The Relationships between Achievement in Basic Reading and Language and Achievement in Reading Comprehension across the School Years

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Review of Literature

- General models \((R = D \times L)\)
- Processing models
- Prospective studies
- Clinical studies
Associations of specific linguistic skills with reading proficiency

- Phonological awareness
- Lexical knowledge
- Morphology, grammar, and syntax
- Receptive language
- Relative weakness (not just disorder) can interfere with literacy acquisition
How can this be studied in a standardized way?

**Previous studies**
- Various information gathering approaches
- Populations
- Age ranges

**Present study**
- Large sample of the general population
- Single test battery that includes measures of language and reading
Woodcock Johnson III
Tests of Achievement

Reading
- Basic Reading
  - Letter-Word Identification
  - Word Attack
- Reading Fluency
- Reading Comprehension
  - Passage Comprehension
  - Reading Vocabulary

Oral Language
- Oral Expression
  - Story Recall
  - Picture Vocabulary
- Listening Comprehension
  - Understanding Directions
  - Oral Comprehension

Sound Awareness
Research question #1

What are the relationships between achievement in Language, Sound Awareness, and Basic Reading and achievement in Reading Comprehension and Reading Fluency, as measured by the Woodcock-Johnson III Tests of Achievement, across the age range of 6 to 18 years?
Research question #2

What are the relationships between achievement in Language, Sound Awareness, and Basic Reading and achievement in Reading Comprehension and Reading Fluency, as measured by the Woodcock-Johnson III Tests of Achievement, across the grade range 1 through 12?
Participant characteristics

- Drawn from normative sample for WJ III, which was balanced for geography, race, sex and parental education level (>4,000 for these age/grade ranges)

- Inclusion in this study limited to
  - speakers of English as a first language, and
  - those who were administered the Reading Fluency and Reading Comprehension clusters
## Participant groups

<table>
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<th>Grade groups</th>
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Data analysis: Cluster level

- Basic Reading
- Reading Fluency
- Reading Comprehension
- Oral Expression
- Listening Comprehension
- Sound Awareness
Data analysis: Test level
Results for regression analyses

- All analyses yielded significant $R^2$ and F values ($p < .01$)
- $R^2$ range: 0.313 to 0.704
- All predictors were not significant in all analyses
Synthesis of analyses

- Constructed plots of standardized regression coefficients for predictors that were significant in more than one age or grade group for a criterion
- Smoothed plots with DWLS
- Examined the plots for trends
- Few differences in trends by age vs. grade
Overview of Results

1. Basic Reading cluster and LWI test were significant predictors of all criteria, and magnitude of these coefficients decreased across age and grade groups.

2. For Reading Fluency, this decrease was accompanied by an increase in coefficients for Listening Comprehension.

3. For Reading Comprehension, this decrease was accompanied by an increase in coefficients for Listening Comprehension, Oral Expression, and Sound Awareness.
Basic Reading cluster and Letter-Word Identification test
Results for Basic Reading cluster/LWI test

- BR cluster was a significant predictor of both Reading Comprehension and Reading Fluency across all groups, and magnitude of these coefficients decreased across age and grade groups.

- This was driven by LWI, which was also significant across groups and exhibited a decreasing trend.
Results for Basic Reading cluster/LWI test

- Decoding (input) continues to be a significant predictor of comprehension at age 17-18 and grade 10-12, although its relative importance decreases.
- Supports models of language that emphasize importance of input.
- Even in older children, decoding difficulties may be associated with comprehension difficulties.
Predictors of Reading Fluency cluster
Results for Reading Fluency cluster

- The decrease in coefficients for Basic Reading cluster was accompanied by an increase in coefficients for Listening Comprehension.

- LC coefficients surpassed BR in grade group 7-9 and approximated BR in age group 13-16.
Basic Reading and Listening Comprehension clusters as Predictors of Reading Fluency cluster by Grade

Grade Groups

BRc
LCc
Letter-Word Identification and Understanding Directions tests as Predictors of Reading Fluency test by Grade

Grade Groups

LWI
UD

0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

a
b
c
d
e
f

Grade Groups
Results for
Reading Fluency cluster

- RF is associated with Listening Comprehension cluster, in particular the Understanding Directions test, which is similar to RF in content and modality

- SA/OL not significant
  - Modality (no oral response for RF)
  - Vocabulary vs. morphosyntax (OL tests are more vocabulary focused/RF is broader)
Predictors of
Reading Comprehension cluster
Results for Reading Comprehension cluster

- The decrease in coefficients for Basic Reading cluster was accompanied by an increase in coefficients for Listening Comprehension, Oral Expression, and Sound Awareness.

- RC cluster consists of the tests Reading Vocabulary (RV) and Passage Comprehension (PC)
RC results:

Listening Comprehension cluster

- Consists of Oral Comprehension (OC) and Understanding Directions (UD) tests
- UD, which was an important predictor of RF, not associated with either RC test
- OC associated with both RC tests
RC results:

Listening Comprehension cluster

- Significant predictor with increasing trend, but no crossover or approximation of other predictors, as seen in RF
RC results:

Oral Expression cluster

- Consists of Story Recall (SR) and Picture Vocabulary (PV) tests
- SR and PV were associated with RV but not with PC
Predictors of Reading Vocabulary Test

Grade Groups

LWM
SR
RC results:

Oral Expression cluster

- OE tests were associated with RV but not PC
- OE tests are vocabulary focused
- Association between PV and RV was stable, but association between SR and RV increased, which may reflect the increasing importance of broader language knowledge for reading vocabulary.
RC results:

Sound Awareness test

- SA test was a significant predictor of RC in all but the 2 youngest age groups/earliest grade groups
- It was the strongest predictor of RC cluster in the oldest age group/grade group
Predictors of Reading Comprehension Cluster

Grade Groups

BR
SA
RC results:

Sound Awareness test

- Is this result in line with previous studies?
- SA test includes manipulations at the word level/compound words—lang knowledge may facilitate performance
- Advanced reading and language experience (e.g., derivational morphology) may improve phonological awareness as measured by this test
Interpretation of RC results

- LC, OE, and SA were all significant predictors with increasing importance across groups.

- For the tasks involved in RC tests, each of these areas become more important in the older groups, as the relative importance of BR decreased.
Summary and Conclusions
Summary: Basic Reading

Basic Reading cluster (driven by LWI test) is a significant predictor of both Reading Fluency and Reading Comprehension across groups, though the magnitude of standardized regression coefficients decreases across groups.
Summary: Reading Fluency

Reading Fluency, a timed test of reading comprehension with a nonverbal response, is increasingly associated with Listening Comprehension across groups but is not associated with Sound Awareness or Oral Expression.
Summary:

Reading Comprehension

RC cluster (Passage Comprehension and Reading Vocabulary tests, which require verbal responses) is increasingly associated with OE, LC, and SA across groups. The patterns of these associations were related to the structure of the tests, both with respect to content and test modality.
Take-home points

- BR was a significant predictor of comprehension across all age and grade groups, not just in the earlier groups.

- For RC, Sound Awareness was increasingly important across age/grade groups. This finding warrants further study.

- Across both measures of reading comprehension (RF and RC), Listening Comprehension was increasingly important across age/grade groups. This supports the view that broader linguistic comprehension is increasingly important for reading comprehension in more experienced readers.