Maximizing Literacy Outcomes for Students with Intellectual Disabilities: Research Study Findings from a Longitudinal Intervention Study

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Overview of Project Maximize: Project Staff

Principal Investigator

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Research Teachers

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Research Assistants

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Supported by IES Grant
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Overview of Project Maximize:

- Determine if a ***comprehensive***, phonics-based, direct instruction ***reading program*** would be effective in teaching early reading and language skills to ***students with IQs ranging from 40-79***
- Longitudinal – 4 years (05-06 through 08-09)
- Random assignment to intervention or contrast group
  - Within school
  - Within IQ range (40-54; 55-69; 70-79)
- Students in Grades 1-4 when they began the study

Participants

141 students participated at least one year	Treatment	Contrast
Borderline IQ* (70-79) *WASI or school testing	*n* = 35	*n* = 35
Mild IQ (55-69)	*n* = 21	*n* = 16
Moderate IQ (40-54)	*n* = 20	*n* = 14
TOTAL	*n* = 76	*n* = 65

Literature Review: Reading and Intellectual Disabilities (ID)

- Minimal amount of research
- Focused on mild ID, not moderate ID
- Focused on isolated subskills
  - Even students with moderate to severe levels of ID can learn to automatically recognize a fairly large number of words (sight words)
  - Phonics research is promising

Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Conners, Rosenquist, Sligh, Atwell, & Kiser, 2006

Literature Review: Reading and Intellectual Disabilities (ID)

- To our knowledge, no longitudinal randomized control trial research has been conducted to determine whether students with ID can learn to read by fully processing the print and meaning of connected text, as is consistent with current theories of reading development

Manuscripts

- (year 2) Allor, J.H., Mathes, P.G., Roberts J.K., Jones, F.G., & Champlin, T. (2010). Teaching students with moderate intellectual disabilities to read: An experimental examination of a comprehensive reading intervention. *Education and Training in Autism and Developmental Disabilities, 45,* 3-22*.*
- (year 3) Allor, J.H., Mathes, P.G., Roberts, J.K., Cheatham, J., & Champlin, T. (in press). Comprehensive reading instruction for students with intellectual disabilities: Findings from the first three years of a longitudinal study. *Psychology in the Schools.*

Research Questions:

1. Is a comprehensive, structured reading intervention that has been proven to be effective with struggling readers (including students with learning disabilities) also effective for students with IQs between 40 and 79 (including students with intellectual disabilities)?
2. What is the influence of IQ on rate of student response to a comprehensive, structured reading curriculum?

Participants by IQ Range

141 students participated at least one year	Treatment	Contrast
Borderline IQ* (70-79) *WASI or school testing	*n* = 35	*n* = 35
Mild IQ (55-69)	*n* = 21	*n* = 16
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TOTAL	*n* = 76	*n* = 65

Participants by Years of Participation

141 students participated at least one year	Treatment	Contrast
1 Year	*n* = 8	*n* = 7
2 Years	*n* = 12	*n* = 11
3 Years	*n* = 23	*n* = 21
4 Years	*n* = 33	*n* = 26
TOTAL	*n* = 76	*n* = 65

Schools

- From 05-08, students were in 14 elementary schools
- During 08-09, students were in 14 elementary schools and 9 middle schools

Intervention: Intensity

- Daily Instructional Sessions
- Implemented by research teachers
- 40-50 minutes
- Groups of 1-4 students
- Students participated 1-4 academic years

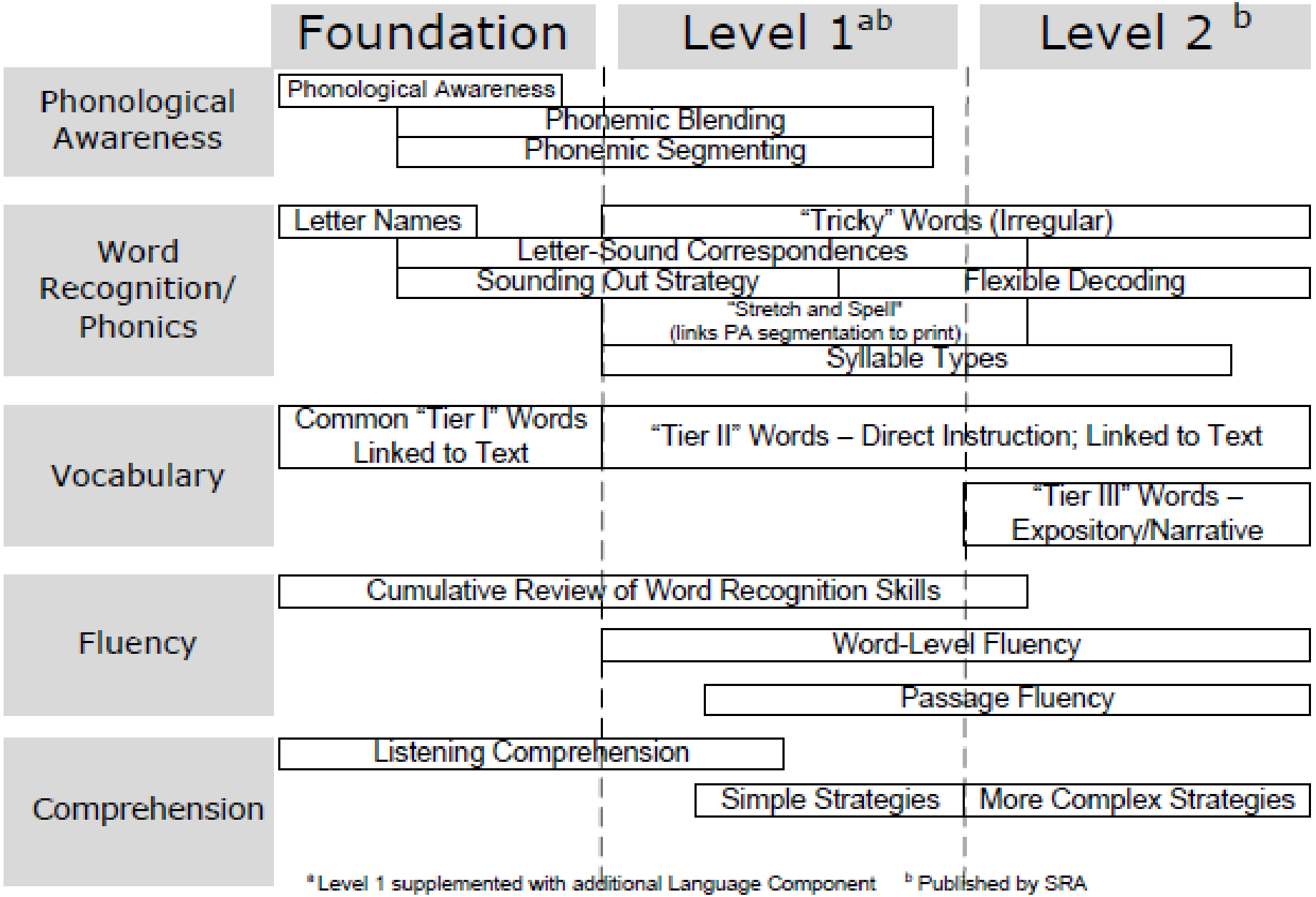
Intervention: Components

- Early Interventions in Reading (EIR)
  - Explicit, systematic and comprehensive
  - Foundation, Level 1*, Level 2*
  - *published by SRA/McGraw-Hill
- Supplemental language instruction
- Supplemental home-school connection materials to increase intensity

Curriculum: Critical Features

- Explicit and Systematic
  - Explicit strategies
  - Cumulative review
  - Careful sequencing
- Phonics-based
- Fast-paced
- Immediate Feedback
- Teaching to Mastery
- Increased Opportunities to Respond

Overview of Instructional Strands Content



[a] Level 1 supplemented with additional Language Component [b] Published by SRA

Contrast Group

- “business as usual”
- Students in Borderline (IQ 70-80) Range
  - General education
  - Open Court in first 2 years; Scott Foresman in last 2 years
- Mild/Moderate (IQ 40-69)
  - Approximately half of the students in the contrast group received instruction using a structured curriculum (Open Court, Scott Foresman, Corrective Reading)
  - Other students participated in a variety of literacy experiences (writing names, letters, listening, etc.)
  - Many participated in Edmark

Measures

Reading Skill	Measure (*N* = 141)
Phonemic Awareness	CTOPP Blending Words
	CTOPP Blending Nonwords
	CTOPP Segmenting Words
	DIBELS Phoneme Segmentation Fluency
Language	Expressive Vocabulary Test
	Peabody Picture Vocabulary Test
	WIAT Listening Comprehension (n=95; post only)
Phonemic Decoding	DIBELS Nonsense Word Fluency
	TOWRE Phonemic Decoding Efficiency
	WLPB Word Attack
Word Identification	DIBELS Oral Reading Fluency
	TOWRE Sight Word Efficiency
	WLPB Letter-Word Identification
Comprehension	WIAT Passage Comprehension (n=95; post only)

Research Questions:

1. Is a comprehensive, structured reading intervention that has been proven to be effective with struggling readers (including students with learning disabilities) also effective for students with IQs between 40 and 79 (including students with intellectual disabilities)?
2. What is the influence of IQ on rate of student response to a comprehensive, structured reading curriculum?

