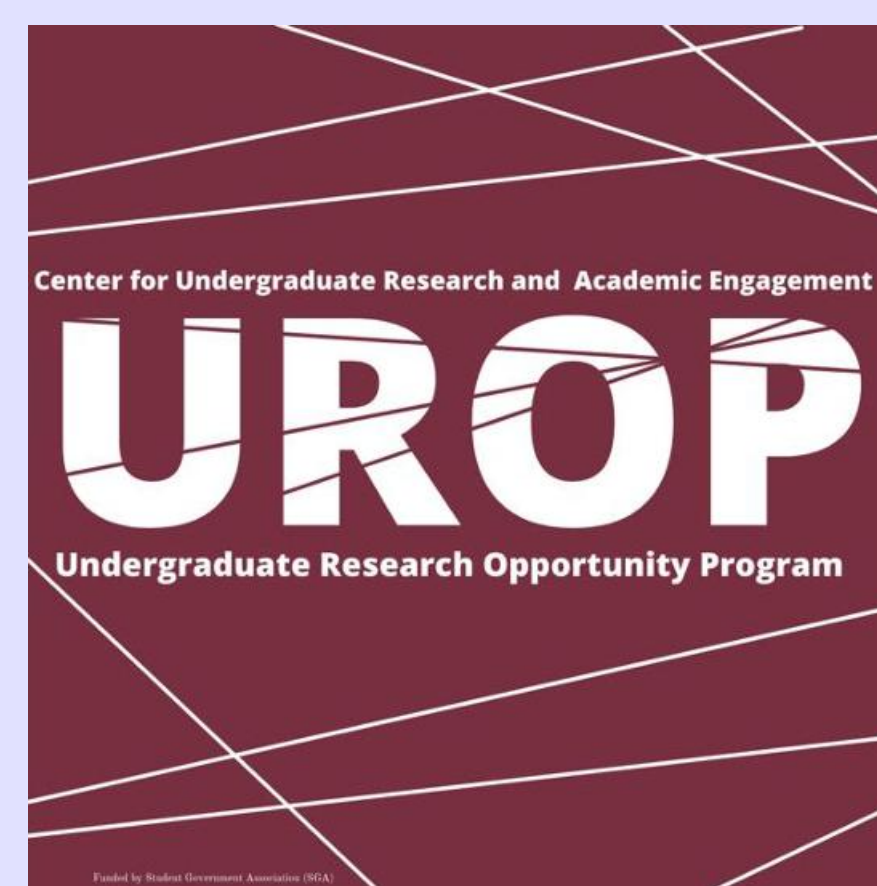


Meta-Analysis in Determining a Comprehensive Prediction Criteria for Developmental Dyslexia



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Introductory Background

- Dyslexia affects 1 in 10 people worldwide
- Formative disorder which hinders language comprehension, reading capabilities, and influences other cognitive factors
- Developmental dyslexia is neurobiological in origin

Four key factors characterizing its definition

1. Impacts specific neurological systems, tied towards phonological understanding and reading capacity, not the whole individual's cognitive abilities
2. Cannot be developed; external conditions influence the scale of symptomatic relief
3. Deteriorated phonological loop resulting in difficulties with word-reading and spelling
4. May cause secondary deficiency in related cognitive areas, such as vocabulary and comprehension

Problem: Lack of a worldwide agreed-upon criteria for diagnosis

- Pilot study completed by our lab prior to this current study
- Testing individuals for phonological processing abilities, family history, and response to effective instruction
- Fairly accurate means to determine whether someone has dyslexia
- Current study aims to analyze a database of published reports
- Create an accurate and more comprehensive criteria containing valid predictors across thousands of studies

