Testing with English Learners and the C-LIM:

Myths and misconceptions.

School Psyched Podcast

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Samuel O. Ortiz, Ph.D.
St. John's University

Evidence-Based Assessment

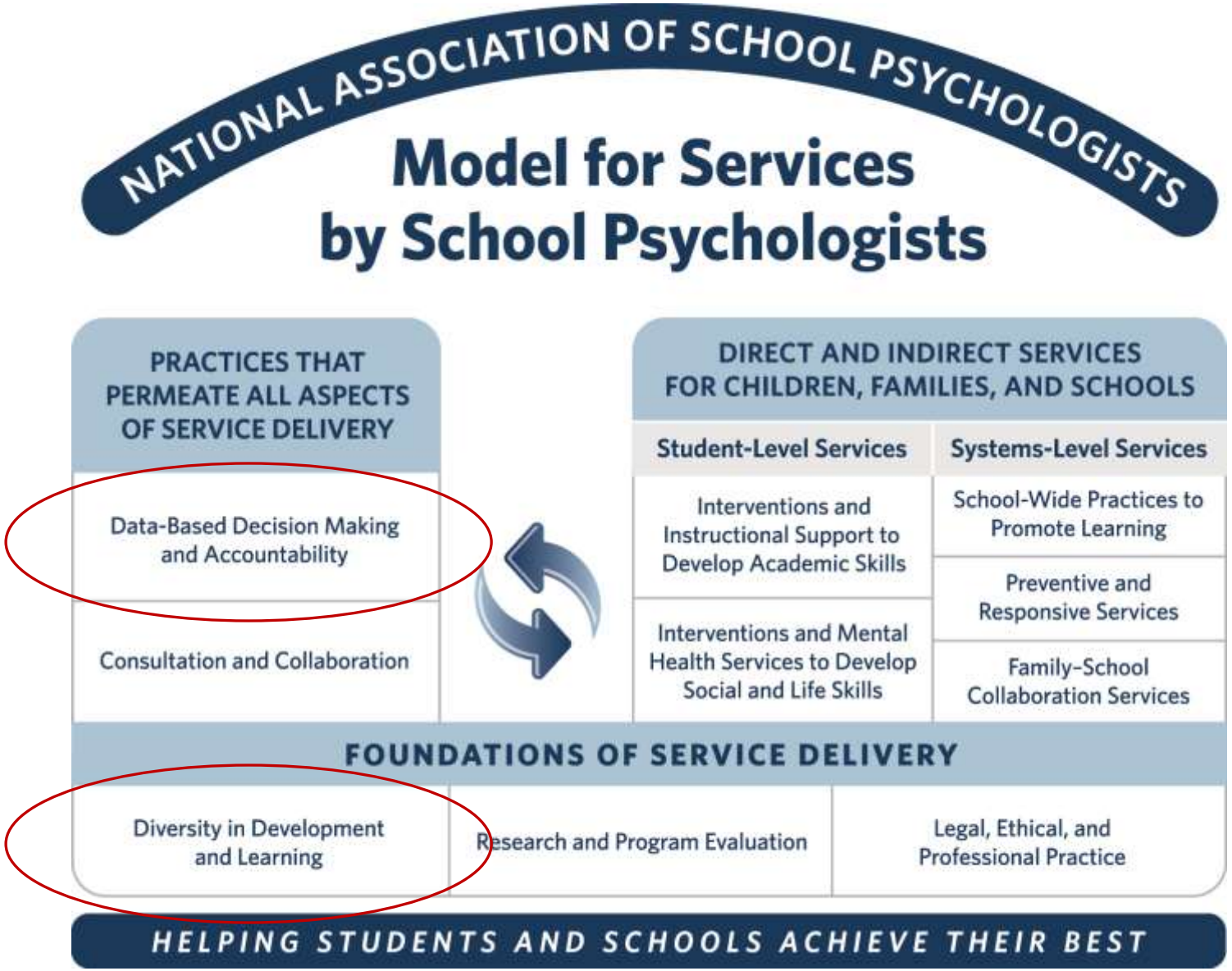
According to the APA Task Force on Evidence-based practice in psychology (EBPP), evidence-based practice is defined as:

> *"the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preferences (p. 273)*

Evidence-based practice within the context of psychoeducational evaluation has never gone much beyond an over-reliance on the validity of standardized tests. But without inherently fair norm samples, the only recourse for individual practitioners is to apply research on the use of standardized tests with English learners. This becomes, in effect, evidence-based assessment.

Source: American Psychological Association (2006). Evidence-Based Practice in Psychology, American Psychologist, pp. 271-285.

The NASP Practice Model



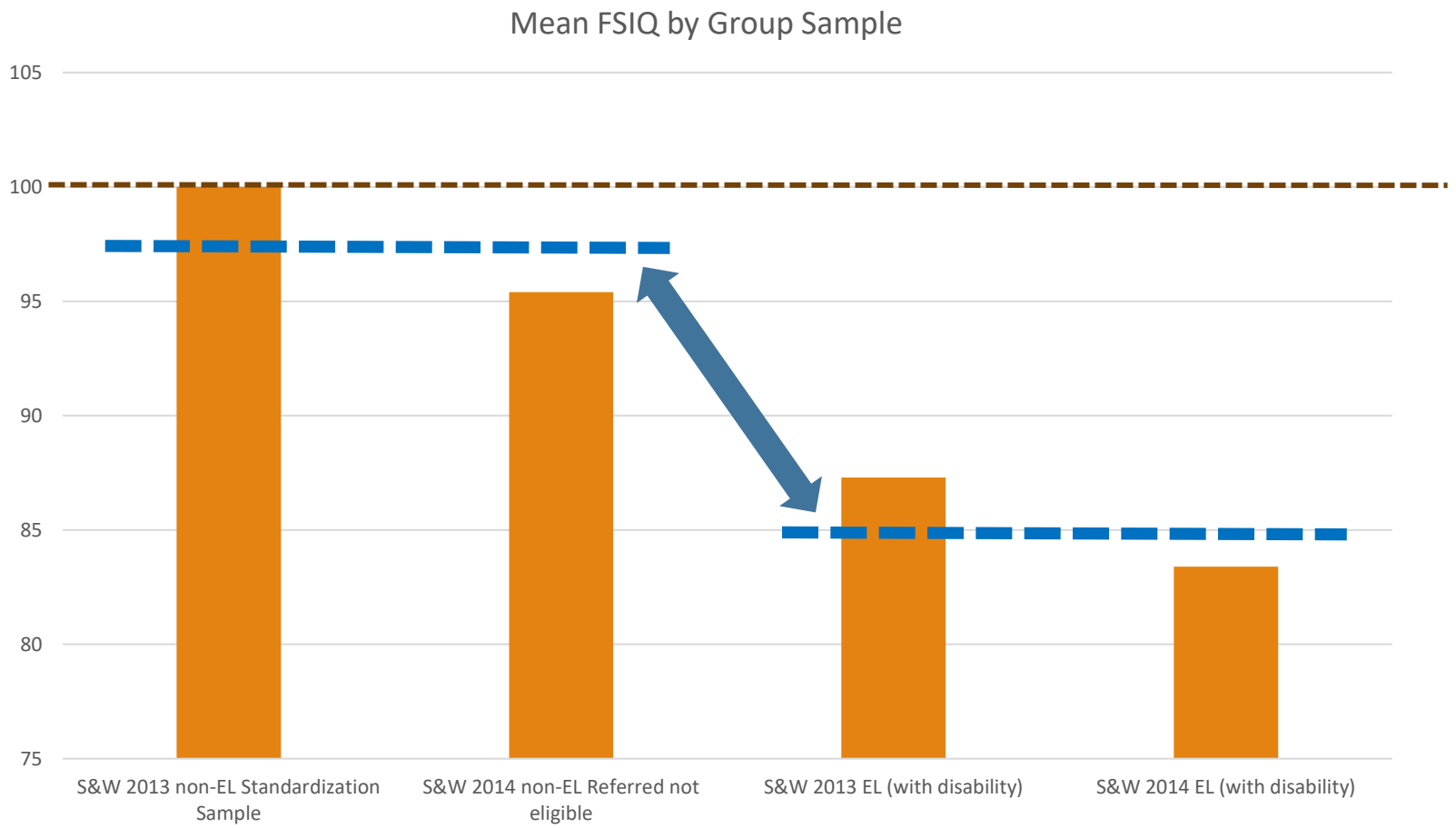
Current Approaches Lack Evidence for Establishing Test Score Validity

Evaluation Issues and Methods	Norm sample representative of bilingual development	Measures a wider range of school-related abilities	Does not require the evaluator to be bilingual	Adheres to the test's standardized protocol	Substantial research base on bilingual performance	Sufficient to identify or diagnosis disability	Accounts for variation in bilingual development	Most likely to yield reliable and valid data and information	Provides extensive data regarding development
Modified or Altered Assessment	✗	✓	✓	✗	✗	✗	✗	✗	✗
Language Reduced Assessment	✗	✗	✓	✓	✗	✗	✗	✗	✗
Dominant Language Assessment in L1: native only	✗	✓	✗	✓	✗	✗	✗	✗	✗
Dominant Language Assessment in L2: English only	✗	✓	✓	✓	✓	✗	✗	✗	✗

All approaches are limited in some manner when addressing test score validity and none are sufficient to diagnosis a disability, account for variation in bilingual development, represent a form or manner that automatically yields reliable and valid results, and do not provide extensive data regarding cognitive and school-based learning and development.