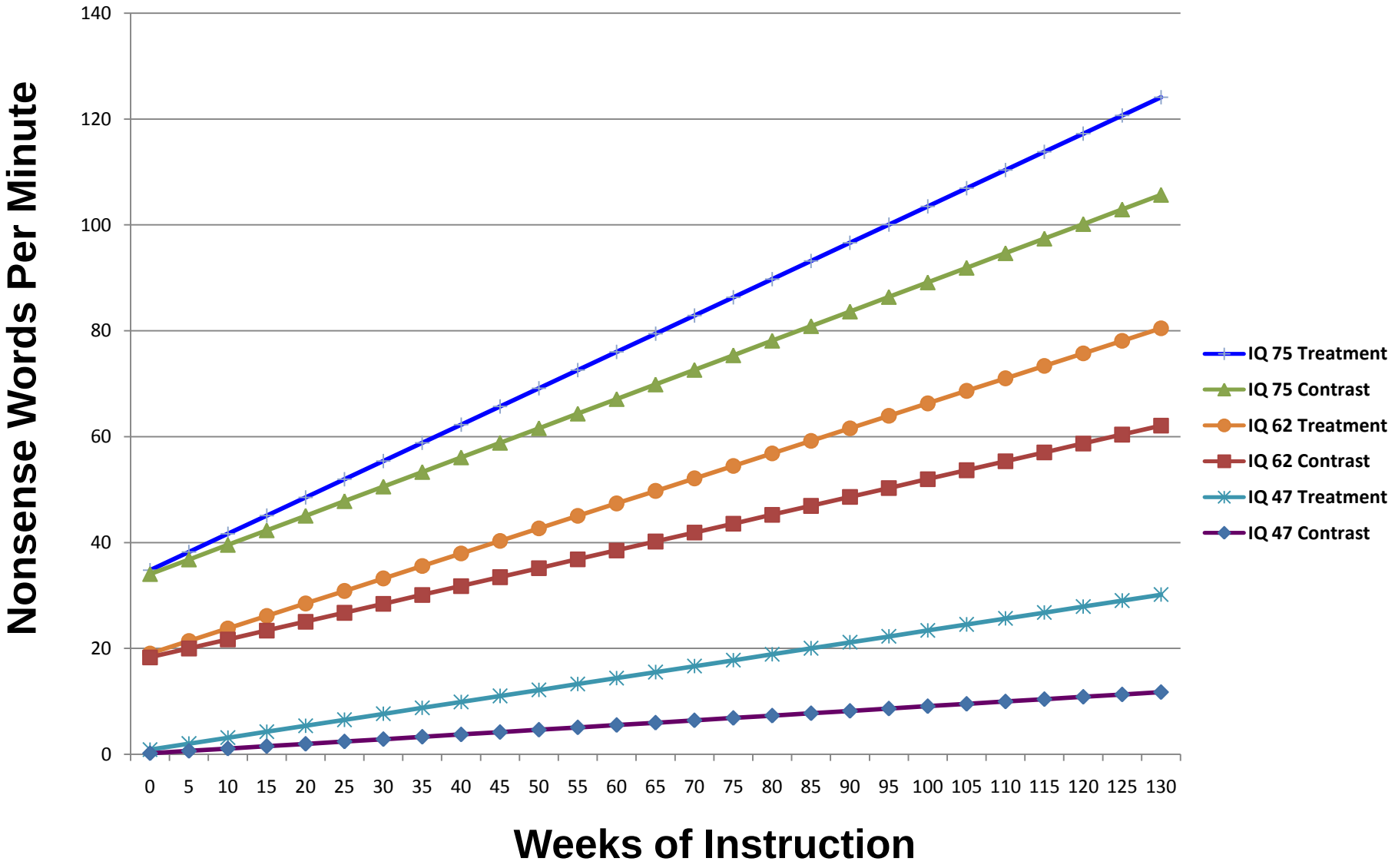
Data Analysis

- Annual and Progress Monitoring Measures
  - Hierarchical Linear Modeling
  - Level-1: measurement occasions
  - Level-2: students
  - Factors: IQ and Assignment (T/C)
- Posttest Only
  - Separate univariate analyses of covariance
  - covariate IQ
  - WIAT Reading Comprehension
  - WIAT Listening Comprehension

Data Analysis

- Model of best fit
- 3 models
  - Null model
  - Factor: Assignment
  - Factor: IQ and assignment
- 3rd model (IQ and assignment) best fit
- Graphs of predicted scores (not actual scores)

Nonsense Word Fluency: Predicted Scores by IQ and Condition



Data Analysis Summary: HLM (Annual/PM)

Reading Skill	Measure (*N* = 141)	Statistical Significance
Phonemic Awareness	CTOPP Blending Words	Yes
	CTOPP Blending Nonwords	Yes
	CTOPP Segmenting Words	Yes
	DIBELS Phoneme Segmentation Fluency	Yes
Language	Expressive Vocabulary Test	Yes
	Peabody Picture Vocabulary Test	Yes
	WIAT Listening Comprehension (n=95)	
Phonemic Decoding	DIBELS Nonsense Word Fluency	Yes
	TOWRE Phonemic Decoding Efficiency	Yes
	Woodcock Word Attack	Yes
Word Identification	DIBELS Oral Reading Fluency	Yes
	TOWRE Sight Word Efficiency	Yes
	Woodcock Letter-Word Identification	No
Comprehension	WIAT Reading Comprehension (n=95)	

ANCOVA: Post Only

IQ	***Reading Comprehension (p < .05)***		***Listening Comprehension***	
	Treatment (*n* = 54) *Adjusted Mean*	Contrast (*n* = 41) *Adjusted Mean*	Treatment (*n* = 54) *Adjusted Mean*	Contrast (*n* = 41) *Adjusted Mean*
75	96.98	85.80	20.35	19.36
62	73.85	62.67	14.99	14.00
47	47.17	35.99	8.80	7.81

Data Analysis Summary

Reading Skill	Measure (*N* = 141)	Statistical Significance
Phonemic Awareness	CTOPP Blending Words	Yes
	CTOPP Blending Nonwords	Yes
	CTOPP Segmenting Words	Yes
	DIBELS Phoneme Segmentation Fluency	Yes
Language	Expressive Vocabulary Test	Yes
	Peabody Picture Vocabulary Test	Yes
	WIAT Listening Comprehension (n=95)	No
Phonemic Decoding	DIBELS Nonsense Word Fluency	Yes
	TOWRE Phonemic Decoding Efficiency	Yes
	Woodcock Word Attack	Yes
Word Identification	DIBELS Oral Reading Fluency	Yes
	TOWRE Sight Word Efficiency	Yes
	Woodcock Letter-Word Identification	No
Comprehension	WIAT Reading Comprehension (n=95)	Yes

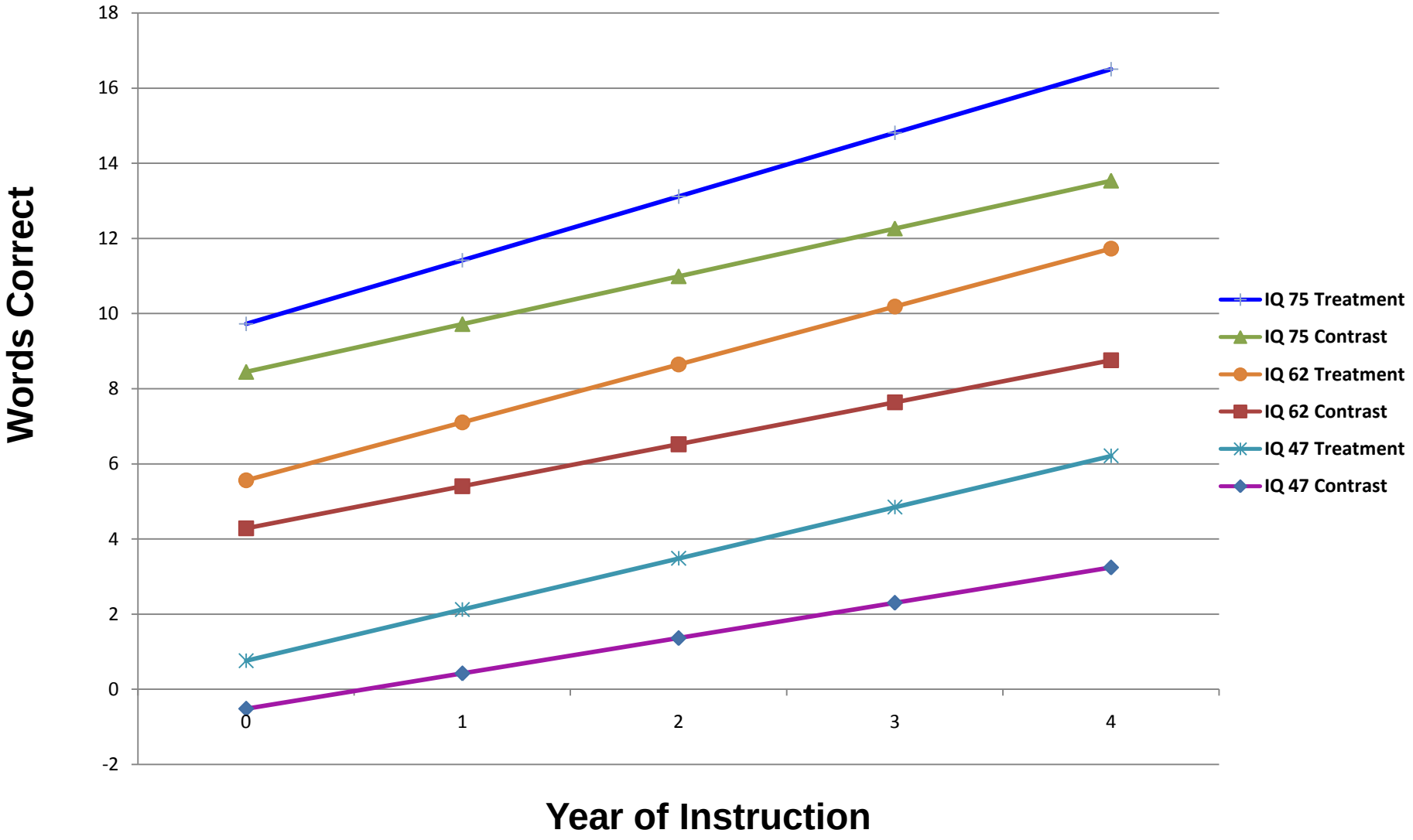
Results: RQ #1 Was intervention effective? Yes!

