodality of interventions

- Level of effectiveness:
 - studies reported mixed effects 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: How to conduct & report a clinical study

- 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



potential source of bias

[J Child Psychol Psychiatry](#). 2013 Mar; 54(3): 247–259.
Published online 2013 Jan 2. doi: [10.1111/jcpp.12034](https://doi.org/10.1111/jcpp.12034)

PMCID: PMC3593170
PMID: [23278309](https://pubmed.ncbi.nlm.nih.gov/23278309/)

Research Review: Emanuel Miller Memorial Lecture 2012 – Neuroscientific studies of intervention for language impairment in children: interpretive and methodological problems

[D V M Bishop](#)

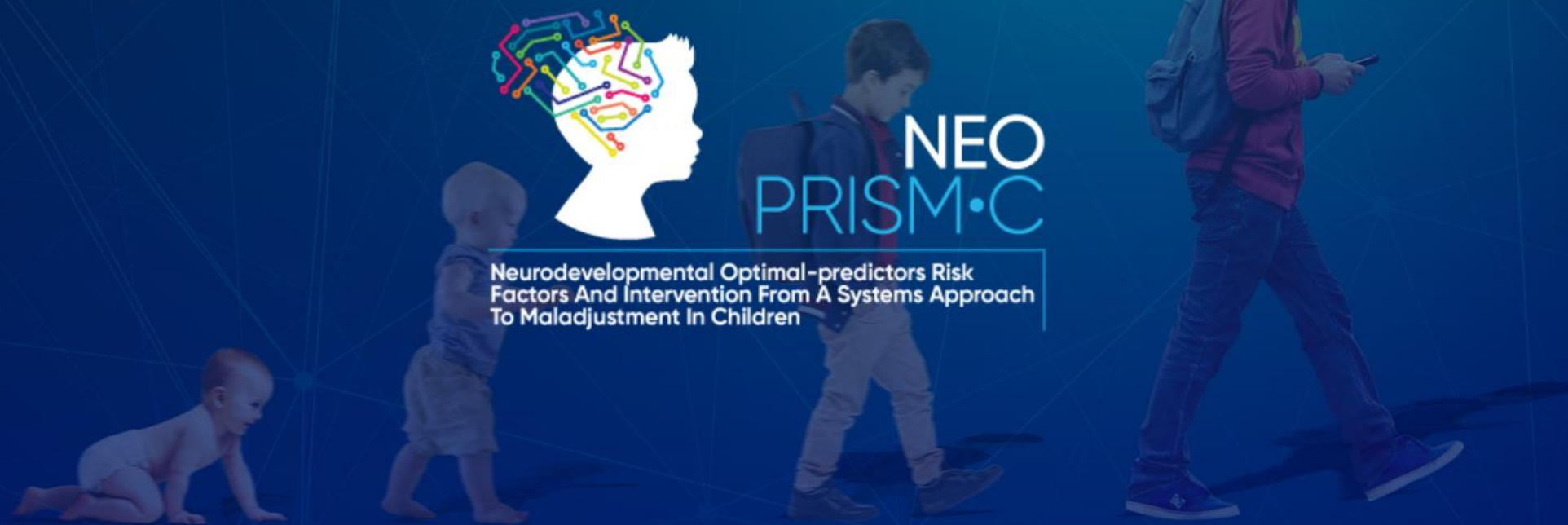


**Council for Exceptional Children
Standards for Evidence-Based Practice
in Special Education**

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)



Thank you!

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