

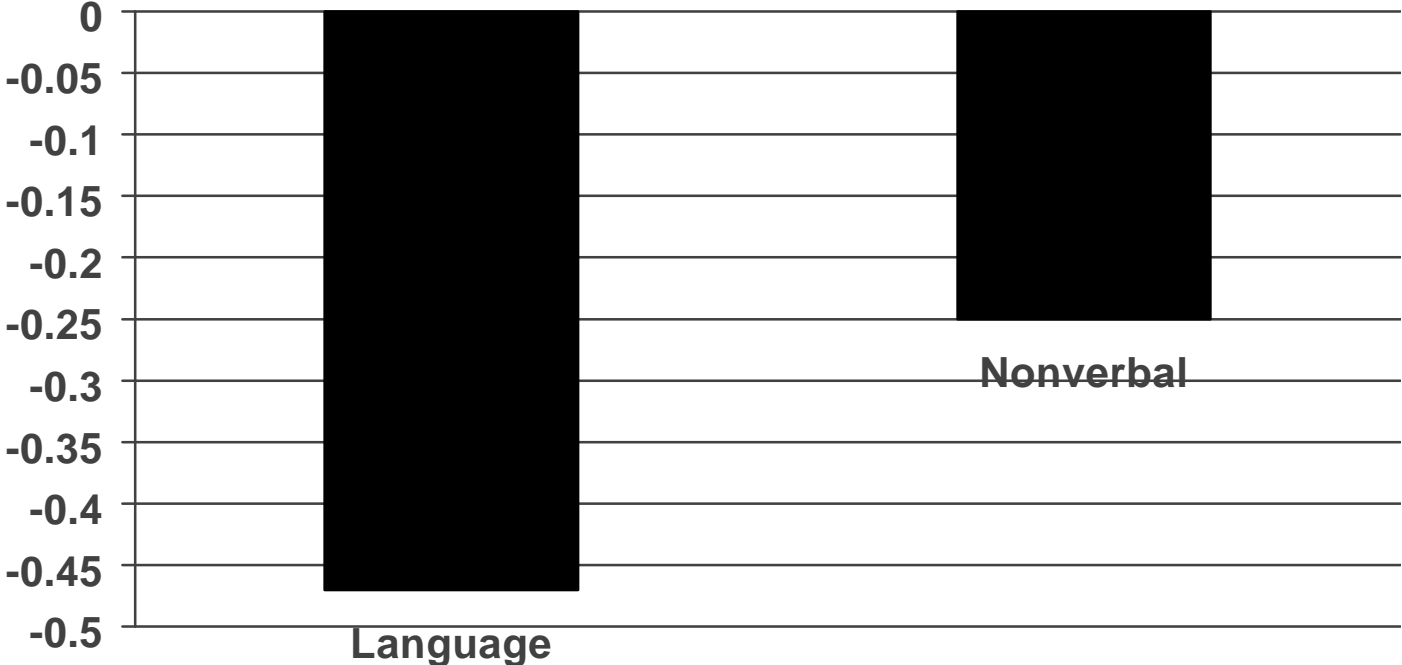
- The diagnosis of specific language impairment has often entailed the use of a criterion for a discrepancy between non-verbal IQ and language. The alternative approach has been to require a discrepancy between language status and chronological expectation.
- In recent years, several authors have questioned the validity of a diagnosis based upon a discrepancy between language and non-verbal IQ (Aram, Morris, & Hall, 1993; Bishop, 1994; Cole, Mills, & Kelly, 1994; Lahey, 1990).

- This study was conducted to compare two approaches to SLI diagnosis
 - An age-referencing approach that applied a cut-off to a spoken language score based on the chronological age norm.
 - An non-verbal IQ discrepancy approach that applied a cut-off to a the discrepancy values obtained by the regression of language onto non-verbal IQ.

- Which diagnostic approach provides the best predictive accuracy of:
 - Poor reading comprehension
 - Poor teacher rating of classroom speaking
 - Poor social-behavioral performancewhen both language status and outcome measures were obtained in second grade.

- Participants: 528 second graders, 222 females and 306 males. All children's performance IQ was above or equal to 70. The age range was from 7:01 to 8:11 (Mean 8.0 years, SD 0.39).
- This group of children has been followed since kindergarten. Within this group was a disproportionate number of children with poor language development (Figure 1 shows that these children scored lower than population average on both language and nonverbal ability).