- Measures Across Time -- HLM
  - The differences between the treatment and contrast group increase over time
  - These differences are statistically significant on all measures except WLPB – Word Identification
- Post-Test Only – ANCOVA (IQ as covariate)
  - Treatment group outperformed control group on WIAT Reading Comprehension; differences were statistically significant
  - Treatment and control groups performed similarly on WIAT Listening Comprehension

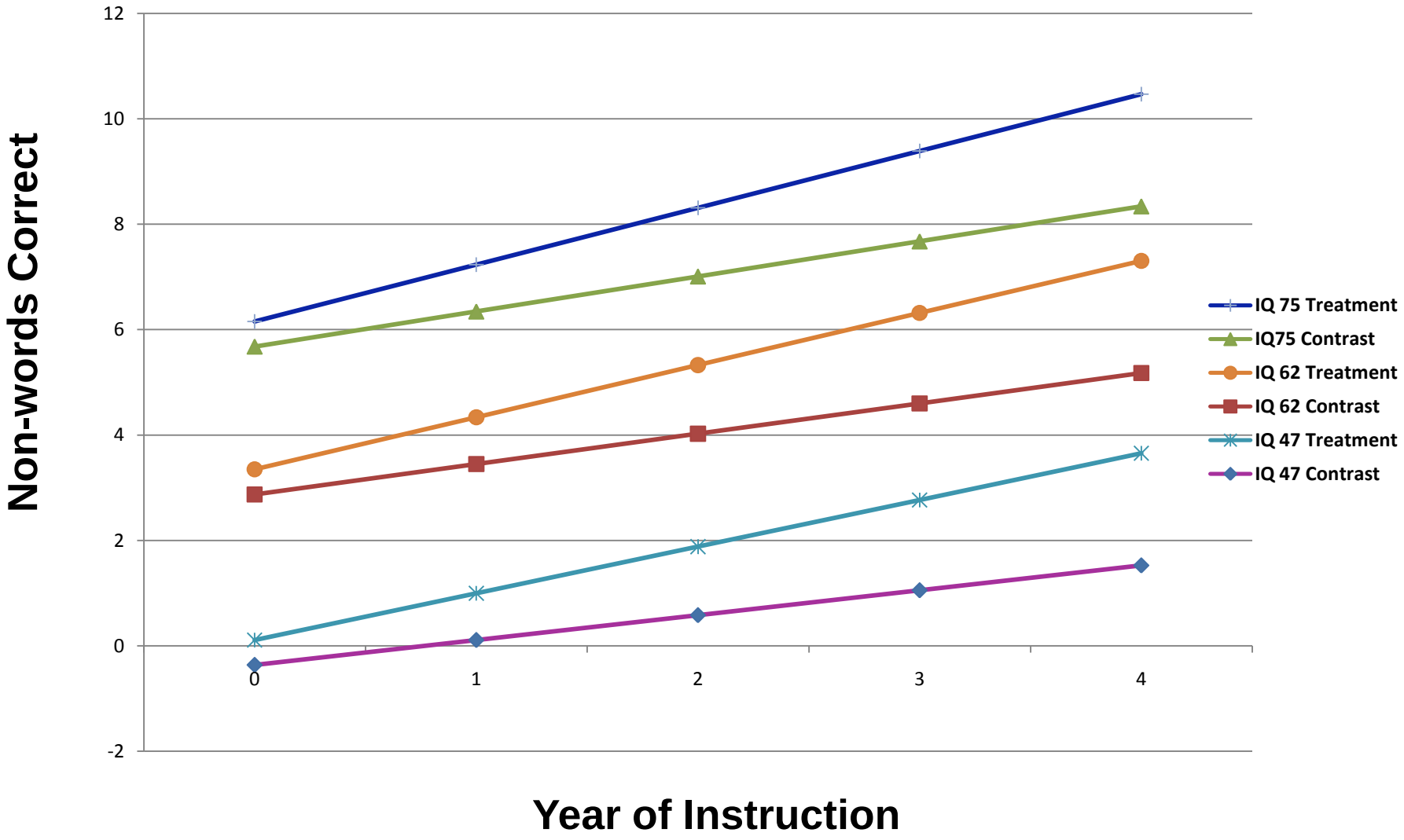
Results: RQ #2 What was the influence of IQ on rate of response?

- Measures Across Time – HLM
  - Score at pretest was higher if you had a higher IQ
  - Rate of growth was higher if you had a higher IQ
- However….
  - General pattern of the data
  - Variability was high

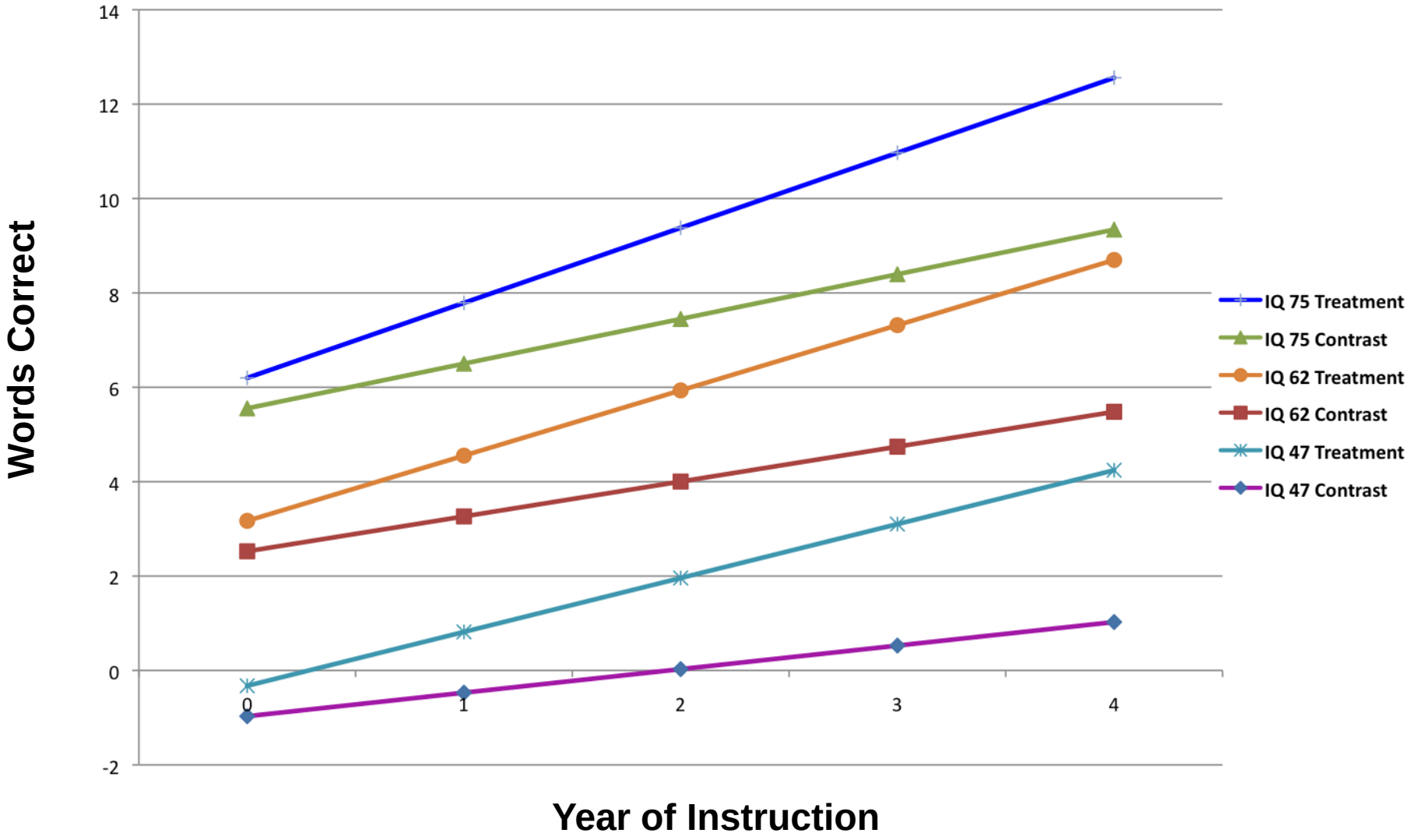
CTOPP Blending Words: Predicted Raw Scores by IQ and Condition



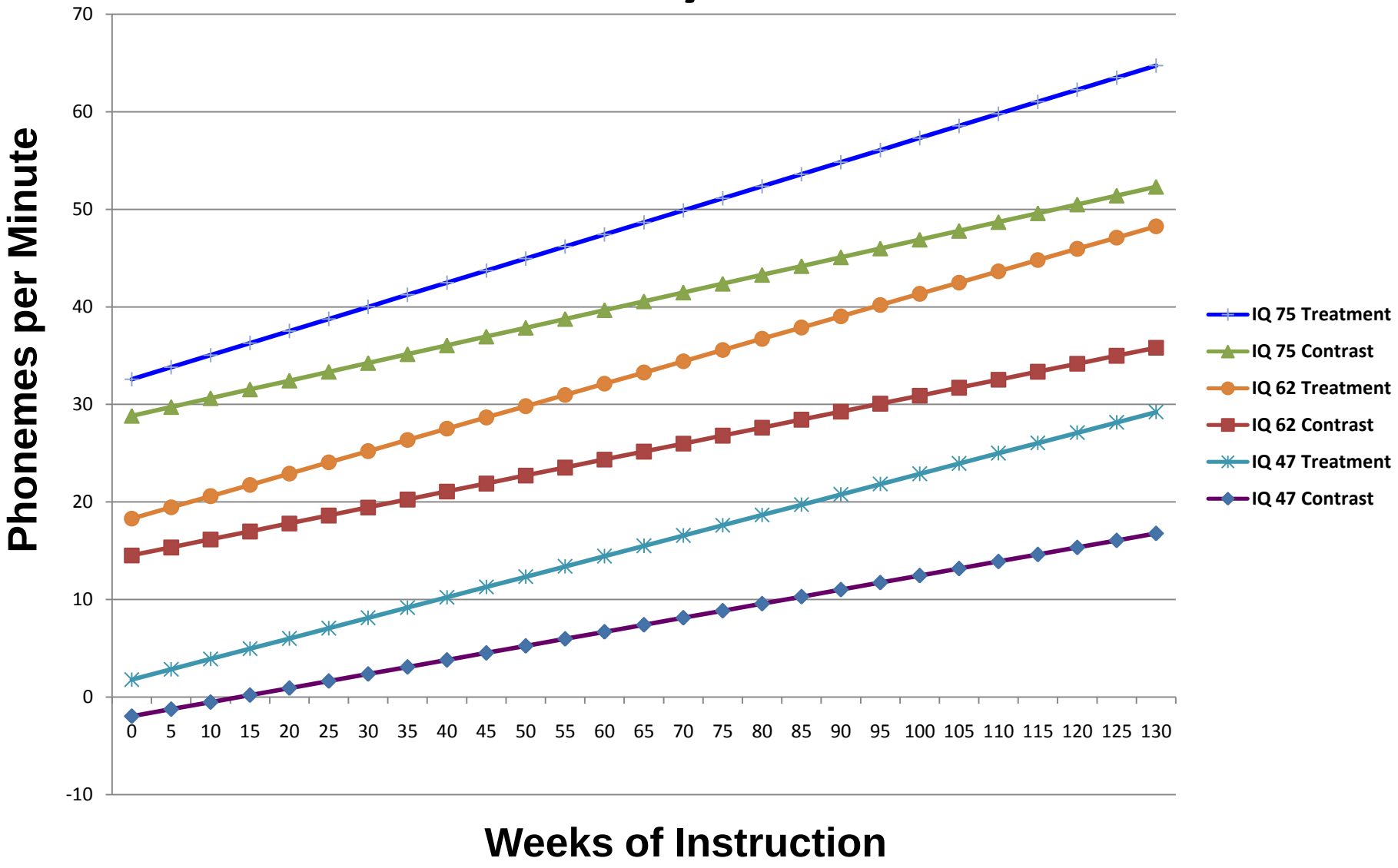
CTOPP Blending Non-Words: Predicted Raw Scores by IQ and Condition