Research Foundations for EL Evaluation

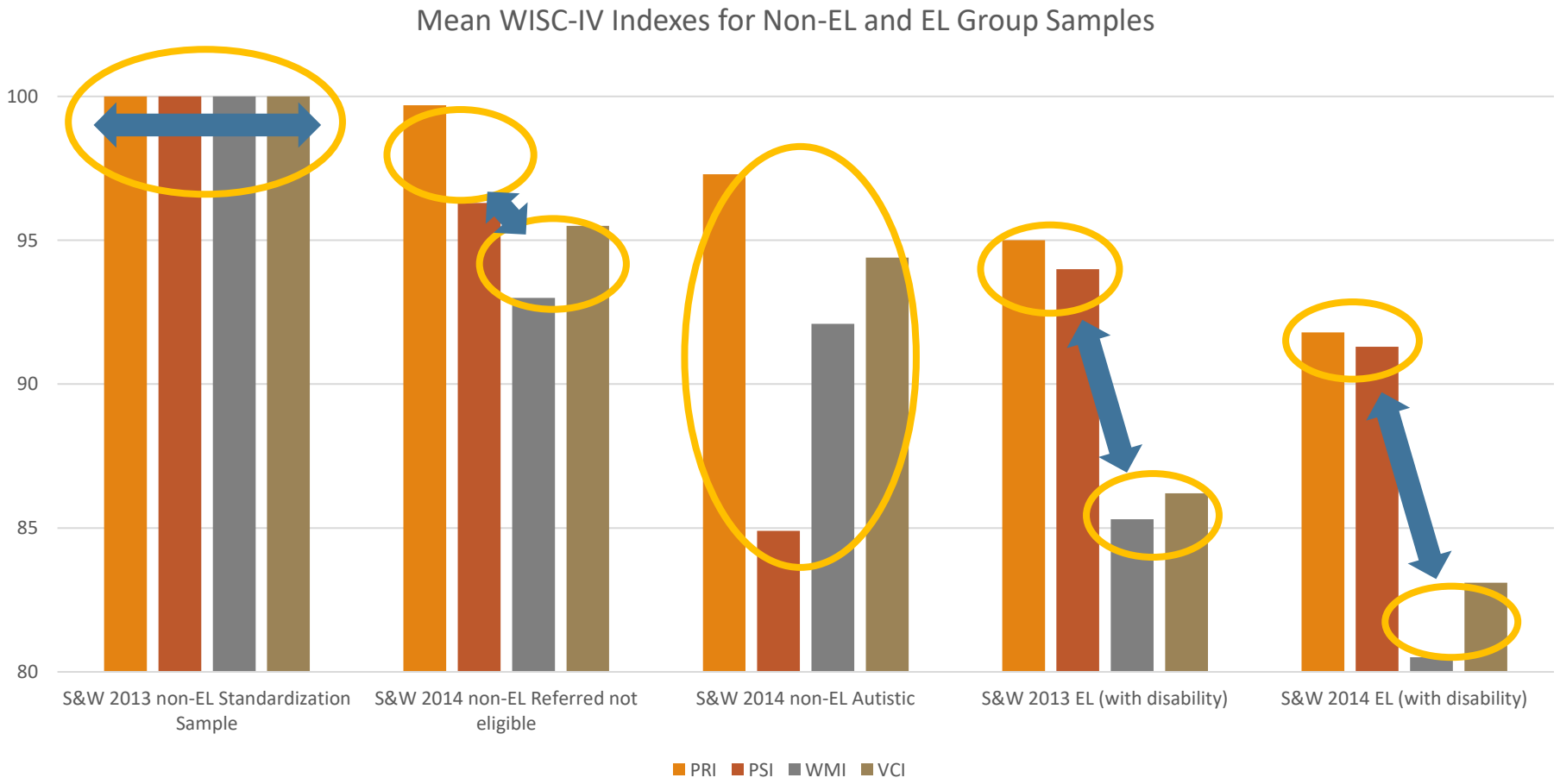
ELs and non-EL's perform differently: Broad ability level



Sources: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382. and Styck, K. M. & Watkins, M. W. (2014). Discriminant Validity of the WISC-IV Culture-Language Interpretive Matrix. Contemporary School Psychology , 18, 168-188.

Research Foundations for EL Evaluation

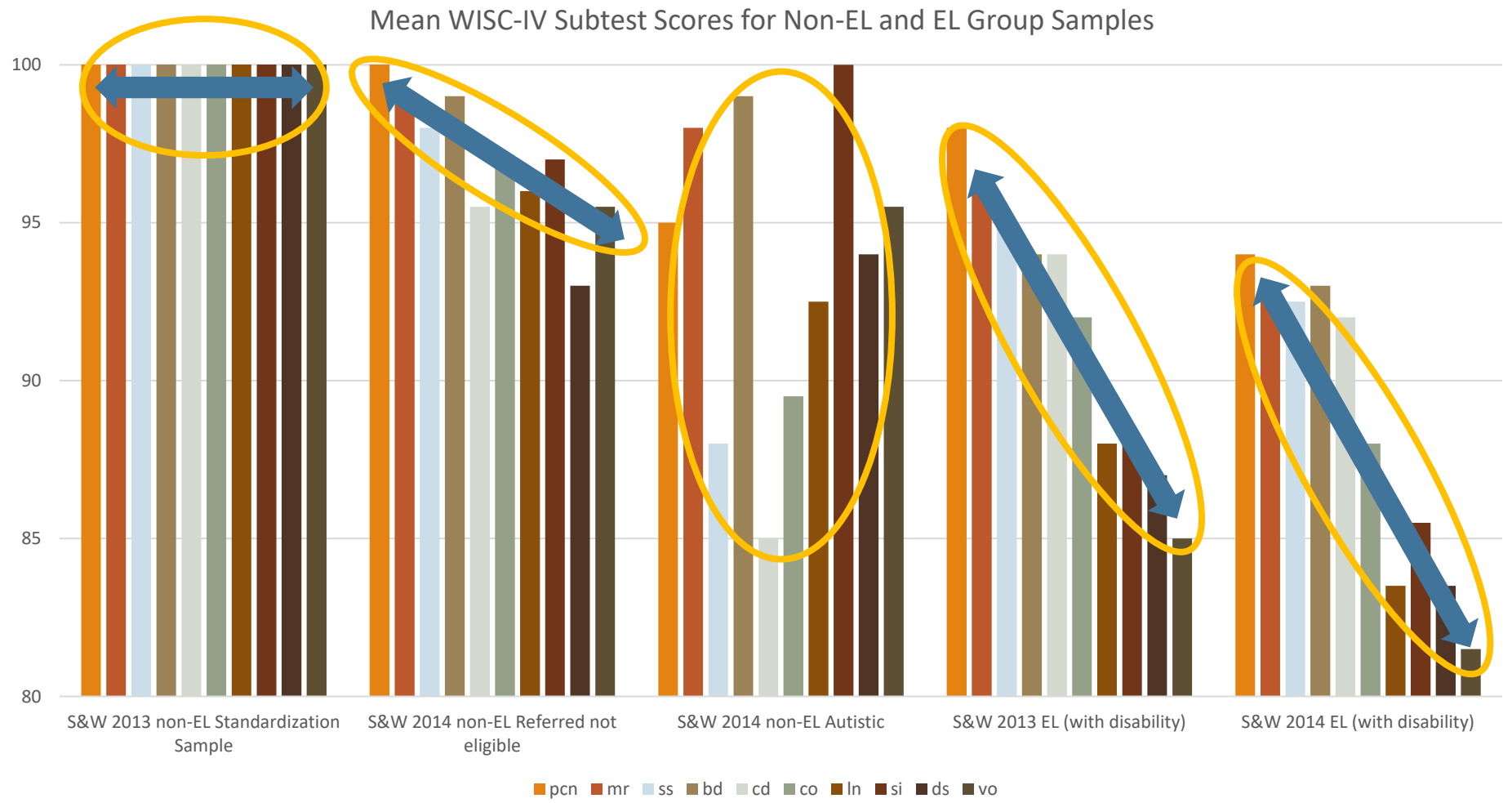
ELs and non-EL's perform differently: Index level



Soures: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382. and Styck, K. M. & Watkins, M. W. (2014). Discriminant Validity of the WISC-IV Culture-Language Interpretive Matrix. Contemporary School Psychology , 18, 168-188.

Research Foundations for EL Evaluation

ELs and non-EL's perform differently: Subtest level



Soures: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382. and Styck, K. M. & Watkins, M. W. (2014). Discriminant Validity of the WISC-IV Culture-Language Interpretive Matrix. Contemporary School Psychology , 18, 168-188.

Research Foundations for ELL Evaluation

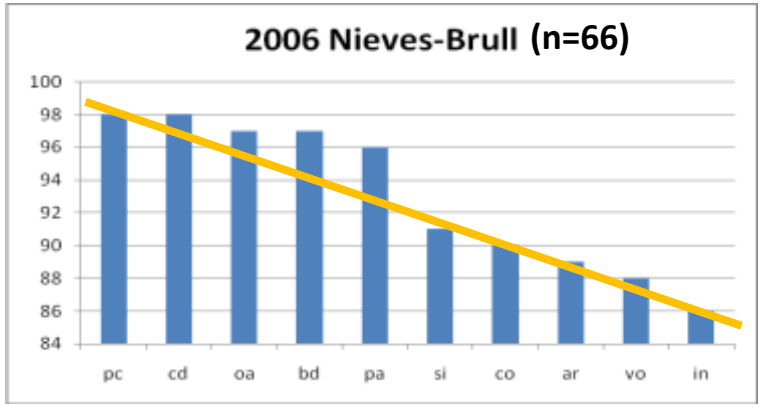
The Influence of Language on Test Performance: Subtest level

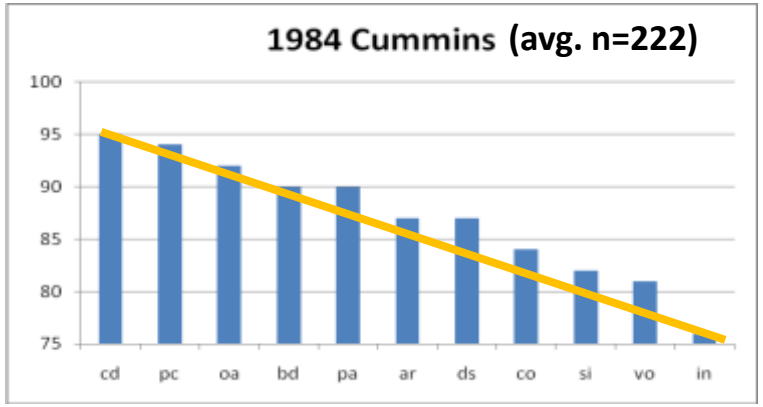
	Hispanic Group (Mercer) (1972)	Hispanic Group (Vukovich & Figueroa) (1982)	ESL Group (Cummins) (1982)	Bilingual Group (Nieves-Brull) (2006)
Subtest Name	**Mean SS**	**Mean SS**	**Mean SS**	**Mean SS**
Information	7.5	7.8	5.1	7.2
Vocabulary	8.0	8.3	6.1	7.5
Similarities	7.6	8.8	6.4	8.2
Comprehension	7.8	9.0	6.7	8.0
Digit Span	8.3	8.5	7.3	*
Arithmetic	8.7	9.4	7.4	7.8
Picture Arrangement	9.0	10.3	8.0	9.2
Block Design	9.5	10.8	8.0	9.4
Object Assembly	9.6	10.7	8.4	9.3
Picture Completion	9.7	9.9	8.7	9.5
Coding	9.6	10.9	8.9	9.6