Figure 1. Language and nonverbal ability for the study sample (N=528)



Measures:

1. Language Measures (The product of the measures is a composite language score)

| | | |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------|
| PPVT-R (Dunn & Dunn, 1981) | CREVT-Expressive Subtest (Wallace & Hammill, 1994) | Vocabulary Level |
| CELF-3: Sentence Structure and Concepts and Directions subtests (Semel, Wiig, & Secord, 1995) | CELF-3: Word Structure and Recalling Sentences subtests | Sentence (Grammar) Level |
| CELF-3: Listening to Paragraphs | Story Generation | Narrative Level |

Receptive Modality Expressive Modality

2. Nonverbal Intelligence Measures

■ WISC-III

- Picture Completion
- Picture Arrangement
- Block Design
- Object Assembly
- Coding

■ The product of these measures is a nonverbal ability score

3. Reading Comprehension Measures

- Passage Comprehension subtest of Woodcock Reading Mastery Tests-R (Woodcock, 1987)
- Gray Oral Reading Tests-3 (Wiederholt & Bryant, 1992)
- Reading Comprehension in Diagnostic Achievement Battery-2 (Newcomer, 1990)
- The product of these measures formed a reading comprehension composite z-score. A child with this z-score lower than -1 was diagnosed as reading disabled.

4. Classroom speaking

- The classroom teachers rated each child's speaking performance on a 5- point scale with high scores representing good performance. A child with a score lower than or equal to 2 (i.e., somewhat below average) was considered having a speaking problem in the classroom.

5. Social-emotional behavior

- A Child Behavior Checklist (Achenbach, 1991) was filled out by the parent for each child and a total problem behavior T-score was obtained following the standard procedures in the checklist manual. A child with a score ≥ 60 was diagnosed as having behavioral problems.

- Weighted regression: A weighted regression was performed (SAS Institute Inc., 1990). The weights were determined by the child's gender and kindergarten screening and diagnostic background. By using this procedure, the obtained regression function was representative of the general population.
- PIQ-regression discrepancy = Obtained language composite score - PIQ-predicted score.

- Two different approaches to SLI diagnosis using different metrics
 - Age-referencing approach: language composite score
 - Cognition-referencing approach: PIQ-regression discrepancy
- Which of the two metrics had better sensitivity and specificity when predicting academic and real life function?
- As cut-off points change, there is a trade-off between sensitivity and specificity. We compared the two metrics along all possible cut-offs using ROC techniques (Vida, 1995)

- The ROC curve indicates how much sensitivity you would lose when you change the cut-off point to get better specificity (i.e., using a more stringent criterion and getting fewer normals misdiagnosed as disordered), or vice versa. A perfect metric would have a perfect sensitivity and perfect specificity and the area under the curve would be 1. Thus, the area under the curve (AUC) is a statistic that indicates how desirable the metric is for predicting certain disorders.
- For each gold standard (reading, speaking, or behavior), two curves were created: one for the language composite and the other for the regression discrepancy. The area under the two curves was compared.

- A comparison between language composite score and PIQ-regression discrepancy score in predicting reading comprehension status:
 - As shown in Figure 2, AUC for language composite is 0.82, while for discrepancy is 0.76.
 - Chi-Square=21.5, df=1, p=.000
 - The language composite score is significantly better than the discrepancy (e.g., when specificity was .74, the sensitivity for language score was .74 too, while the sensitivity for PIQ discrepancy score was .63).

