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## Introduction

- Dyslexia is a developmental learning disorder that affects word recognition, spelling, and reading fluency.
- It affects an estimated 5-20% of the population and accounts for approximately 80% of Specific Learning Disorder (SLD) cases.
- The primary goal of this project is to identify patterns and predict outcomes related to dyslexia.
- This project uses a model-based meta-analytic approach, combining results from a variety of studies and fitting them into a statistical model.
- Studies are synthesized using Covidence, a systematic review software that allows full-text screening based on specific inclusion and exclusion criteria.
- Findings from the literature are used to generate a correlation matrix to examine relationships among cognitive risk factors for dyslexia .
- To date, over 80% of approximately 9,100 studies identified in the comprehensive search have been screened.
- Next steps include detailed review and data extraction to strengthen a high-quality dataset focused on cognitive predictors of dyslexia.
- Developing this matrix may allow for earlier prediction of dyslexia, shifting diagnosis from reactive to proactive.
- Ultimately, this research aims to bridge theoretical findings and clinical practice, informing evidence-based diagnosis and educational policy for individuals with lifelong learning challenges.

## Methods

- This project is a model-based meta-analysis conducted using Covidence.
- A comprehensive search string was applied, yielding 9,236 potential studies for review.
- Titles and abstracts were screened for relevance, with 4,601 studies advancing to full text review.
- Full-text articles were evaluated using structured inclusion and exclusion criteria based on language, population, target constructs, and study design.
- Target constructs include established risk factors for dyslexia (Wagner, 2021).
- Studies meeting criteria proceed to the data extraction phase.
- Extracted data on predictive cognitive measures are combined to generate a large correlation matrix of key dyslexia risk factors.
- The correlation matrix will be used to run a predictive model estimating effect sizes of major cognitive predictors of dyslexia and Specific Learning Disorder.

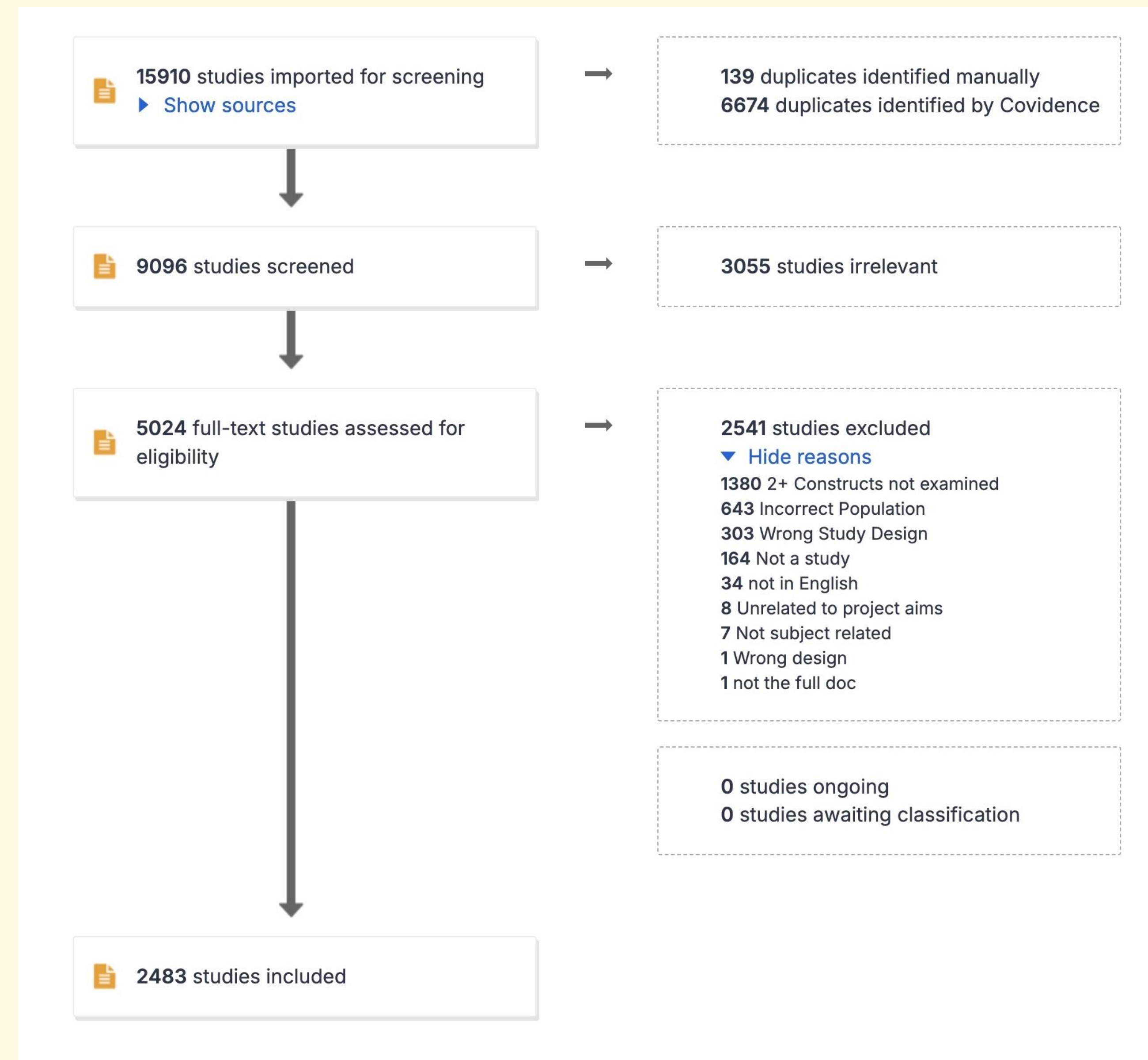


Figure 1 shows the distribution of the articles uploaded using the search string, shown in a PRISMA graph.