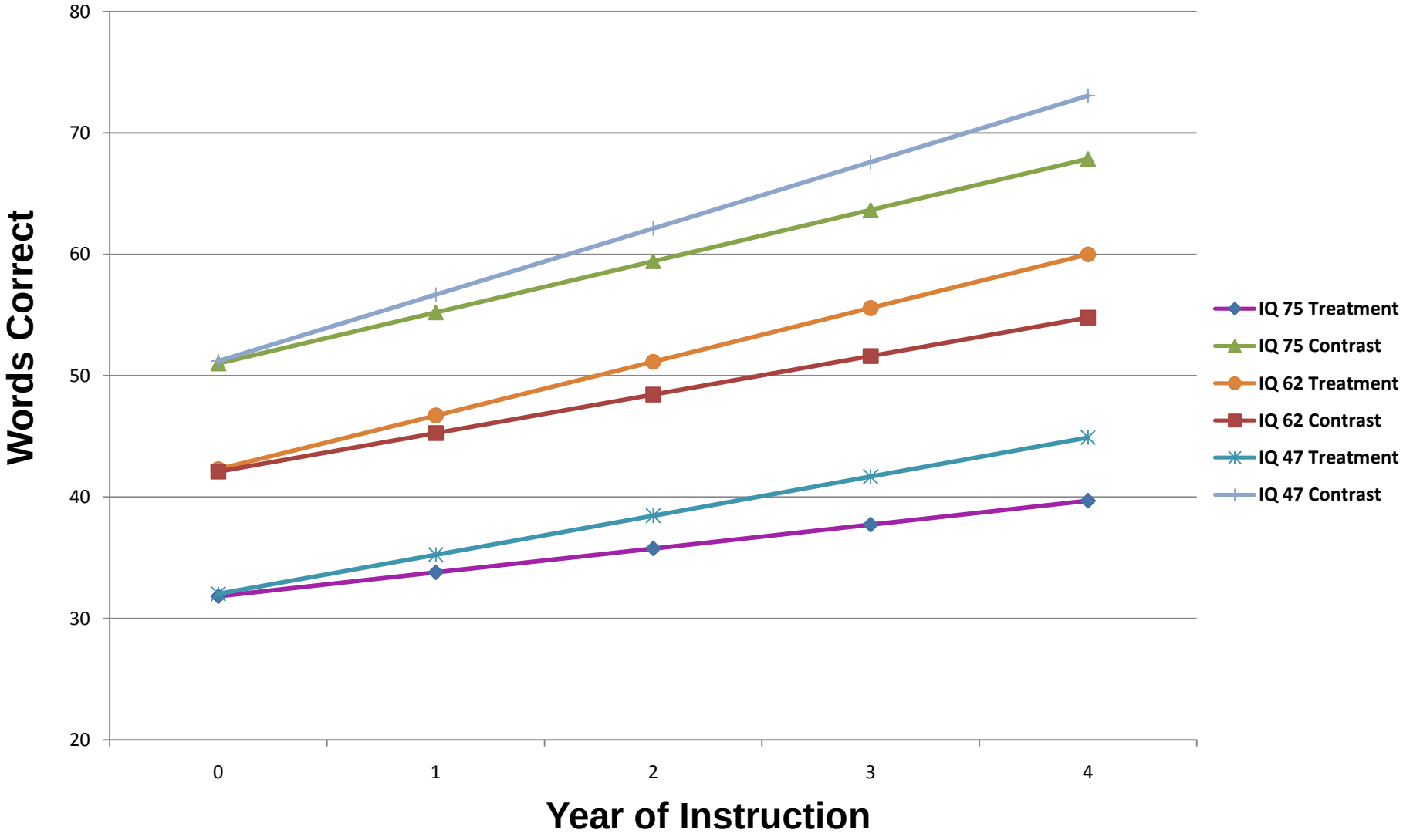
CTOPP Segmenting Words: Predicted Raw Scores by IQ and Condition



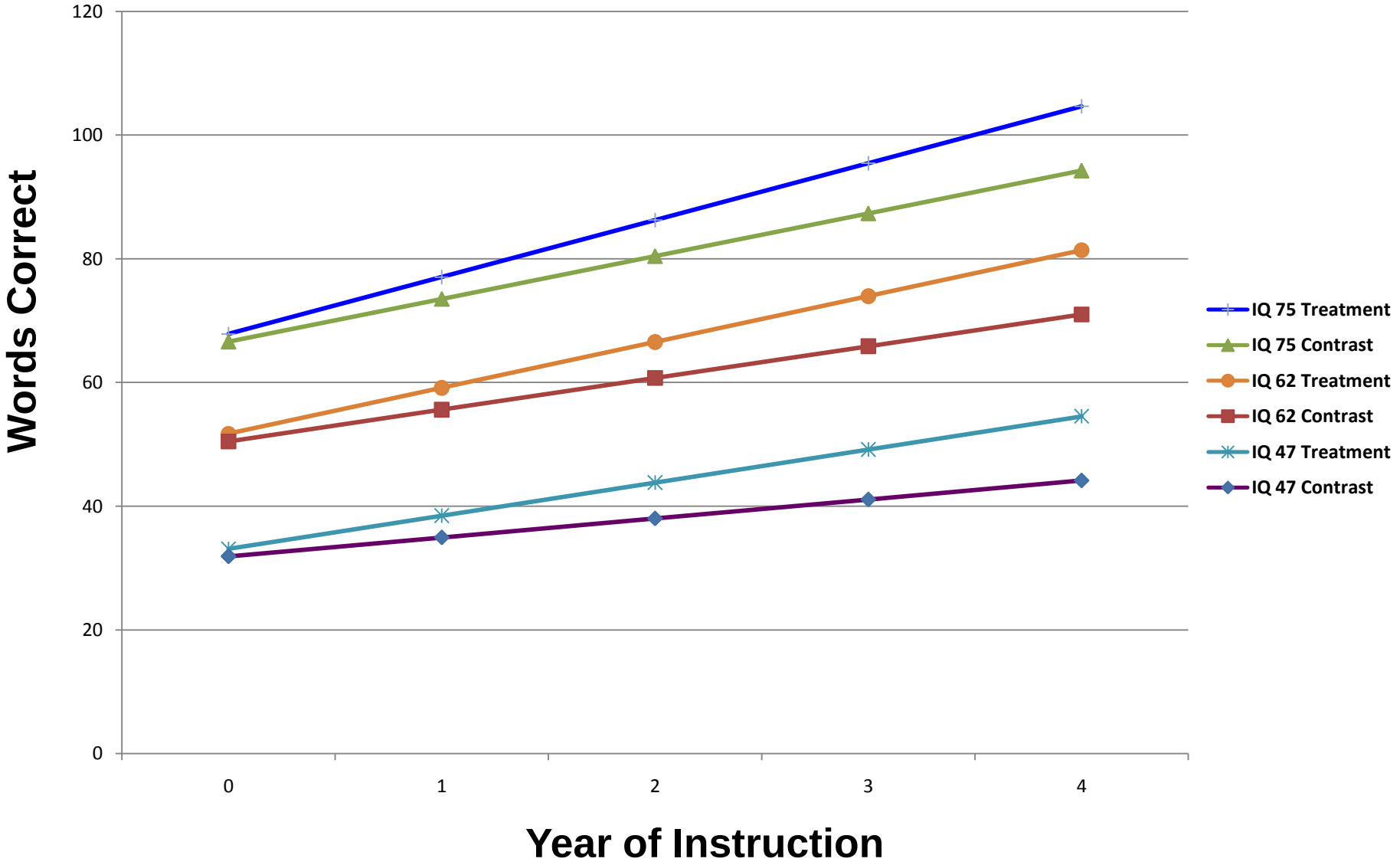
Phoneme Segmentation Fluency: Predicted Scores by IQ and Condition