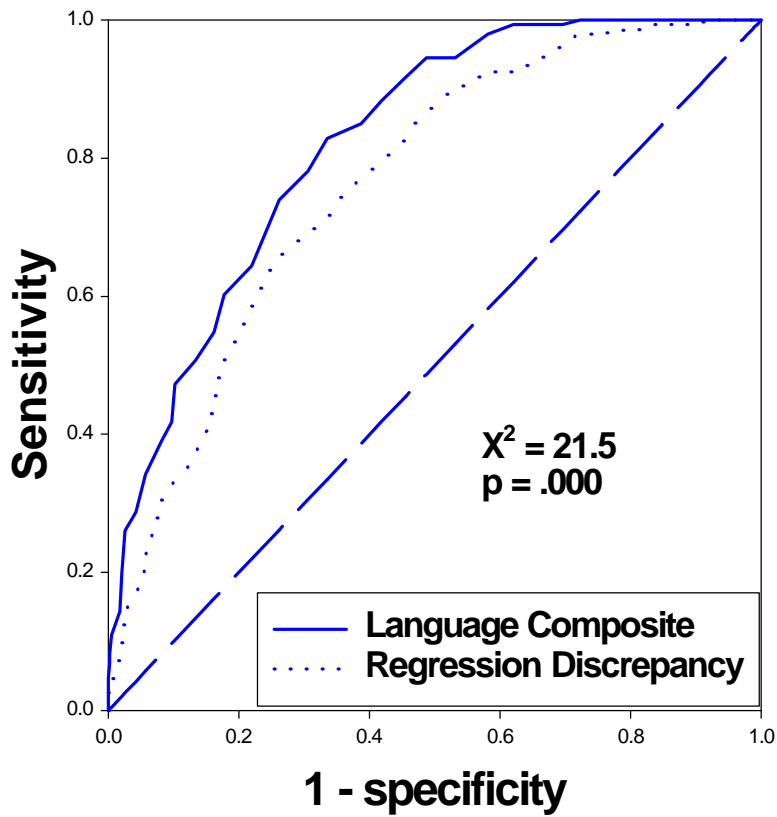


Figure 2. Predicting reading comprehension status

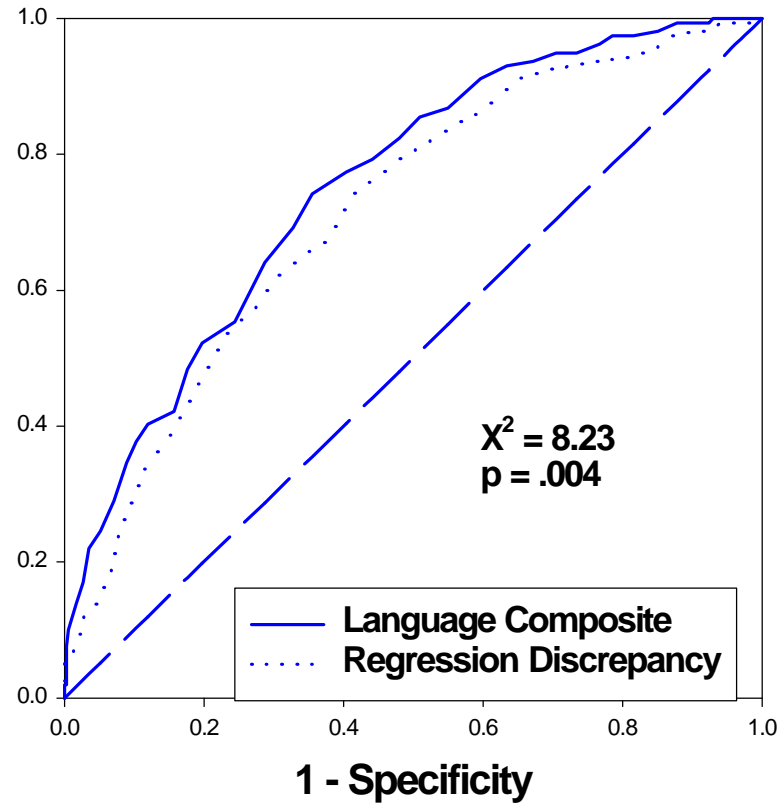


Figure 3. Predicting classroom speaking status

- Predicting classroom speaking status:
 - As shown in Figure 3, AUC for language composite is 0.75, while for discrepancy is 0.71.
 - Chi-Square=8.23, df=1, p=.004
 - The language composite score is significantly better than the discrepancy.

- Predicting behavior problem:
 - As shown in Figure 4, AUC for language composite is 0.61, while for discrepancy is 0.58.
 - Chi-Square=6.42, df=1, p=.011
 - The language composite score is significantly better than the discrepancy.

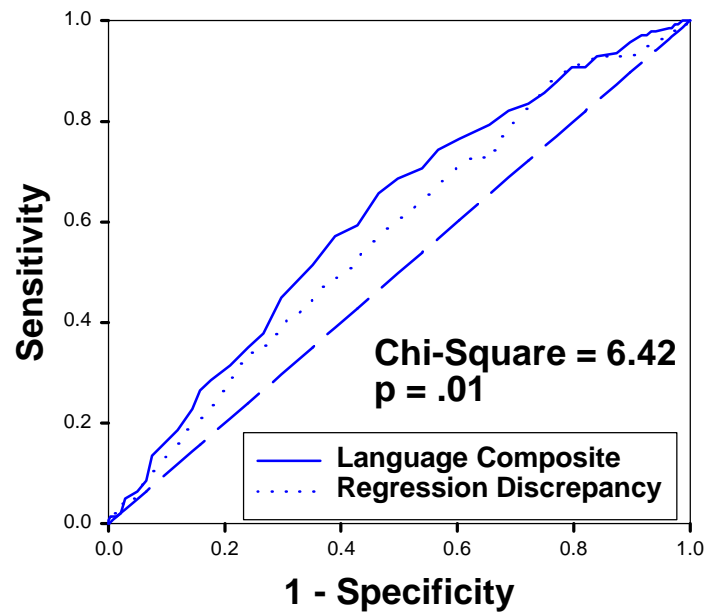


Figure 4. Predicting behavior problem.

- Language composite is better than regression discrepancy predicting all academic and real life functions addressed in this study. Therefore, the age-referencing approach serves better than the cognition-referencing approach for the purpose of predicting academic and real life functions.