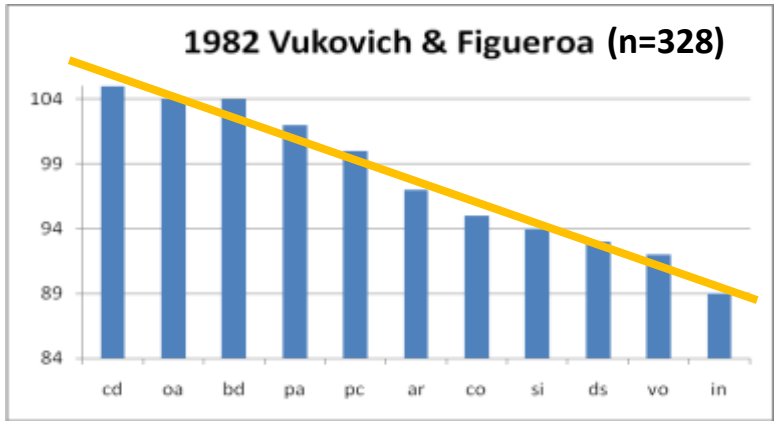
**Data for this subtest were not reported in the study.*

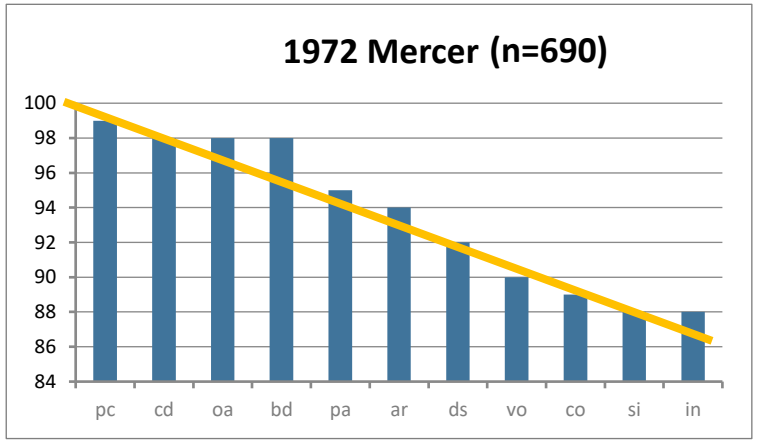
Research Foundations for ELL Evaluation

The Influence of Language on Test Performance: Subtest level



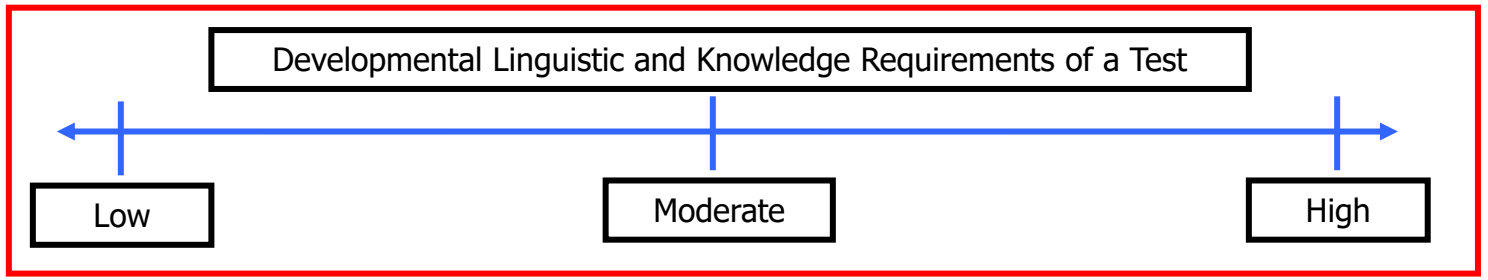




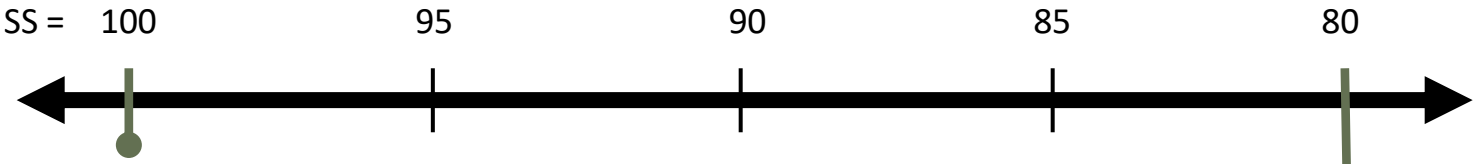


Research Foundations for EL Evaluation

Although it has long been recognized that ***language differences*** likely account for the differences in test performance between English leaners and native English speakers, language has rarely been examined directly as a confounding variable. When so examined, the impact of language on test performance of ELs is not seen to be a simple "verbal vs. nonverbal" dichotomy but rather ***a continuum formed by a linear and proportional attenuation of performance.***



The more a test requires age-based developmental language proficiency and acculturative knowledge, the more the effect on test performance.



For ELs, tests that require little or no level of age-based acquisition of language and cultural knowledge yield scores at or close to the normative mean.

For ELs, tests that require full or high levels of age-based acquisition of language and cultural knowledge yield scores much lower than the normative mean.

Research Foundations for EL Evaluation

ELs vs. non-ELs *and* ELs vs. ELs

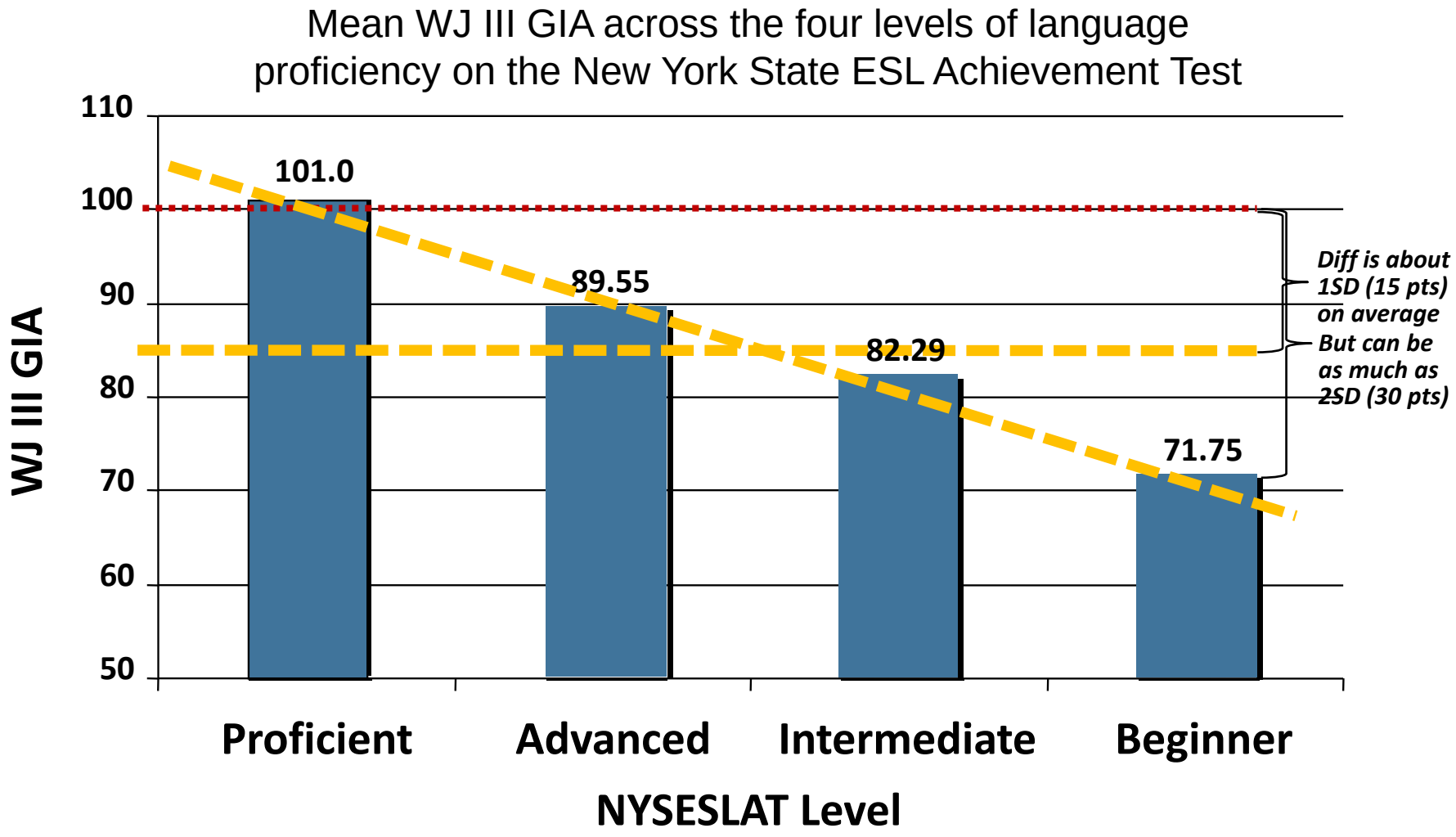
Clearly, we have known for a long time that ELs do not perform comparably to native-English speakers at any level of cognitive ability testing and that the reason is due to differences in developmental language proficiency that arises out of differential exposure to English (i.e., ELs do not learn English from birth). Thus, a 10 year old Hispanic student who began learning English when entering kindergarten has only had about ½ of the exposure to English as that of a monolingual, native-English speaking student and to compare their performance on tests that are moderately to heavily saturated with or dependent on language would be unfair and inappropriate.