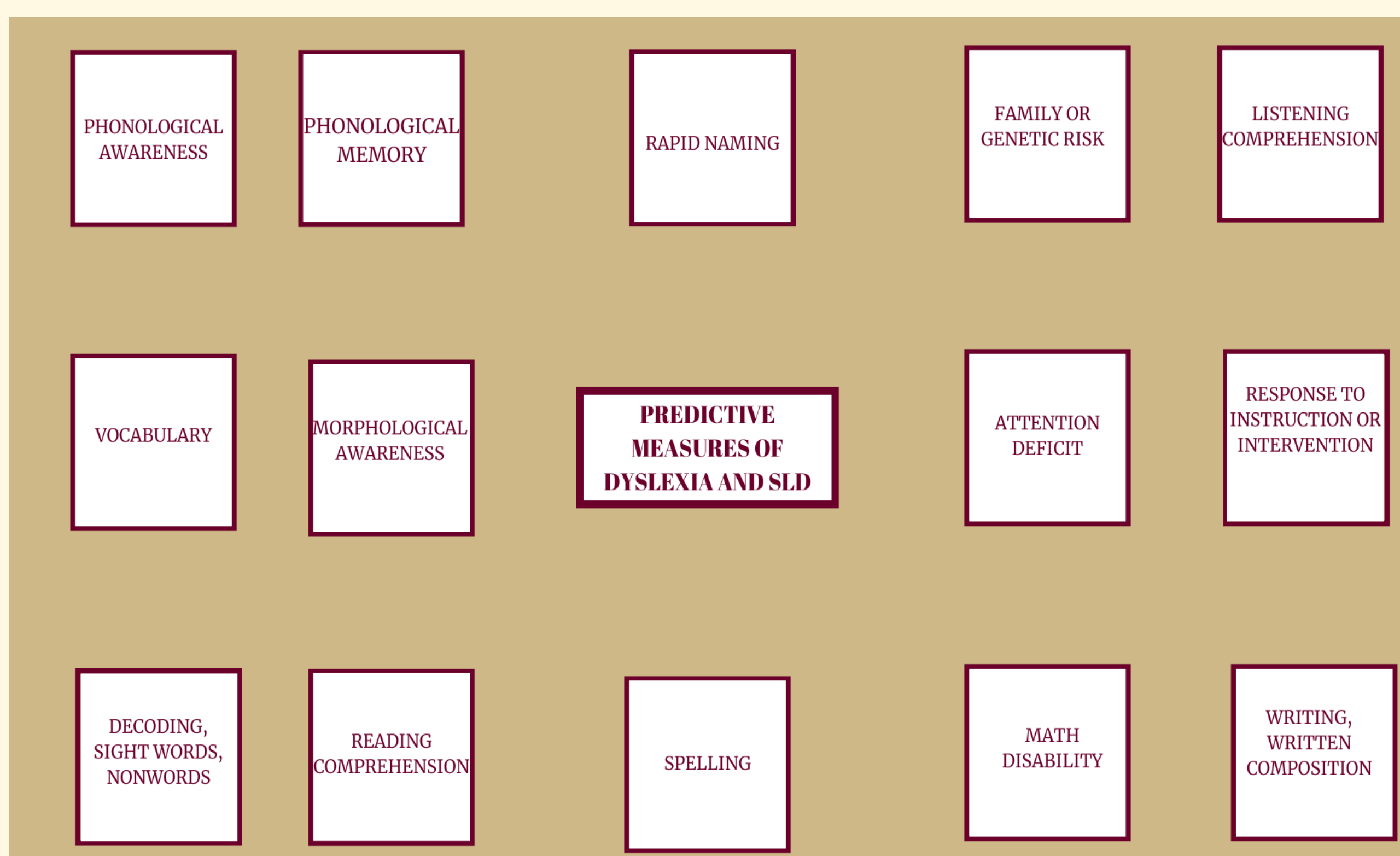


Figure 2 shows the many risk factors that this project aims to evaluate. These risk factors are adapted directly from the inclusion/exclusion criteria used to evaluate articles within this meta-analysis.

## Results

- Currently, results are limited because the project is still in the article screening phase.
- Over 80% of articles have been screened, with the most common reason for exclusion being that relevant constructs were not examined.
- Of those reviewed, 49.4% met inclusion criteria, while 50.6% were excluded due to insufficient data or lack of relevance.
- The meta-analysis is expected to identify correlations between multiple risk factors and the development of dyslexia
- Using these correlations, we expect to be able to create an in-depth dyslexia risk calculator.

## Discussion

- The goal of this study is to identify predictive measures of dyslexia to support earlier detection.
- Early intervention is considered one of the most effective ways to reduce the long-term impact of dyslexia.
- A model-based meta-analysis was used to combine findings from a large number of studies.
- The large combined sample size makes it easier to identify patterns that may not be as clear in smaller studies.
- This approach helps address concerns about replication by combining evidence across thousands of studies, which increases the reliability of the findings.
- One limitation of this study is that all articles screened were obtained from a single database, ProQuest, which may limit the range of research included.
- Future studies could search additional databases to include a wider range of research to further assess predictive factors of dyslexia.

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