In designing your research, it's crucial to address the limitations and gaps in previous studies to advance the field. Here are some areas where previous research may have fallen short and how your study can improve upon them:

1. Limited Longitudinal Data

- **Shortcoming:** Many studies on auditory processing and dyslexia risk have been cross-sectional, providing a snapshot at a single point in time. This approach limits the understanding of how early auditory processing abilities evolve and relate to later language and literacy outcomes.
- **Improvement:** Your study can address this by employing a longitudinal design, following participants from infancy through early childhood. This allows for the tracking of developmental trajectories and the assessment of how early auditory processing skills influence later language and reading abilities.

2. Small Sample Sizes

- **Shortcoming:** Previous studies often had small sample sizes, limiting the generalizability of their findings and the ability to detect subtle effects, especially in longitudinal designs where attrition is common.
- **Improvement:** By planning for a larger sample size and accounting for attrition, your study can improve statistical power and robustness, leading to more reliable and generalizable results.

3. Lack of Control for Confounding Variables

- **Shortcoming:** Some studies did not adequately control for confounding variables like socioeconomic status (SES), cognitive abilities, or language exposure, which can influence both auditory processing and language outcomes.
- **Improvement:** Your study can improve by carefully selecting and controlling for these variables, such as including measures of SES, non-verbal IQ, and language exposure in the analysis. This will allow you to more accurately isolate the effects of auditory processing on language development.

4. Narrow Focus on Specific Auditory Processing Abilities

- **Shortcoming:** Previous research often focused on a single aspect of auditory processing, such as rise time sensitivity, without considering how other aspects, like speech envelope tracking, might interact or contribute to language development.

- **Improvement:** By incorporating multiple dimensions of auditory processing (e.g., rise time sensitivity and speech envelope tracking), your study can provide a more comprehensive understanding of how these abilities collectively impact language and literacy outcomes.

5. Insufficient Examination of Moderating and Mediating Factors

- **Shortcoming:** Many studies did not explore how factors like phonological awareness, environmental influences, or early interventions might mediate or moderate the relationship between auditory processing and language outcomes.
- **Improvement:** Your study can improve by explicitly testing for mediation and moderation effects, which can reveal the mechanisms through which auditory processing impacts language development and how different factors might strengthen or weaken this relationship.

6. Limited Attention to Individual Differences

- **Shortcoming:** Some studies did not account for individual differences in development, leading to less nuanced findings that might overlook important variability within the population.
- **Improvement:** By using mixed-effects models and other statistical techniques that account for individual differences, your study can provide more detailed insights into how different children develop language and reading skills, potentially identifying subgroups that may benefit from specific interventions.

7. Focus on Monolingual Populations Only

- **Shortcoming:** While focusing on monolinguals controls for variability, it also limits the applicability of findings to diverse linguistic populations.
- **Improvement:** Consider including a small exploratory cohort of bilingual children to compare with the monolingual group. This could provide valuable insights into whether the findings generalize across different linguistic contexts or if bilingualism offers a protective effect against dyslexia.

8. Lack of Intervention Testing

- **Shortcoming:** Many studies identify risk factors but do not test interventions that could mitigate these risks.
- **Improvement:** Your study could include a component where early interventions are introduced based on initial auditory processing assessments, allowing you to test their effectiveness in improving language outcomes and reducing dyslexia risk.

9. Insufficient Exploration of Early Neural Markers

- **Shortcoming: Some research has underutilized neuroimaging techniques to explore early neural markers associated with dyslexia risk.**
- **Improvement: Incorporating EEG measures to assess neural responses to speech envelope tracking could provide valuable data on the neural underpinnings of language development and dyslexia, potentially leading to earlier and more precise identification of at-risk children.**

10. Limited Generalizability Due to Homogeneous Samples

- **Shortcoming: Studies often focus on homogeneous samples (e.g., middle-class, English-speaking families), limiting the generalizability of findings.**
- **Improvement: Consider recruiting a more diverse sample in terms of SES, ethnicity, and linguistic background (while still maintaining the primary focus on monolinguals). This would enhance the applicability of your findings to a broader population.**

Summary

Your study can improve upon previous research by addressing these limitations through a longitudinal design, larger sample size, comprehensive control of confounding variables, a multidimensional approach to auditory processing, and the inclusion of intervention testing. By doing so, your research can provide more nuanced and generalizable insights into the early markers of dyslexia and inform more effective early intervention strategies.