However, it is also inappropriate to view all ELs as being equal in terms of their English exposure. A 10 year old Hispanic study who started learning English upon school entry at age 5 is not comparable to another 10 year old Hispanic student who started learning English last year. The difference in exposure is 50% vs. only 10% and evaluation in English would be unfair and discriminatory and thus, biased against the student with only 10% exposure.

As such, it is necessary to further examine EL performance from the perspective of how ELs compare against other ELs with higher, lower, and similar levels of English exposure and developmental language proficiency. Most studies simply ignore this issue and those studies that do examine EL performance in this manner sometimes do not examine the full range of proficiency necessary to illustrate this principle.

Research Foundations for ELL Evaluation

The Influence of Variable Language Exposure on Test Performance: Broad ability level

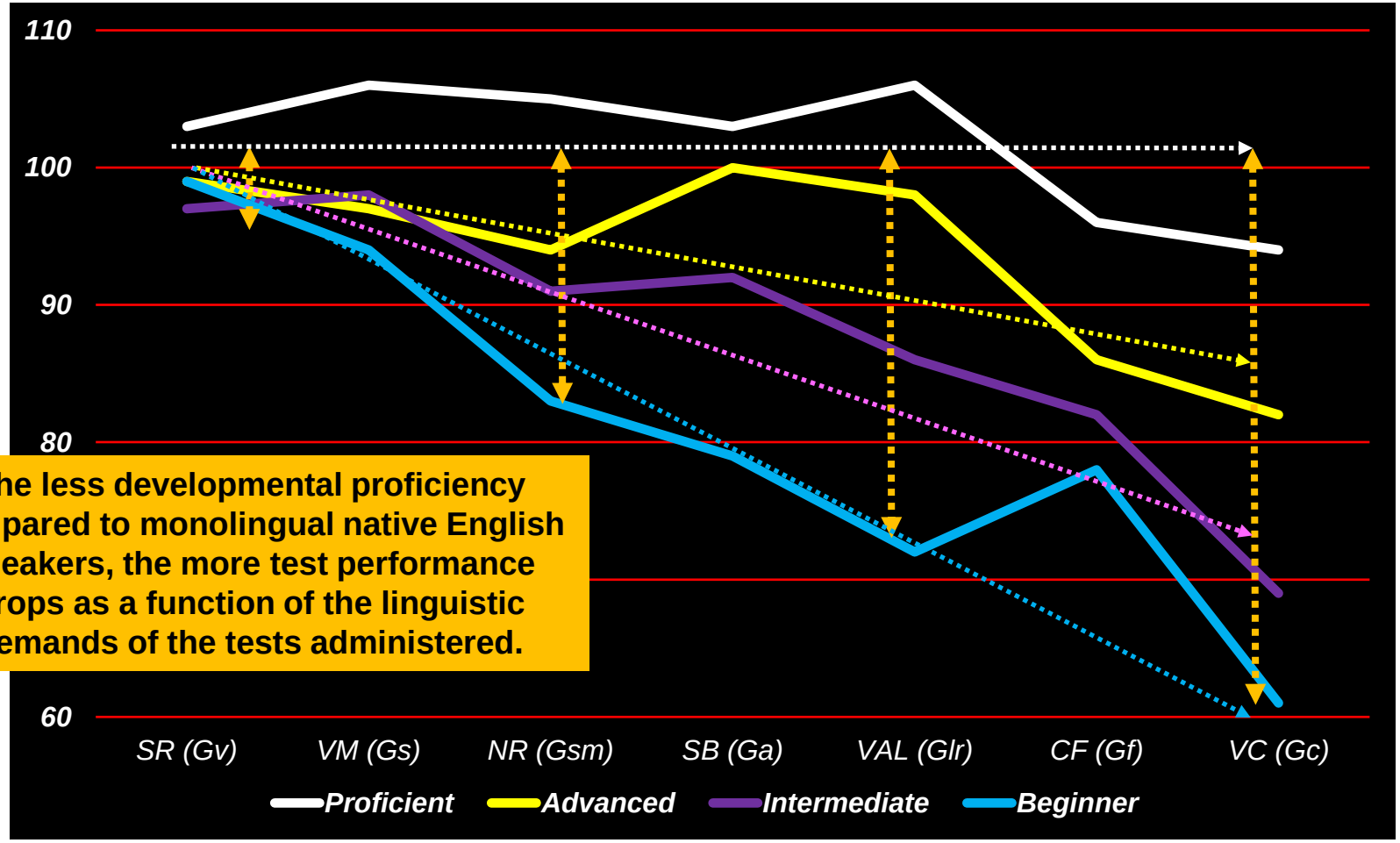


Source: Sotelo-Dynega, M., Ortiz, S.O., Flanagan, D.P., Chaplin, W. (2013).

Research Foundations for ELL Evaluation

The Influence of Variable Language Exposure on Test Performance: Broad ability level

Domain specific scores across the seven WJ III subtests according to language proficiency level on the NYSESLAT



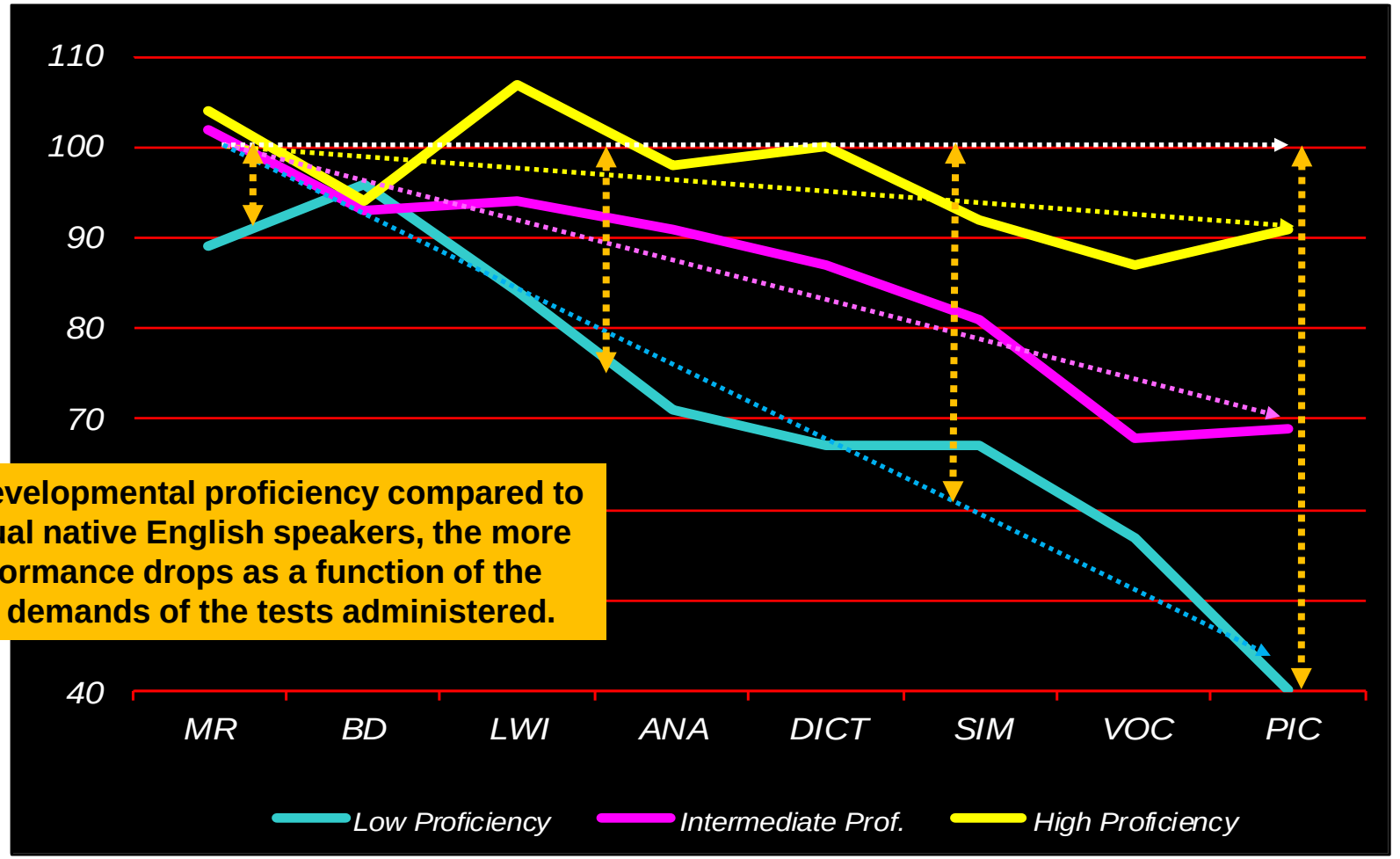
The less developmental proficiency compared to monolingual native English speakers, the more test performance drops as a function of the linguistic demands of the tests administered.

Source: Sotelo-Dynega, M., Ortiz, S.O., Flanagan, D.P., Chaplin, W. (2013). English Language Proficiency and Test Performance: Evaluation of bilinguals with the Woodcock-Johnson III Tests of Cognitive Ability. Psychology in the Schools, Vol 50(8), pp. 781-797.

Research Foundations for ELL Evaluation

The Influence of Variable Language Exposure on Test Performance: Broad ability level

Mean subtest scores across the four WASI subtests and four WMLS-R subtests according to language proficiency level



The less developmental proficiency compared to monolingual native English speakers, the more test performance drops as a function of the linguistic demands of the tests administered.

Source: Dynda, A. M. (2008). The relation between language proficiency and IQ test performance. Unpublished manuscript. St. John's University, NY.

Summary of the Foundational Research Principles with English Learners

1. Test performance of ELs is moderated by the degree to which a given index or subtest relies on or requires age- or grade-expected English language development and the acquisition of incidental acculturative knowledge.