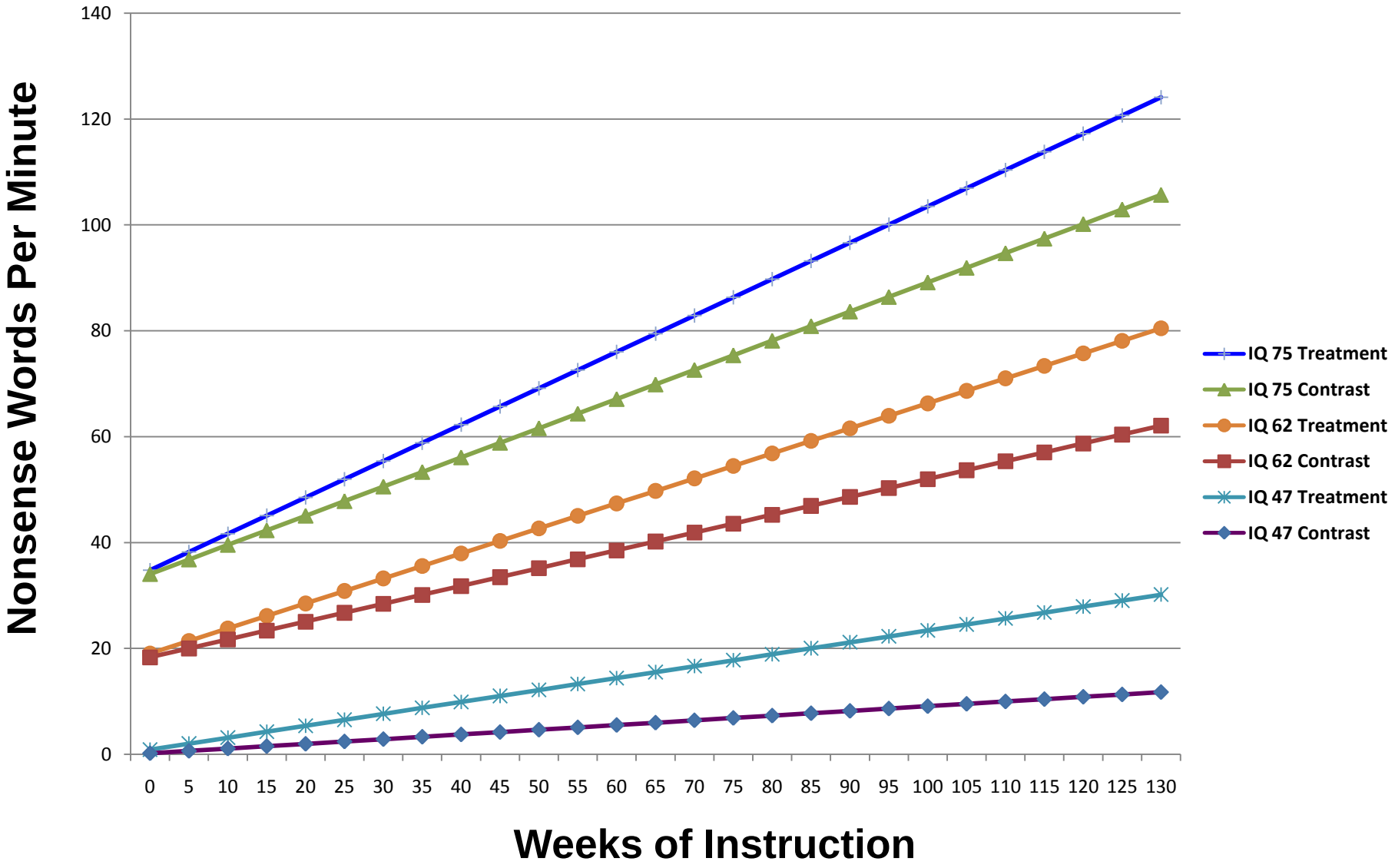
Expressive Vocabulary Test: Predicted Raw Scores by IQ and Condition



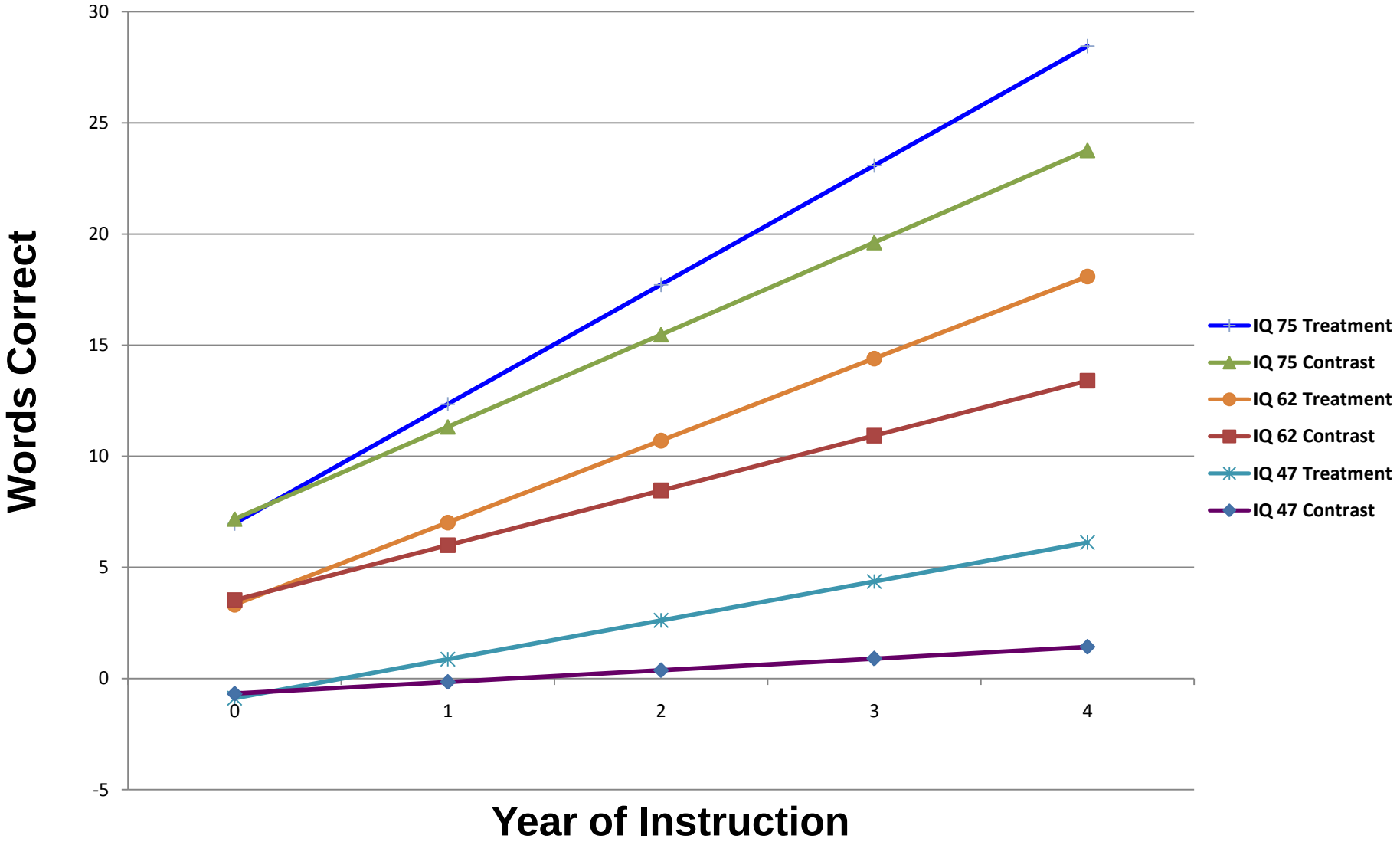
Peabody Picture Vocabulary Test: Predicted Raw Scores by IQ and Condition



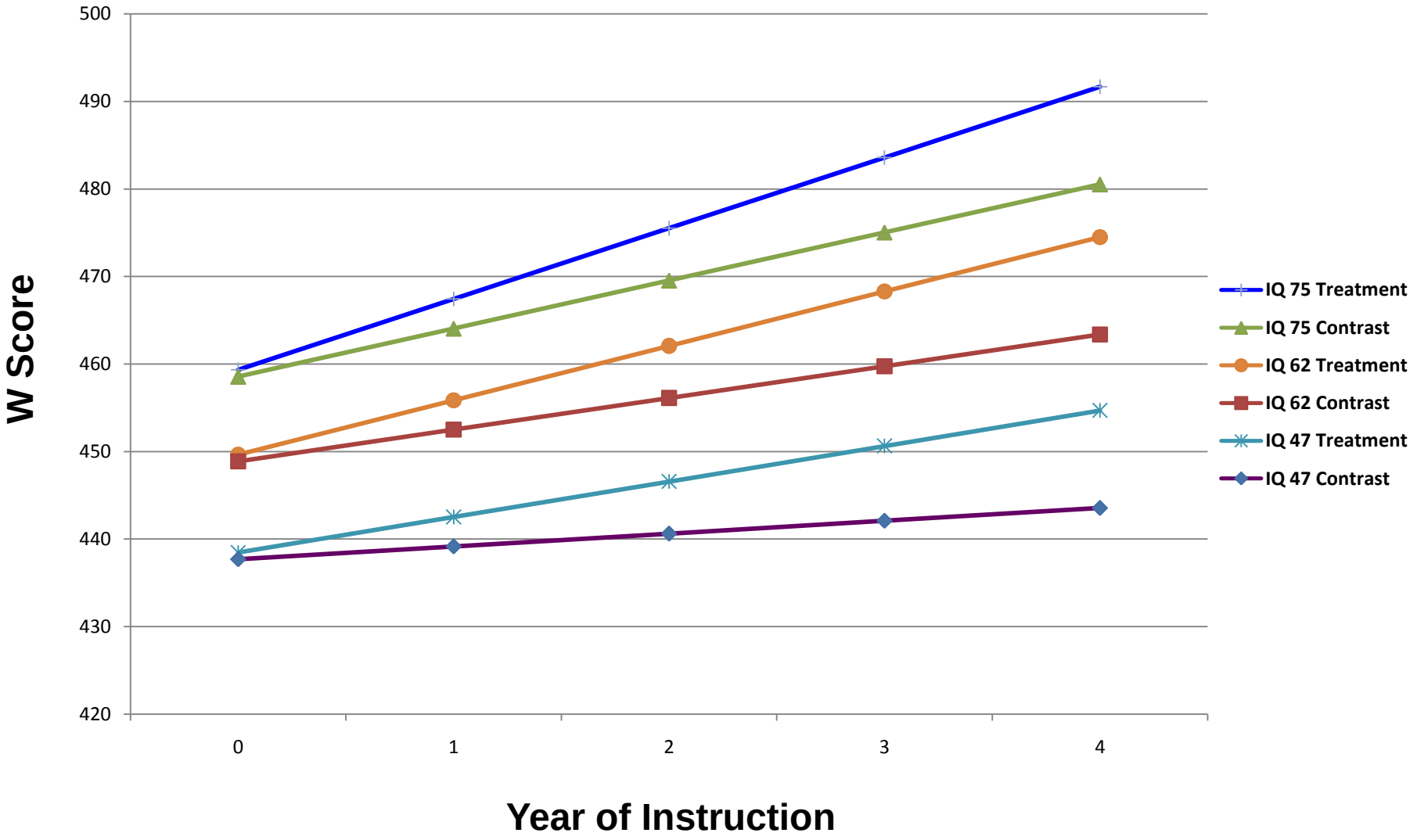
Nonsense Word Fluency: Predicted Scores by IQ and Condition



