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Predictive indices of reading and writing ability and difficulty: a systematic review

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INTRODUCTION

Reading and writing are hierarchically complex cognitive processes that require the integration of various systems. To achieve their full development, in the early stages of life the child must master certain predictive indices: a set of knowledge, skills, cognitive abilities that enable the child to learn and automate these processes (NELP, 2008).

Their identification and study appear to be fundamental to research and clinical practice, and can guide:
- the understanding of the generation and causal hypotheses about literacy development;
- the design of effective instruction and interventions for the teaching of reading and writing;
- the development of tools for early identification of children at risk of reading and writing difficulties.

The literature on the subject is constantly evolving: the most recent attempt at systematisation can be found within the Guideline on the Management of Specific Learning Disorders published in 2022 and included studies published up to 2018 (ISS, 2022).

AIMS

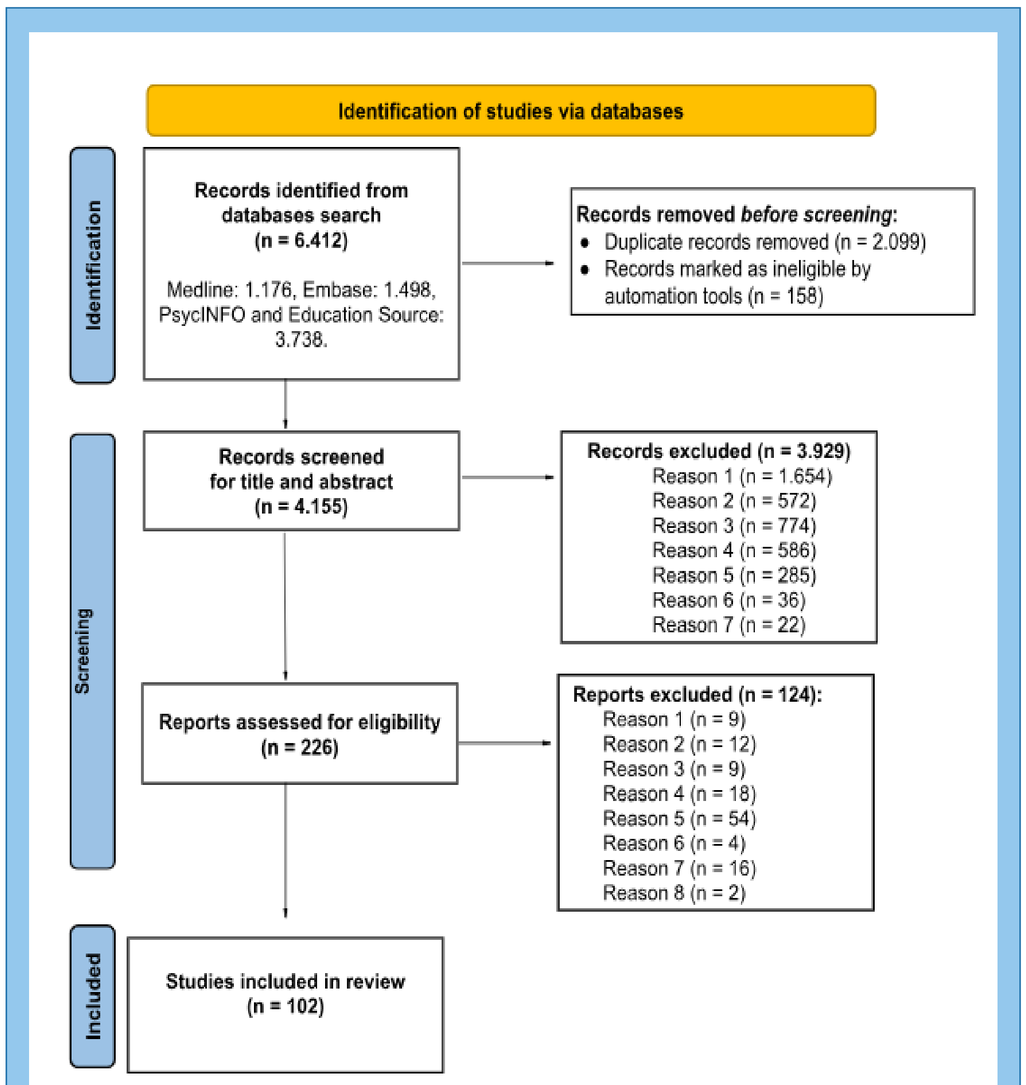
1. Identify which predictive indices have been most studied in relation to reading and writing, in which languages and populations.
2. Study the longitudinal relationship between predictive indices in infancy, preschool or kindergarten and:
   - reading and writing skills in school age with a specific focus on the difference between distal or proximal predictors.
   - the presence of a difficulty in reading and writing or a diagnosis of Specific Learning Disorder (SLD).

METHODOLOGY

1. Keywords definition
2. Definition of inclusion/exclusion criteria
3. Database search (May and August 2023)
4. Use of Rayyan software
5. Study selection process according to PRISMA methodology
6. 102 studies included

Inclusion Criteria

1. Monolingual children with typical development	4. Longitudinal design of the study
2. Assessment of at least one predictive index prior to formal literacy	5. Academic journal articles written in English language
3. Assessment of at least one outcome at school-age	6. Published from 2018 to August 2023



MAIN RESULTS

- ✓ High number of articles published on this topic over a 5-year period (2018-2023).
- ✓ Marked discrepancy between the number of studies investigating the relationship between predictive indices and reading (n=97) compared to the relationship between predictive indices and writing (n=18).
- ✓ 91 studies investigate proximal predictors in preschoolers or kindergartens children, only 11 articles attempt to identify distal predictors by carrying out an initial assessment in infancy (0 to 3 years).
- ✓ In most of the studies using languages with opaque orthography, children spoke English (i.e. for reading in 46/55 studies), while other widely spoken languages have been poorly studied (i.e. Spanish in 3/102 studies).
- ✓ For both school skills, the most studied indices are phonological awareness, followed by language skills, executive functions, rapid automatized naming and non-verbal cognitive skills.
- ✓ Other important predictive indices, such as motor skills or notational awareness, have received limited attention by scientific culture.
- ✓ The longitudinal relationship between predictive indices and the presence of a difficulty in reading and writing in school-age (20 studies) or a SLD's diagnosis (only 3 studies, all the children included also had a family risk for these disorders) has been scarcely analysed.

DISCUSSION AND FUTURE DIRECTIONS

- It is crucial to consider a multi-componential nature of predictive indices of reading and writing and to proceed with an early screening of them to elaborate ad hoc preventive interventions in case of early deficient skills.
- Future research should deepen the investigation on writing, conduct cross-cultural studies with a greater variety of languages and analyse more the role of predictive indices in explaining reading and writing difficulties or disorders.

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