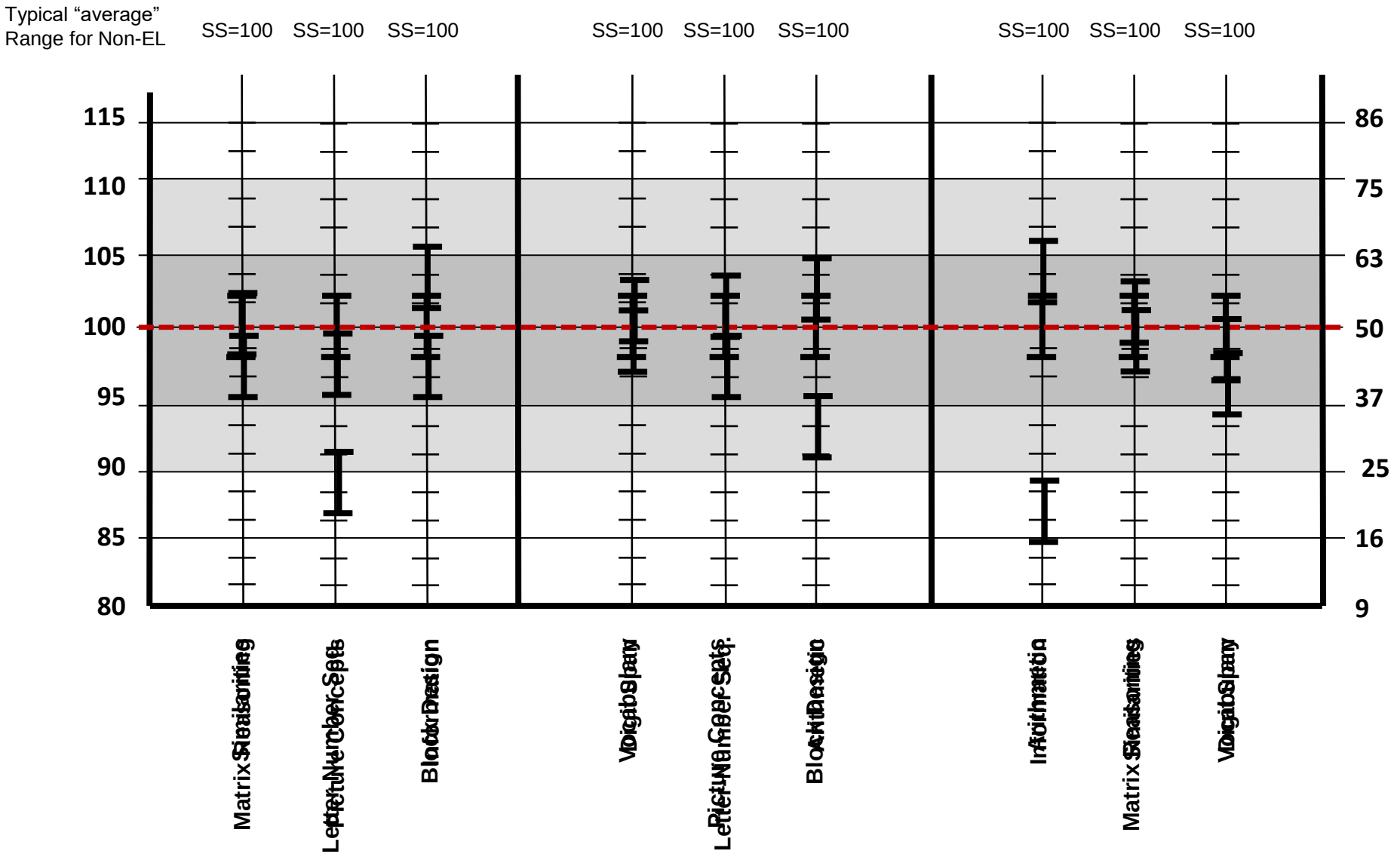
2. Because ELs, as a group, vary widely in terms of their own developmental English language proficiency and acculturative knowledge acquisition, index or subtest performance is affected proportionally according to degree of exposure.

Proper interpretation of EL test performance thus requires a true peer group that is based not on the language spoken by the individual but on comparison to other ELs with the same degree of English exposure and development.

With one exception, current test norm samples lack control for developmental differences in English language exposure. This means that interpretation of test scores at any level must be made within the context of research which provides the only empirically-derived, albeit, very rough, true peer standard or “norm group”.

Use of research on the relative test performance of ELs based on language exposure (as reflected by the degree of “difference” the student displays relative to the norm samples of the tests being used) is the very foundation and sole purpose of the C-LIM.

Fairness in Determining "Average" Performance



Research Foundations for EL Evaluation

EL performance is moderated by level of English proficiency

Tests with "high" language demands

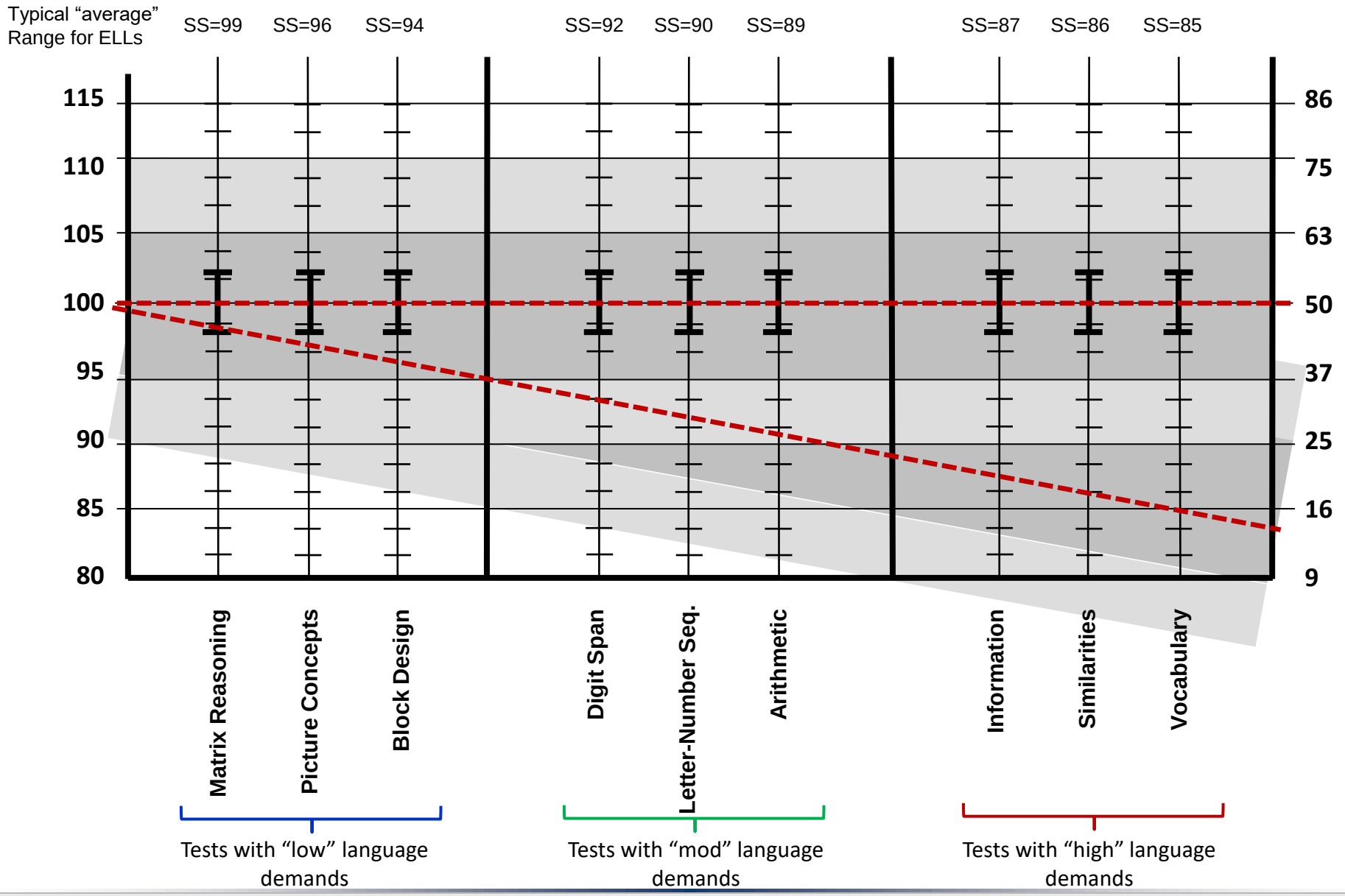
Tests with "mod" language demands

Tests with "low" language demands

	Mercer 1972	Vukovich & Figueroa, 1982	Cummins 1982	Nieves-Brull 2006		
Subtest Name	**Scale Score**	**Scale Score**	**Scale Score**	**Scale Score**	**Grand Mean**	**C-LIM Level**
Information	7.5	7.8	5.1	7.2	85	5
Vocabulary	8.0	8.3	6.1	7.5	87	5
Similarities	7.6	8.8	6.4	8.2	89	4
Comprehension	7.8	9.0	6.7	8.0	89	4
Digit Span	8.3	8.5	7.3	*	90	3
Arithmetic	8.7	9.4	7.4	7.8	92	3
Picture Arrangement	9.0	10.3	8.0	9.2	96	3
Block Design	9.5	10.8	8.0	9.4	97	2
Object Assembly	9.6	10.7	8.4	9.3	98	2
Picture Completion	9.7	9.9	8.7	9.5	97	1
Coding	9.6	10.9	8.9	9.6	99	1

**Data for this subtest were not reported in the study.*

Fairness in Determining "Average" Performance



Application of Research as Foundations for the Cultural and Linguistic Classification of Tests and Culture-Language Interpretive Matrix

EXAMPLE OF POPULAR WISC SUBTESTS ARRANGED IN THE C-LIM BASED ON RESEARCH ON EL TEST PERFORMANCE

DEGREE OF LINGUISTIC DEMAND

DEGREE OF CULTURAL LOADING	LOW	MODERATE	HIGH
LOW	Coding Object Assembly Level 1 SS= 99	Block Design Level 2 SS= 97	Digit Span Level 3 SS= 91
MODERATE	Picture Completion Level 2 SS= 97	Arithmetic Level 3 SS= 91	Comprehension Level 4 SS= 89
HIGH	Picture Arrangement Level 3 SS= 91	Level 4 SS= 89	Information Similarities Vocabulary Level 5 SS= 85