Template for a research outline

Introduction paragraph
General overview about paper, only including most important information
This should include: topic, group (e.g., young infants with risk ..)
Place it in the context of a broader research question it contributes to.
Context
Mention seminal background work on the topic
Problem statement ~ gap

Last sentence of the paragraph: Scope (The current study will investigate… name important keywords on your study content, e.g., infants at risk, segmentation, later language, prospective design, longitudinal)

Theoretical background
Motivation / Justification of your research question - why relevant, important..

- presentation of relevant concepts and theories
- current state of research - presentation of previous related studies (only include the ones that are relevant)
    - which methods, theories and models were used by other researchers – and did it work?
    - Results of their research, that are relevant for your own research
    - Try to connect previous studies with one another
- identification of a research gap, that makes your own research meaningful
- What differentiates your work from that of others? If previous studies did not find evidence of what you are investigating why might your approach work

- one topic - one paragraph

Current study
- RQs
- Hypotheses
- Approach
    - paradigm / give reasons why this procedure was chosen
    -
- Predictions

Methods
Participants

selection criteria (inclusion e.g., 9m-olds (9;00 - 9;30) , gender balanced & exclusion criteria)
recruitment details
number of participants
participant groups (if there are multiple groups.. experimental group and any control group)

If relevant any kind of diseases, impairments, that are relevant to the research

For later for full paper: specification of age (age mean in days / weeks + min - max age) gender, language, ethnicity, socioeconomic status or any other controlled variability.

Stimulus material / material

auditory
- type of the stimuli: words / nonwords / sentences / syllables …
- number of items (e.g., two familiar & two non familiar)
- spoken by .. or generated by …
- acoustic measurements, e.g. length, maybe in table
- stimulus examples
- for what the stimuli are controlled (the frequency, the length, the typicality, the AoA etc.)

visual (pictures on screen, colors, lamps in HPP / checkerboard

attention getters

Procedure

set-up / equipment / paradigm
- experimental procedure / paradigm (e.g. head turn etc.)
- equipment (speakers, ..)
- the environment during the procedure (in lab, describe room, caregiver's lap, headphones to mask caregiver..)
-

How stim presented
- number of trials
- in what way will the stimuli be used
- e.g how many trials were given
- randomization (pseudo-randomized, in which way (constraints)

between or within participant design

Coding
- manual online, offline or automated or combined
- reliability checks (inter-coder-reliability)

Data preprocessing and analysis plan
- (nice but not required: if not already in introduction: hypothesis and appropriate null hypothesis)
- Which outliers will be removed
- How scores are created or standardised across measures
  - e.g., LT: summed looking times per trial
- Which type of statistical analysis (e.g. t-test, linear regression, correlation)
- For linear regression:

- checking that underlying assumptions of the model are met
- contrast coding
- which variables are centred
- which predictors will be included
- which predictors will be controlled for
- random effects structure
- give R-code in the end

Results

- Summary of table,graph, chart
- Themes and categories
- Findings
- Statistical analysis (statistical test and significance level)
- Consistency/ reliability

- Results of statistical analysis
    - effect size
    - significance
- Table of descriptive statistics
    - mean
    - median
    - sd
    - range
- Table of correlations with significance score
- Graphs for visual representation of data, effect, etc.
- Explanation of details of outcomes without discussion

General discussion
- last paragraph: limitations