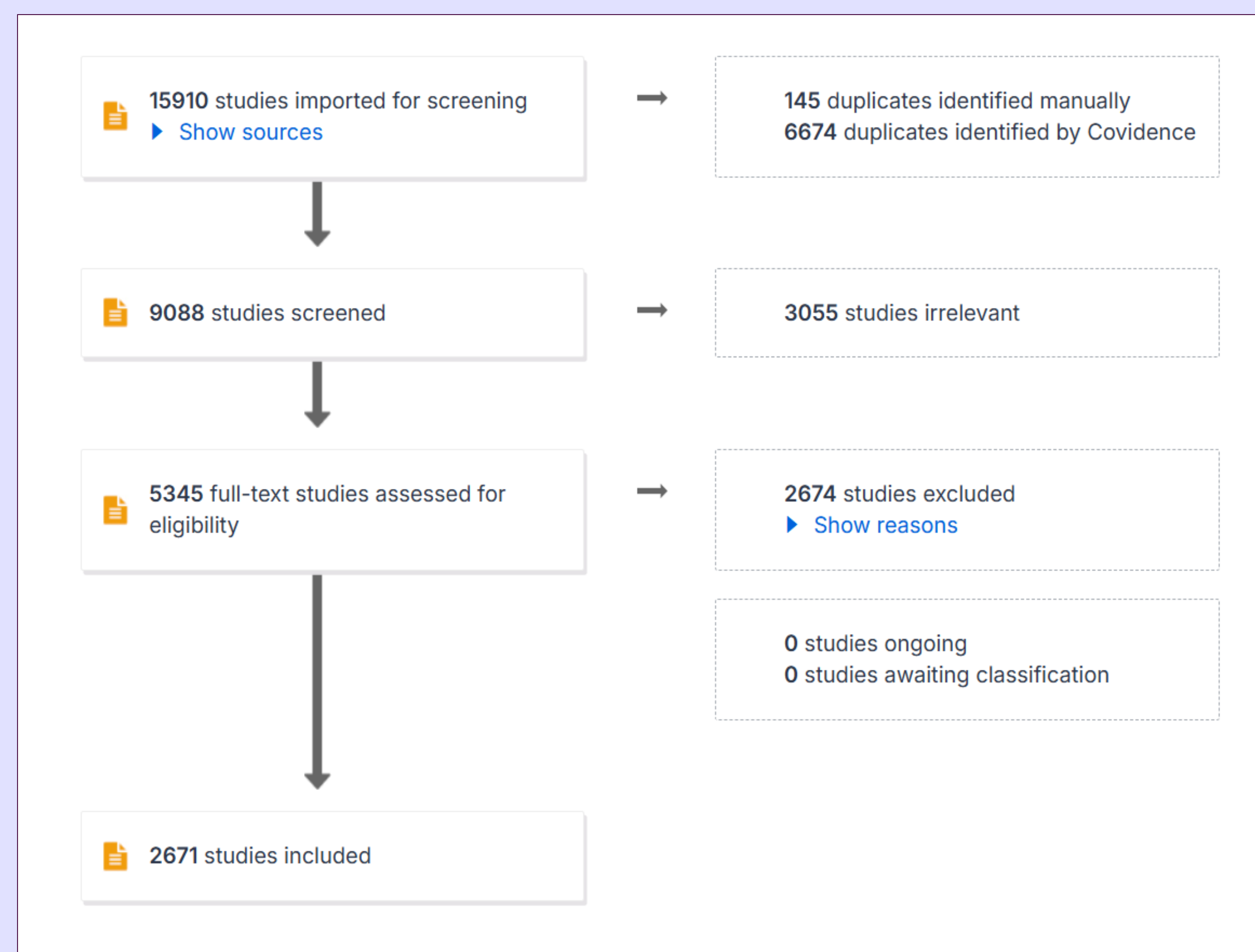


Figure A – PRISMA Chart: Phase 1, Article Screening

Results & Conclusion

- Study is ongoing; only pilot and preliminary findings are available.
- Pilot study identified **three key predictors** of effective dyslexia criteria:
 - **Family history** → 4x increased risk if a family member has dyslexia
 - **Phonological processing deficits** → linked to reading and word-recognition difficulties (rapid naming & phonological memory)
 - Difficulty following reading/writing instructions
- These predictors are expected to remain consistent in final criteria, as many studies examine at least one of these factors.
- **Limitation:** As a meta-analysis, findings reflect correlations, not causation.
- No experimental component means causal relationships cannot be established.
- Results may guide future experimental research and potential clinical application.

Discussion

As assumed our results will be indicative of the pilot study; however, results can only be inferred. This studies widespread implications will produce an ideal criteria to which clinicians and the scientific community can utilize effectively. Additionally, further later experiments may study the individual scale of each predicted diagnosing factor, such as how accurate one is compared to another.

Methods

- Main research mechanism utilized is a **meta-analysis**, which summarizes research findings across a database
- Calculates estimates of the effect effects and its heterogeneity
 - *High rate of heterogeneity* indicates inconsistent correlation matrices across studies
- The premise is to create a comprehensive criteria relating to thousands of studies covering known and studied dyslexia predictors
- Our *initial search string* consisted of 4,035 results, 3,372 journals, 8 books, and 655 dissertation
- The database used to screen articles is *Covidence*
 - Screening entails reading content and identifying if research provides useful evidence towards dyslexia prediction (via a separate criteria)
- Articles reviewed by 2 lab assistants
 - If accepted by both, forwarded to the next stage
 - If dispute occurs, a higher-ranked individual provides a tie-breaking vote
- After the first stage (which we are currently finishing), our study moves toward analyzing the articles for overarching trends in diagnosing dyslexia



Figure B – PRISMA Chart: Phase 2, Group Differences

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