Application of Research as Foundations for the Cultural and Linguistic Classification of Tests and Culture-Language Interpretive Matrix

RESEARCH-BASED MEANS REGARDING EXPECTED PERFORMANCE FOR ELs BY DEGREE OF DIFFERENCE

Degree of Linguistic Demand

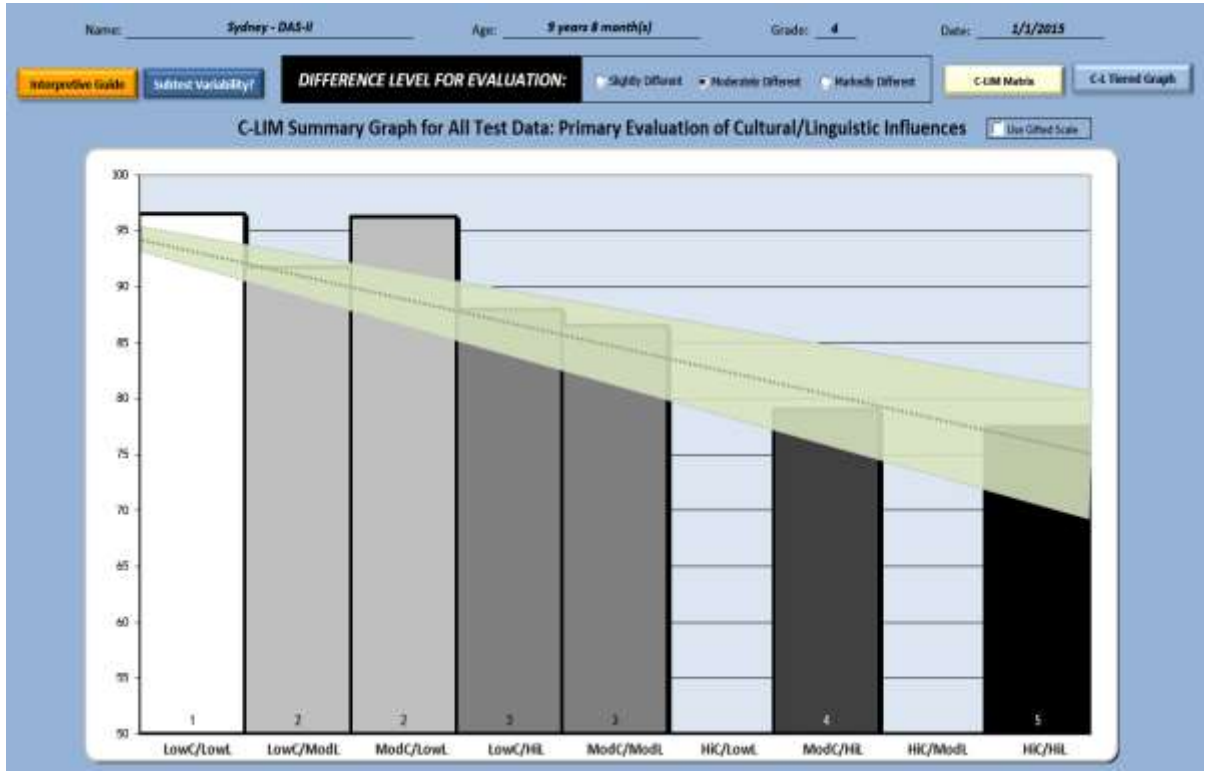
Degree of Cultural Loading	Low	Moderate	High
Low	Slightly Different: 3-5 points Moderately Different: 5-7 points Markedly Different: 7-10 points	Slightly Different: 5-7 points Moderately Different: 7-10 points Markedly Different: 10-15 points	Slightly Different: 7-10 points Moderately Different: 10-15 points Markedly Different: 15-20 points
Moderate	Slightly Different: 5-7 points Moderately Different: 7-10 points Markedly Different: 10-15 points	Slightly Different: 7-10 points Moderately Different: 10-15 points Markedly Different: 15-20 points	Slightly Different: 10-15 points Moderately Different: 15-20 points Markedly Different: 20-25 points
High	Slightly Different: 7-10 points Moderately Different: 10-15 points Markedly Different: 15-20 points	Slightly Different: 10-15 points Moderately Different: 15-20 points Markedly Different: 20-25 points	Slightly Different: 15-20 points Moderately Different: 20-25 points Markedly Different: 25-35 points

***Slightly Different**: Includes individuals with very high levels of English language proficiency (e.g., CALP) and high acculturation, but still not entirely comparable to mainstream U.S. English speakers. Examples include individuals who are third generation in the U.S., have well educated/higher SES parents, have attended dual-language program for at least 6-7 years, or demonstrate native or near native-like proficiency in English language conversation and solid literacy skills. (Not a common category)*

***Moderately Different**: Includes individuals with moderate to higher levels of English language proficiency (e.g., advanced BICS/emerging CALP) and typical EL acculturative learning experiences. Examples include individuals who were born or came early to the U.S. with limited English speaking parents, usually from low to very low SES with parent's having low or limited literacy even in their own language, generally received formal education in English only or primarily in English since starting school.*

***Markedly Different**: Includes individuals with low to very low levels of English language proficiency (e.g., early BICS) or very limited acculturative learning experiences due to unusual influences on development. Examples include extremely low and limited parental SES and education, recently arrival in the U.S. or residence for in the U.S. 3 years or less, lack of prior formal education, exposure to trauma, violence, abuse, neglect, time spent in refugee or resettlement camps, changes in or multiple early languages.*

Basic Interpretation of Test Score Validity via the C-LIM



Example of "Invalid" score pattern—overall general decline **AND** scores within or above expected (average) range. Performance is primarily due to linguistic and cultural factors: CANNOT interpret scores.

Example of "Valid" score pattern—no overall decline **OR** scores below expected (average) range. Performance is NOT due primarily to linguistic and cultural factors: OK to interpret scores (except Gc).

A Critical Review of C-LIM Research: Kranzler et al.

According to the demographic information regarding the participants used in the study, the sample:

1. was comprised of ELs with a mean age of 11 with an average grade placement of 6th

2. of the included ELs, approximately 74% had been educated in their native language and country prior to coming to the U.S.

3. was extremely small (n=46) and there was no control regarding level of English language proficiency or native language proficiency

Thus, the age, grade, and background of 3/4th of the ELs in the sample suggests that the vast majority of participants had very likely already undergone full academic skill development in their native language (i.e., had developed CALP) prior to receiving an education in the U.S. Despite being very different than the background and development of typical ELs in the U.S., the results remained quite consistent with the research underlying the C-LIM, especially that indicated by the “slightly different range.

A Critical Review of C-LIM Research: Kranzler et al.

WJ III DATA FOR PARTICIPANTS IN STUDY (ENGLISH)

XBA Culture-Language Interpretive Matrix (XBA C-LIM v2.0) for WJ III NU COG

Name: *Kranzler et al. Sample* Age: _____ Grade: _____ CLEAR DATA SAVE DATA

DEGREE OF LINGUISTIC DEMAND

DEGREE OF CULTURAL LOADING

	LOW			MODERATE			HIGH		
		Score			Score			Score	
LOW	WJ III Spatial Relations	99	99	WJ III Numbers Reversed	99	99	WJ III Analysis-Synthesis		
				WJ III Visual Matching	97	97	WJ III Auditory Working Memory		
							WJ III Concept Formation	96	96
	Cell Average =	99		Cell Average =	98		Cell Average =	96	
MODERATE		Score			Score			Score	
	WJ III Pair Cancellation			WJ III Delayed Recall: Visual Auditory Learning			WJ III Auditory Attention		
	WJ III Picture Recognition	102	102	WJ III Rapid Picture Naming			WJ III Decision Speed		
	WJ III Planning			WJ III Retrieval Fluency			WJ III Incomplete Words		
				WJ III Visual Auditory Learning	84	84	WJ III Memory for Words		
							WJ III Sound Blending	91	91
	Cell Average =	102		Cell Average =	84		Cell Average =	91	
HIGH		Score			Score			Score	
							WJ III General Information		
							WJ III Verbal Comprehension	83	83
	Cell Average =			Cell Average =			Cell Average =	83	