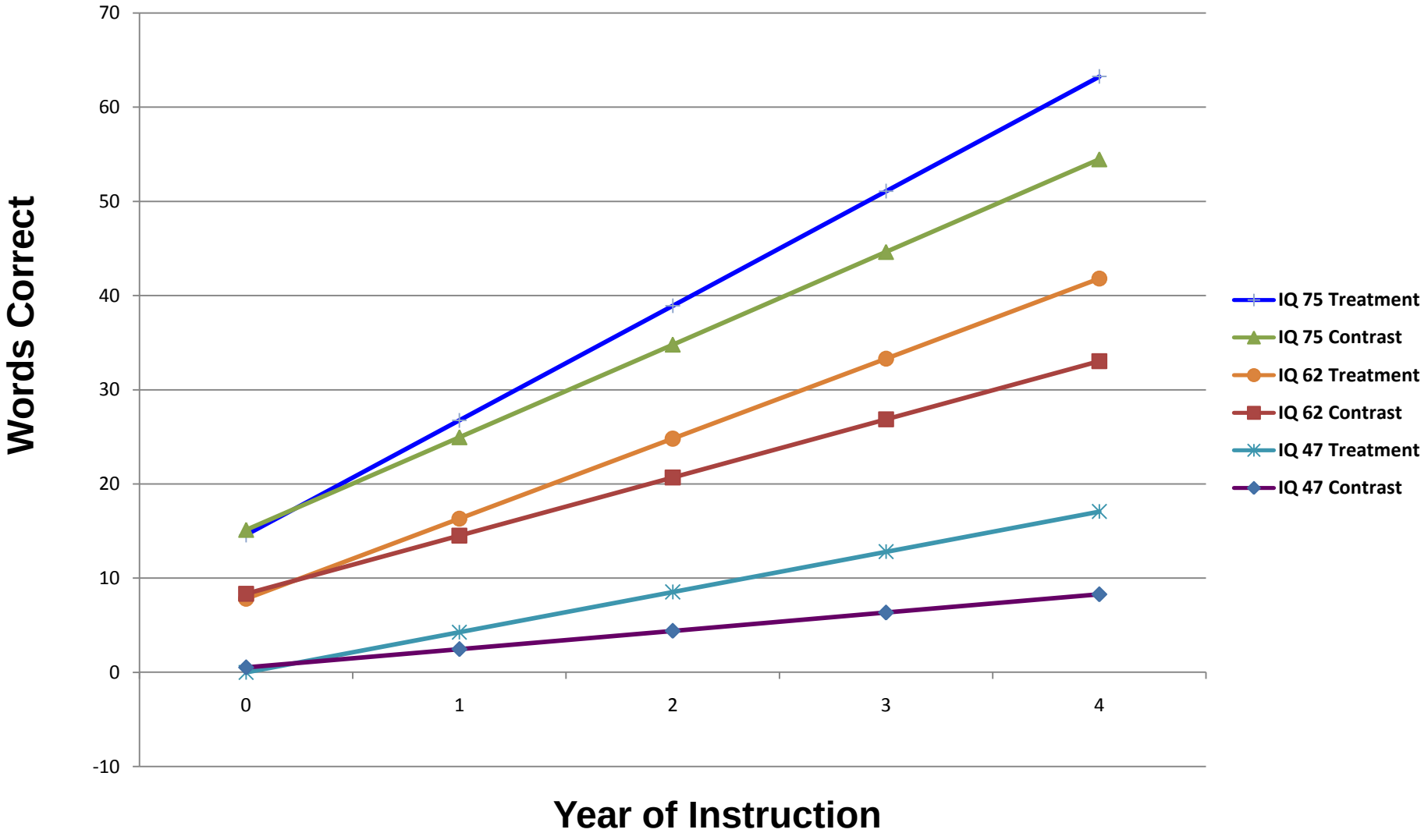
TOWRE Phoneme Decoding Efficiency: Predicted Raw Scores by IQ and Condition



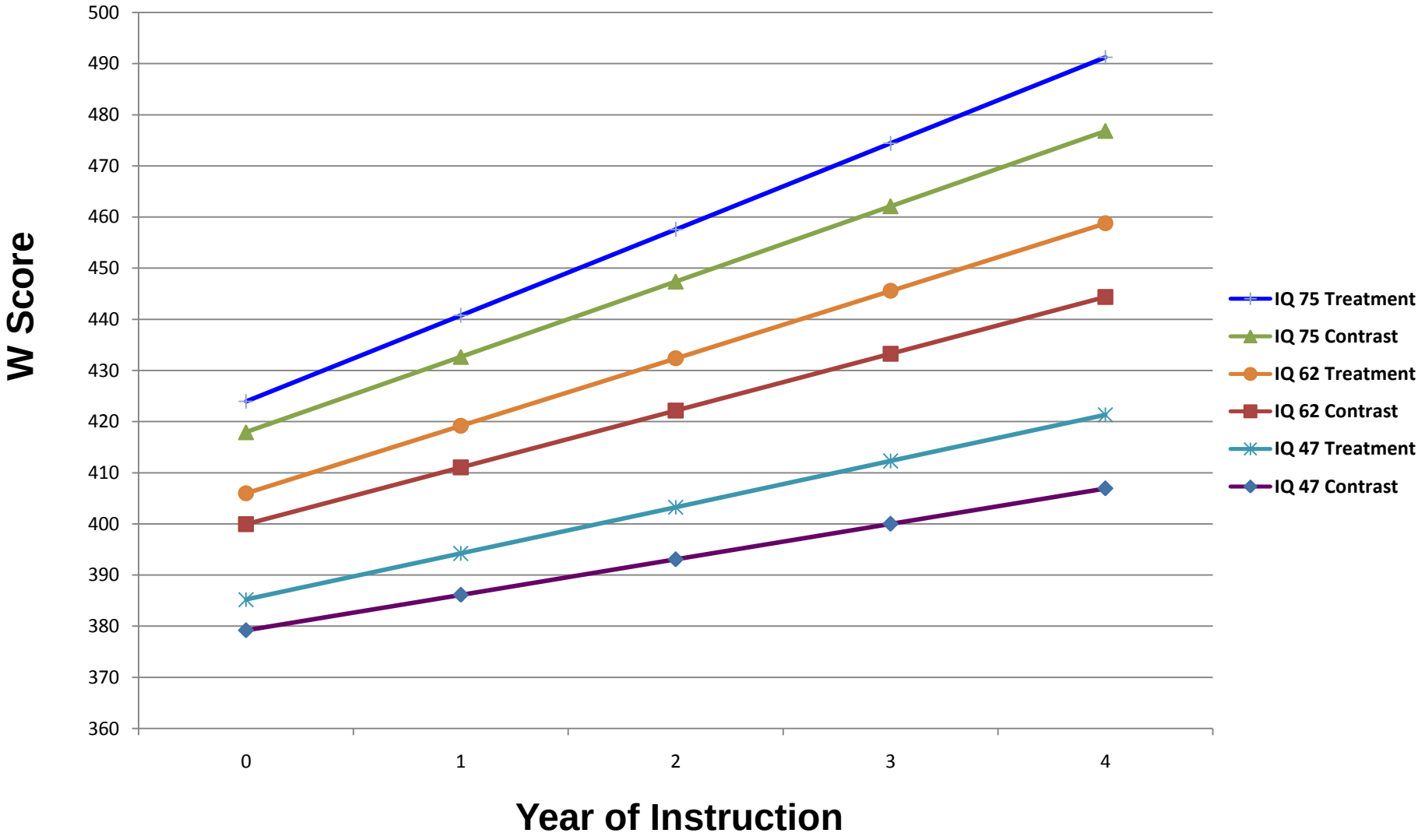
WLPB-R Word Attack:
Predicted W Scores by IQ and Condition