CULTURE-LANGUAGE GRAPH | LANGUAGE-ONLY GRAPH | CULTURE-ONLY GRAPH | RETURN TO INDEX | PRINT MATRIX

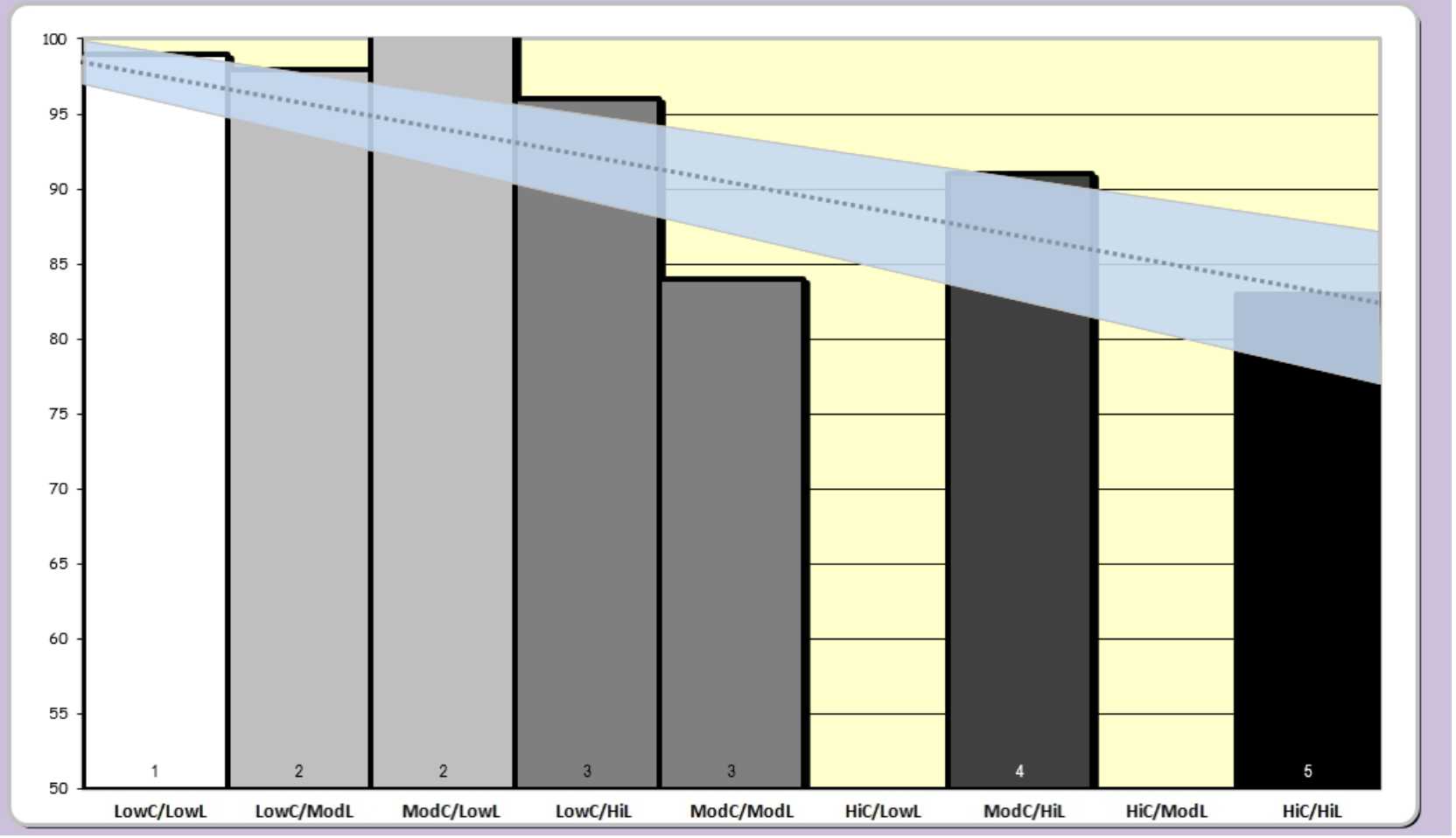
A Critical Review of C-LIM Research: Kranzler et al.

WJ III DATA FOR PARTICIPANTS IN STUDY (ENGLISH)

Name: _____ Age: _____ Grade: _____

DIFFERENCE LEVEL FOR EVALUATION: (•) Slightly Different ( ) Moderately Different ( ) Markedly Different

XBA C-LIM Graph for WJ III NU COG: Primary Evaluation of Cultural and Linguistic Influences



A Critical Review of C-LIM Research: Kranzler et al.

Comparison of Order of Means for WJ III Classifications

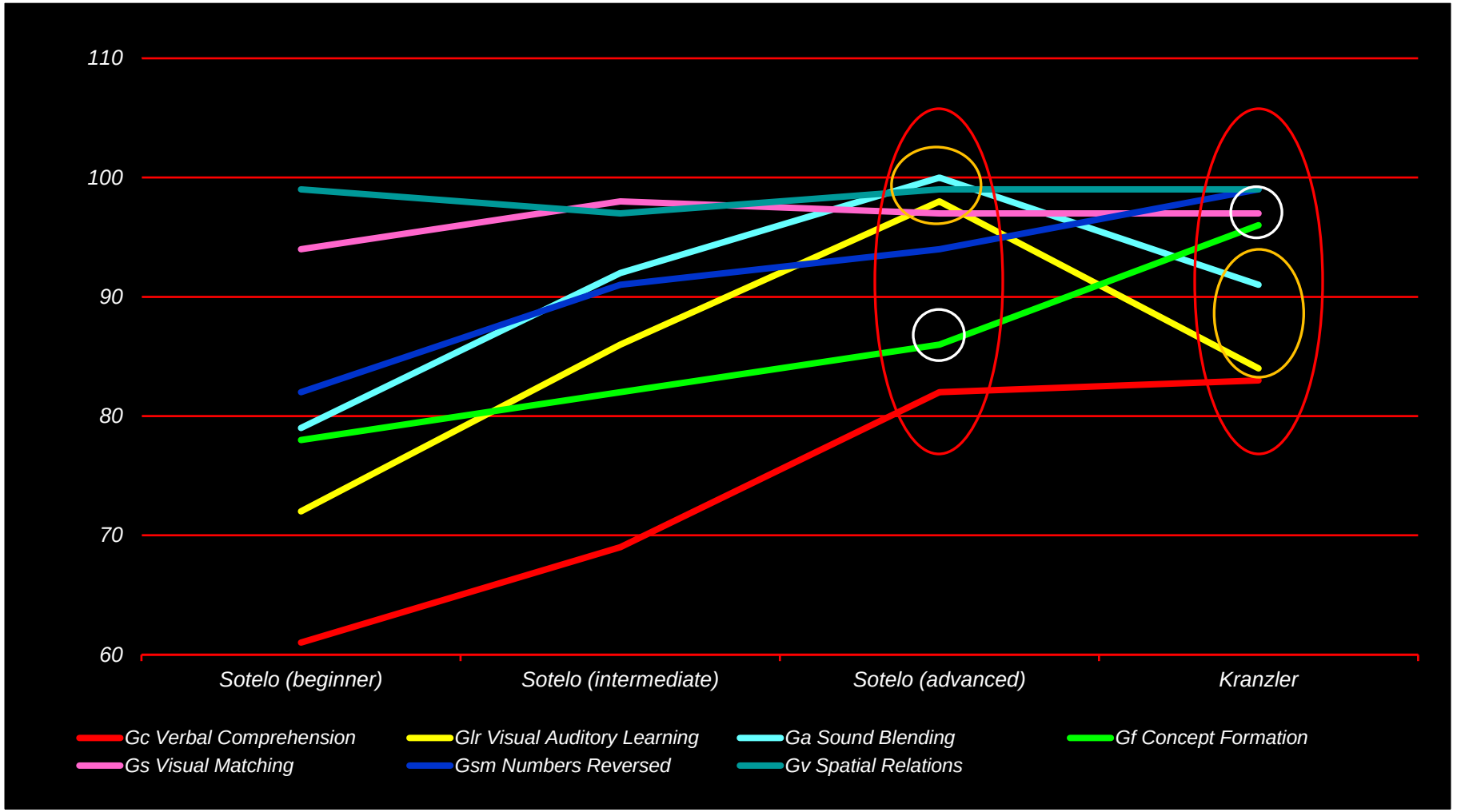
	C-LIM Classifications	Kranzler et al., 2010*
Level 1	Gv - Spatial Relations	Gv - Spatial Relations
Level 2	Gsm - Numbers Reversed	Gsm - Numbers Reversed
	Gs - Visual Matching	Gs - Visual Matching
Level 3	Gf - Concept Formation	Gf - Concept Formation
Level 4	Glr - Visual Auditory Learning	Ga - Sound Blending
	Ga - Sound Blending	Glr - Visual Auditory Learning
Level 5	Gc - Verbal Comprehension	Gc - Verbal Comprehension

All 7 of the WJ III subtest means follow the exact C-LIM classifications. Only two are reversed in order but they remain in the same Level.

**Source: Kranzler, J., Flores, C., & Coady, M. (2010). Examination of the Cross-Battery Approach for the Cognitive Assessment of Children and Youth From Diverse Linguistic and Cultural Backgrounds. School Psychology Review, 2010, 39(3), 431-446.*

A Critical Review of C-LIM Research: Kranzler et al.

Mean subtest scores across the seven WJ III subtests –
Comparison of Sotelo-Dynega and Kranzler et al. Data



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A Critical Review of C-LIM Research: Kranzler et al.

- ○ Calculate Sample Size (for specified Power)
- ◉ Calculate Power (for specified Sample Size)

Enter a value for mu1: 100
Enter a value for mu2: 97
Enter a value for sigma: 15

- ◉ 1 Sided Test
- ○ 2 Sided Test

Enter a value for α (default is .05): .05
Enter a value for desired power (default is .80): 0.25
The sample size (for each sample separately) is: 46

- ◉ Calculate Sample Size (for specified Power)
- ○ Calculate Power (for specified Sample Size)

Enter a value for mu1: 100
Enter a value for mu2: 97
Enter a value for sigma: 15

- ◉ 1 Sided Test
- ○ 2 Sided Test

Enter a value for α (default is .05): .05
Enter a value for desired power (default is .80): .80
The sample size (for each sample separately) is: 310

At .80 power, to detect a 4 point diff, n=174, to detect a 5 point diff, n=112, to detect an 8 point diff, n=44.

Despite the significant lack of statistical power, Kranzler et al. concluded that:

> *"a statistically significant (decreasing) trend was observed for the effect of linguistic demand and cultural loading combined."*

Despite use of an older EL sample that was educated before coming to the U.S., the overall results do show a decline in performance as tests become more culturally/linguistically bound. In addition, all WJIII subtest mean values for the EL sample and the order of decline were nearly identical to the order as indicated by current classifications within the C-LIM and provide considerable support for the WJIII classifications within the C-LIM *and also demonstrates the need to account for developmental issues for ELs at various ages and grades*.

A Critical Review of C-LIM Research: Styck & Watkins

The main finding in the study is stated as follows:

> *"The valid C-LIM profile (i.e., cell means did not decline) emerged in the mean WISC-IV normative sample and the ELL sample." (p. 374). (emphasis added)*

It is clear that the normative sample "did not decline" as their mean on every subtest was invariant,10.3 (SS=102). However, for the ELL sample, the highest mean was on Picture Concepts (SS=98) and lowest was on Vocabulary (SS=85). With minor variation, examination of the data in the following table strongly suggests a clear decline in the EL sample's means.

*Source: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382.