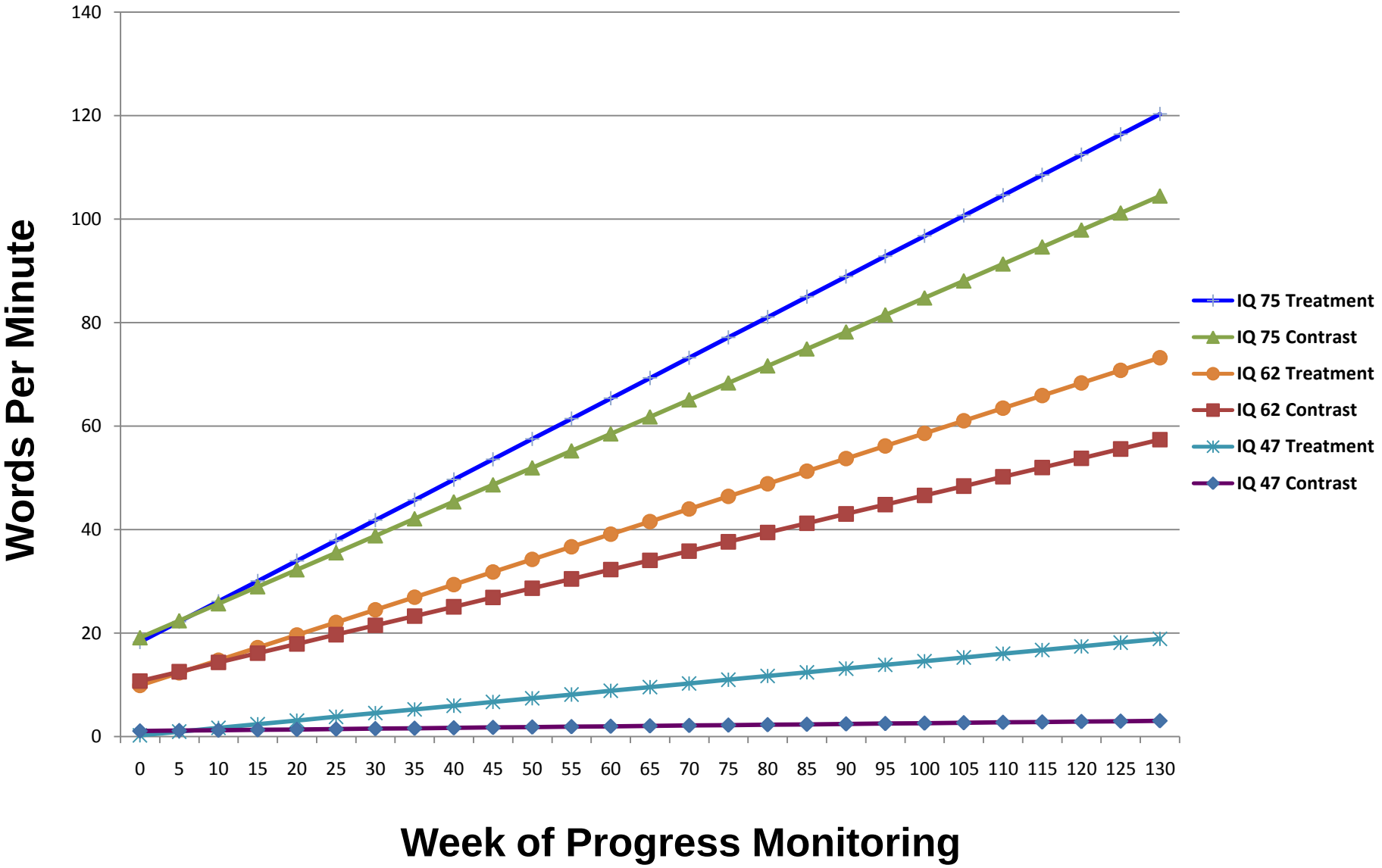
TOWRE Sight Word Efficiency: Predicted Raw Scores by IQ and Condition

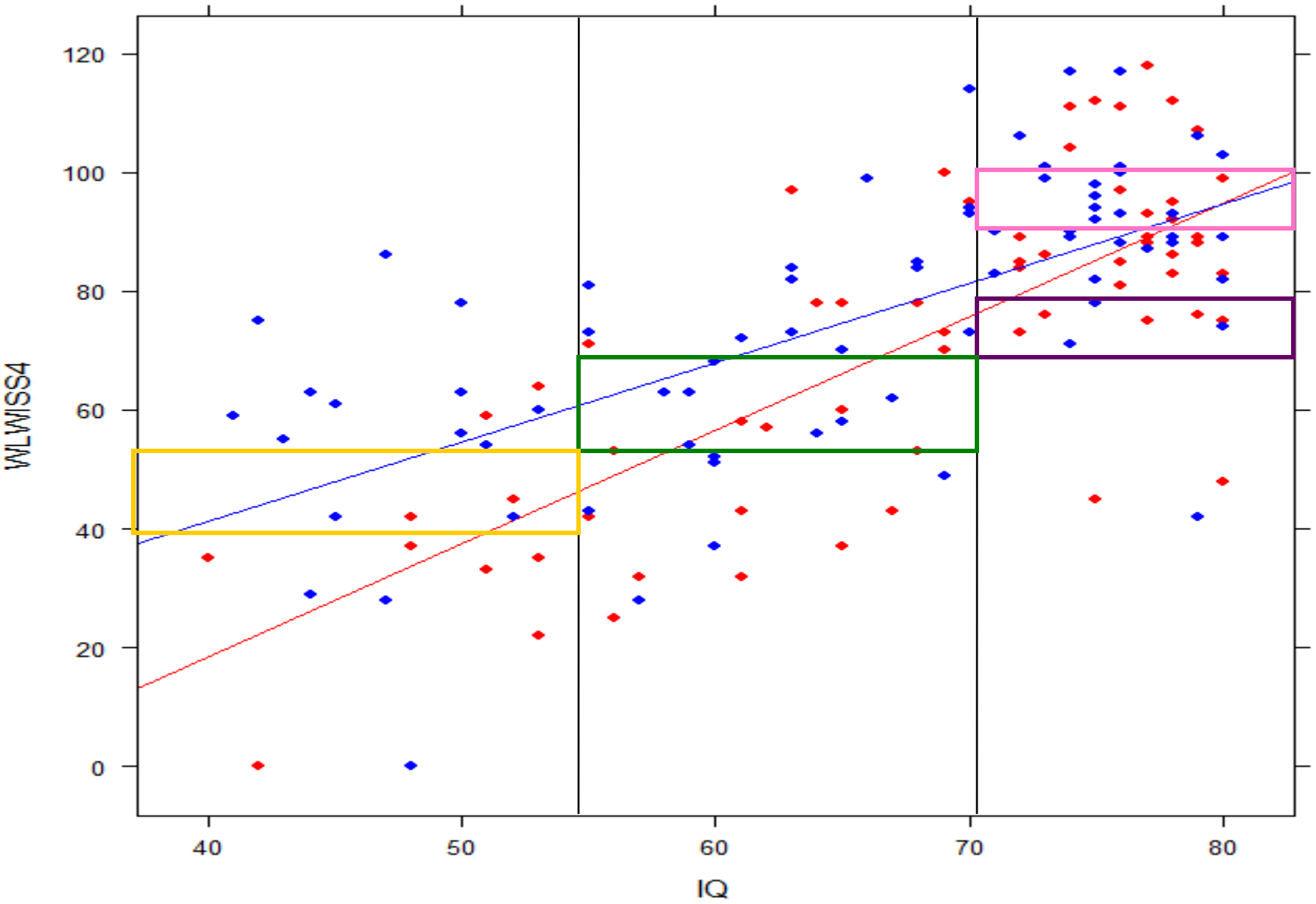


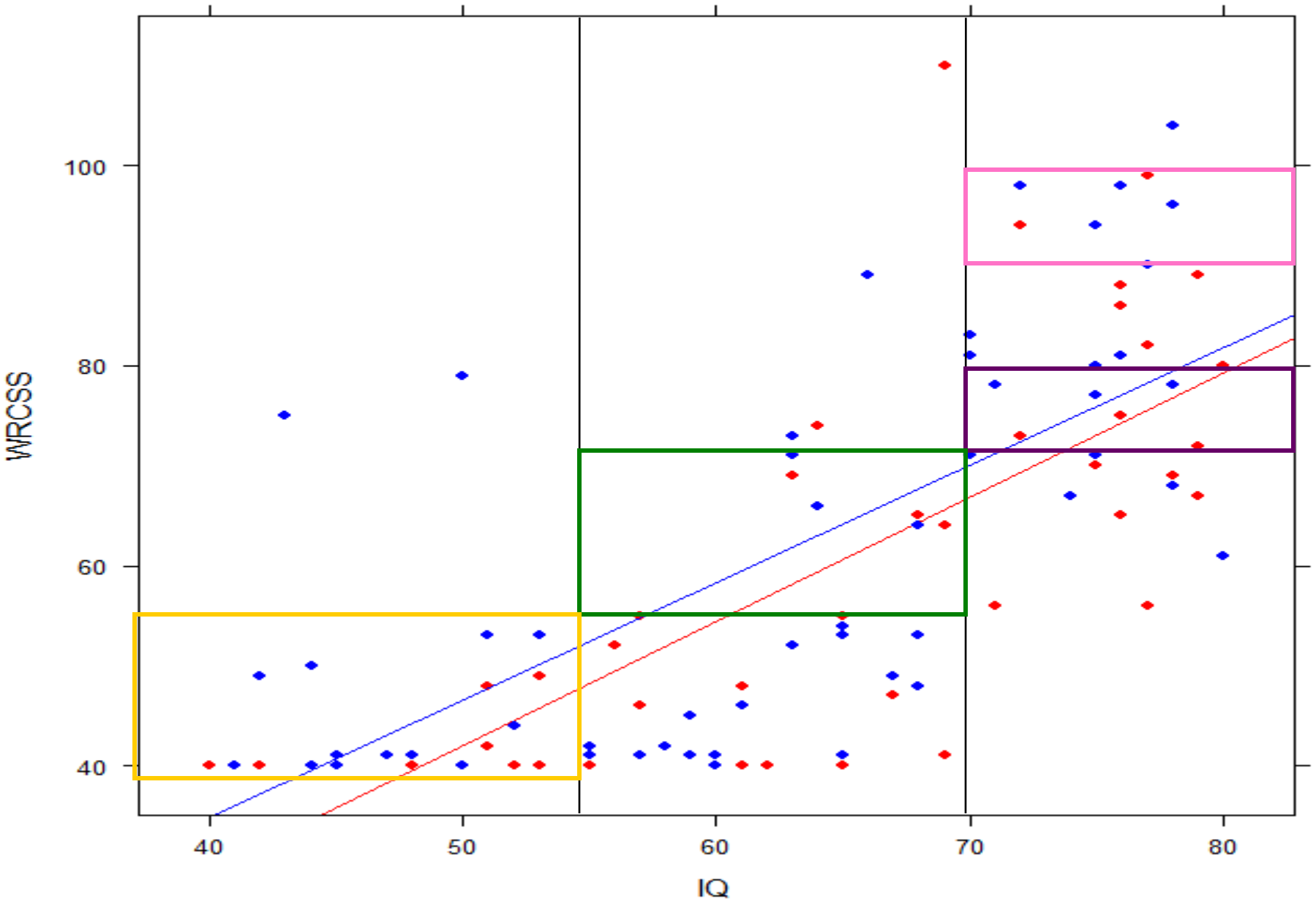
WLPB-R Word Identification: Predicted W Scores by IQ and Condition



Oral Reading Fluency: Predicted Scores by IQ and Condition




WLWISS4
IQ
120
100
80
60
40
20
0
40
50
60
70
80


WRCSS
100
80
60
40
40
50
60
70
80
IQ

Limitations

- Performance among students highly variable
- Though relatively large sample size for population, it is a relatively small sample size for the statistical methods
- Intervention was complex and comprehensive, making it difficult to determine which parts were causing positive effects

Conclusions

- Students with intellectual disabilities respond favorably to comprehensive intervention that was also found to be effective for struggling readers with IQs in the average range
- The intervention was more effective than regular classroom instruction.

Summary

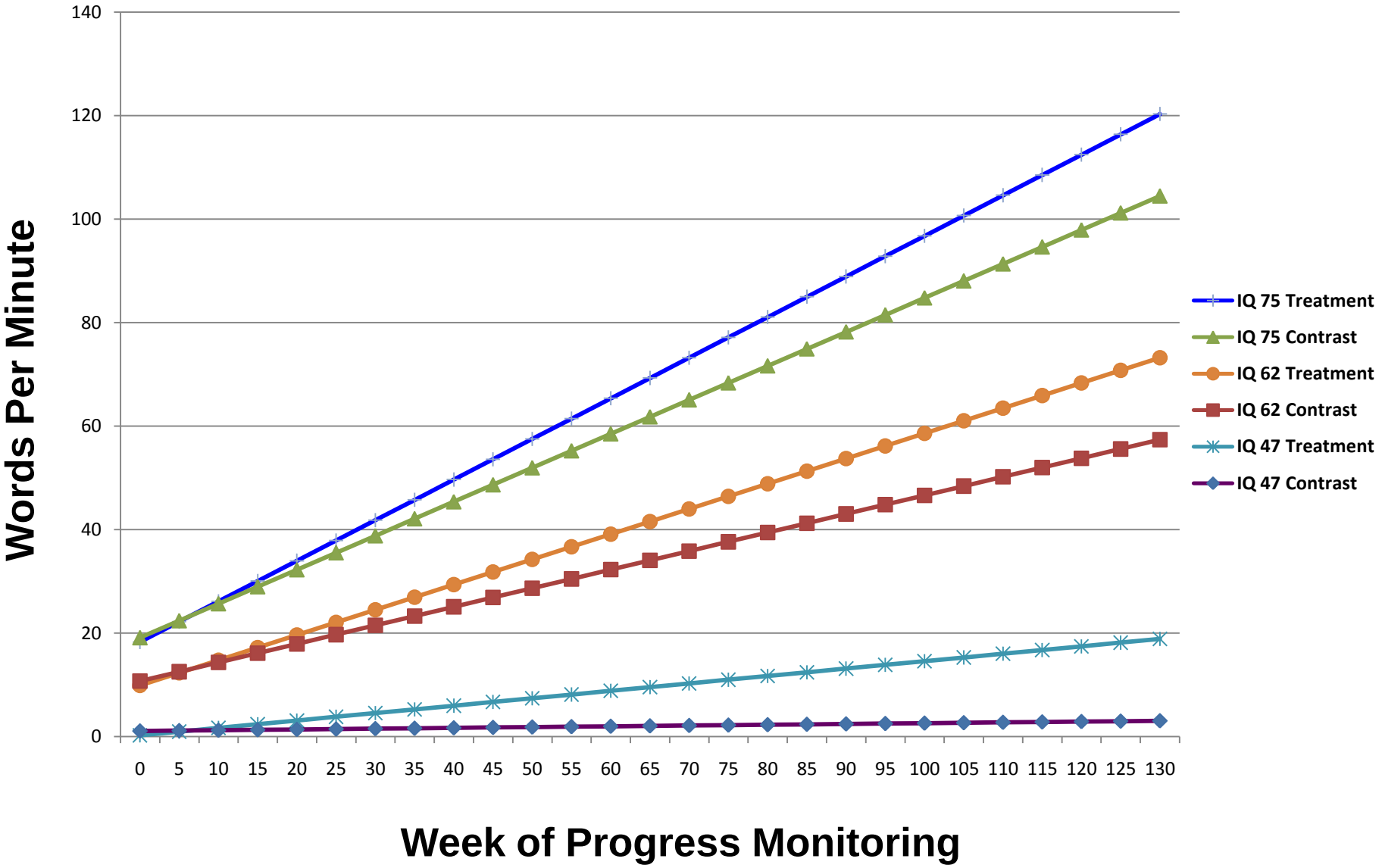
- Support for use of scientifically-based reading instruction for students with low IQs (ID range)
- IF Individualized and with high degrees of fidelity
- IF provided intensive, comprehensive instruction over an extended period of time

Future Research

- Additional/more refined materials to use with students with ID (extra intensity)
- Realistic expectations of reading skills students with ID can master
- Practical application – both instruction and transfer to life skill
- More appropriate measures for students with ID

In 4 years of intensive instruction, how much did students learn?

Oral Reading Fluency: Predicted Scores by IQ and Condition



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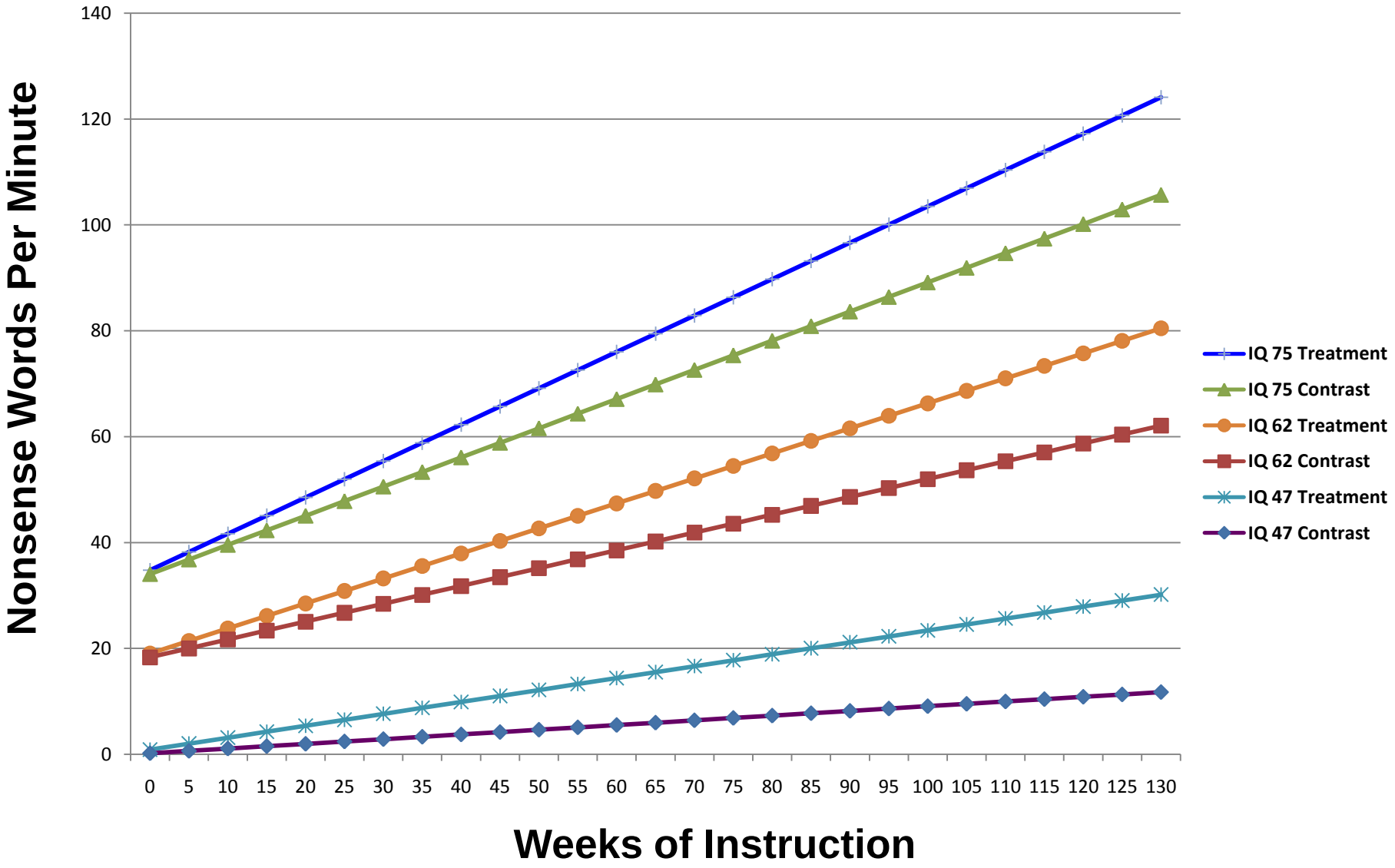

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- Allor, J.H., Champlin, T.M., Gifford, D.B., & Mathes, P.G. (in review). Methods for increasing the intensity of reading instruction for students with intellectual disabilities. *Education and Training in Autism and Developmental Disabilities.*
- Allor, J.H., Mathes, P.G., Champlin, T., & Cheatham, J.P. (2009). Research-based techniques for teaching early reading skills to students with intellectual disabilities. *Education and Training in Developmental Disabilities, 44,* 356-366.
- Allor, J.H., Mathes, P.G., Jones, F.G., Champlin, T., & Cheatham, J.P. (2010). Individualized research-based reading instruction for students with intellectual disabilities. *TEACHING Exceptional Children, 42,* 6-12.
- Allor, J.H., Gifford, D.B., & Champlin, T. M. (manuscript in progress). Teaching students with intellectual disabilities to unitize words and transfer early reading skills to connected text.