A Critical Review of C-LIM Research: Styck & Watkins

Decline or No Decline? Comparison of Means for WISC-IV Subtests

WISC-IV Subtest	Norm Sample Mean[a]	ELL Mean 2013	Difference[b]	ELL Mean 2014	Difference[b]
Picture Concepts	102	98	4	94	8
Matrix Reasoning	102	96	6	93	9
Symbol Search	102	95	7	93	9
Block Design	102	94	8	93	9
Coding	102	94	8	92	10
Comprehension	102	92	10	88	14
Letter-Number Sequencing	102	88	14	84	18
Similarities	102	88	14	86	16
Digit Span	102	87	15	84	14
Vocabulary	102	85	17	82	20

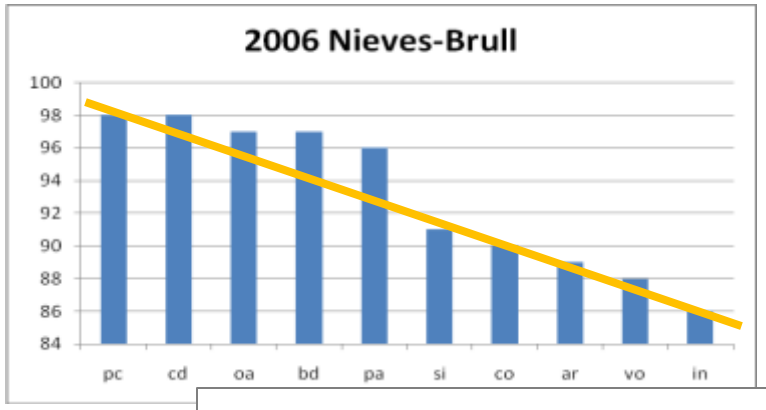
[a] *Means were reported in the study as Scaled Scores (e.g., 10.3). They have been converted here to Deviation IQ metric for the sake of simplicity.*

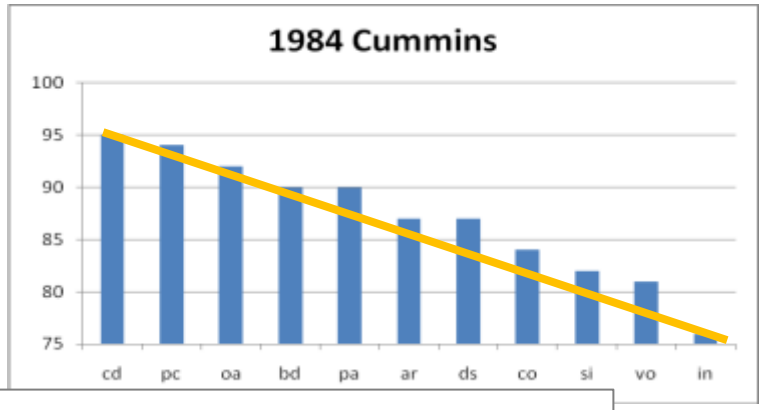
[b] *The difference between all 15 norm sample and ELL subtest and composite means were found to be statistically significant at the p<.001 level.*

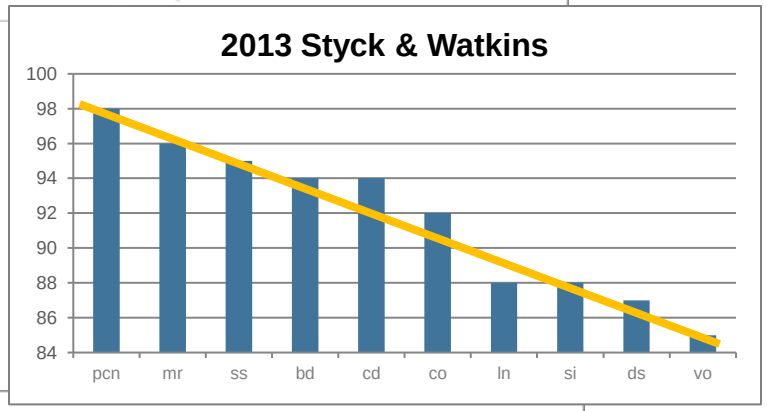
**Sources: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382. and Styck & Watkins, .*

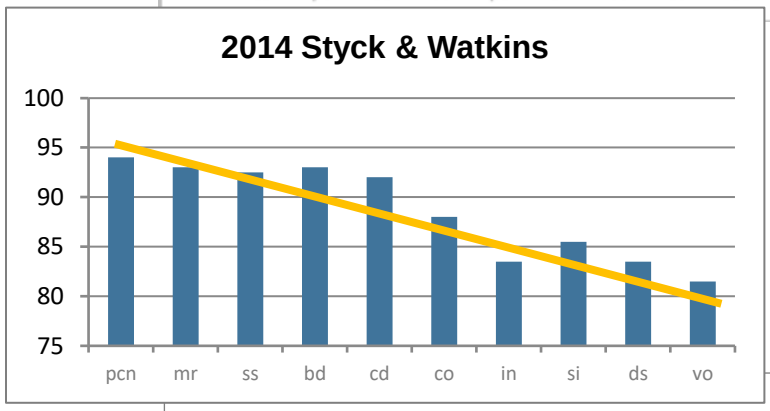
A Critical Review of C-LIM Research: Styck & Watkins

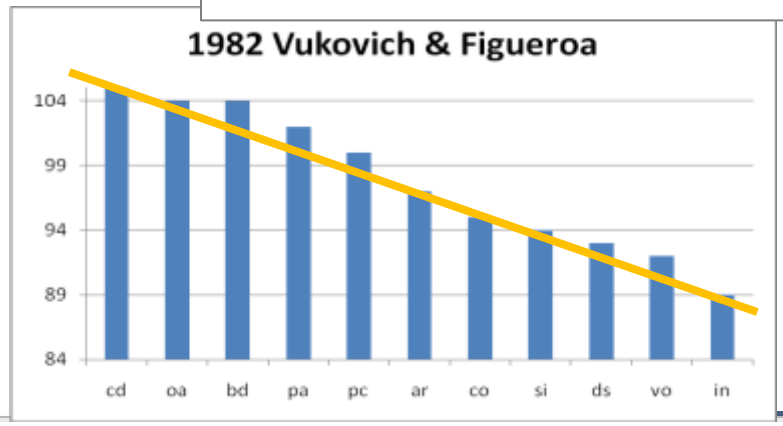
Comparison of 2013/2014 Styck & Watkins data and other WISC studies with ELs

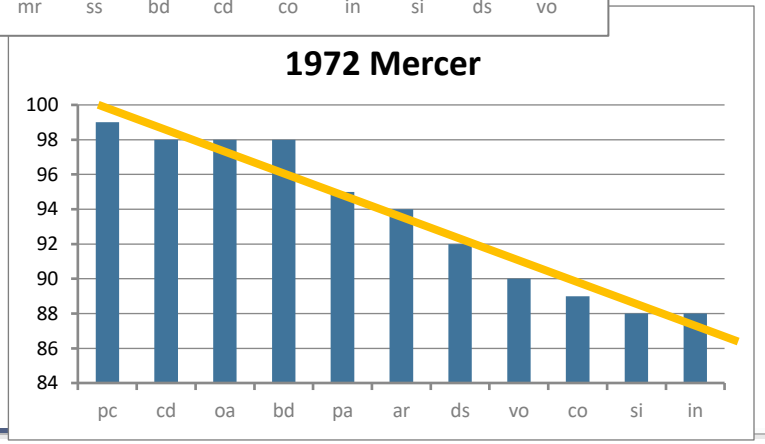












A Critical Review of C-LIM Research: Styck & Watkins

Main conclusion in the 2013 study is stated as follows:

> *"Thus, neither sample of children exhibited the invalid C-LIM profile when group mean scores were considered" (p. 374) (emphasis added).*

The "invalid C-LIM profile" would be indicated by a systematic decline in mean scores in the matrix meaning that the test results were influenced primarily by the presence of cultural and linguistic variables.

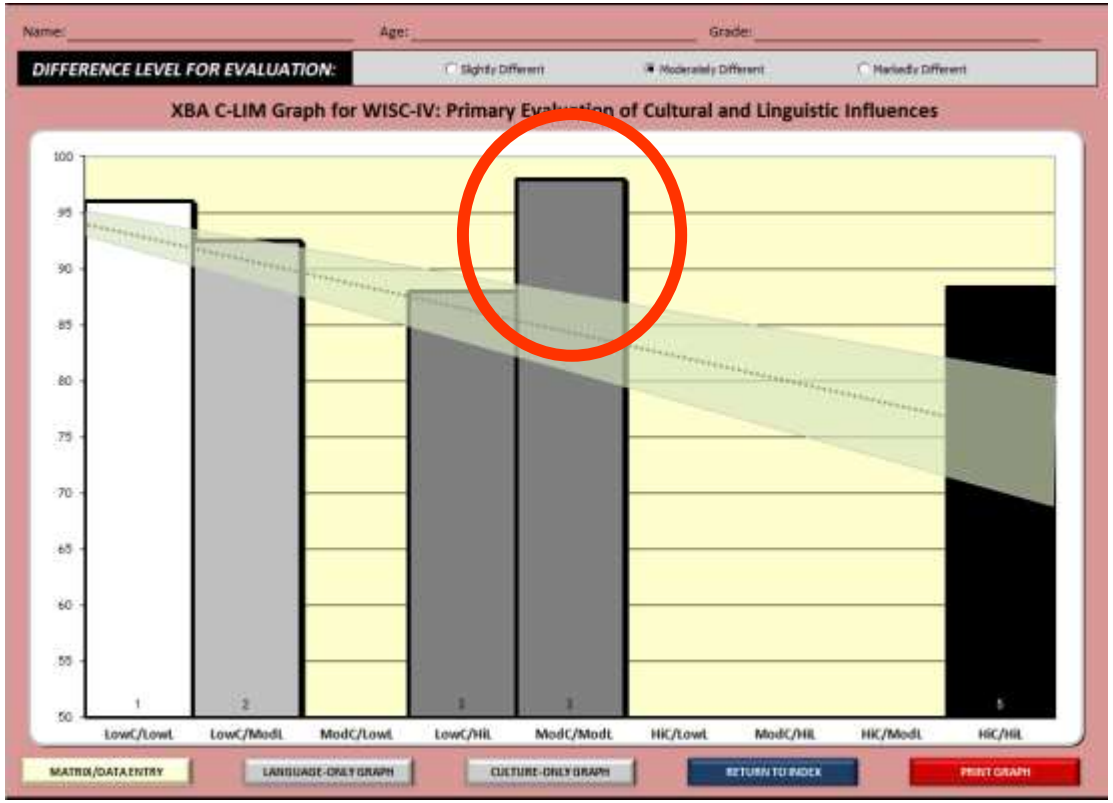
Although the C-LIM is not for use with monolingual, native English speakers, an "invalid" pattern should result anyway because language is effectively controlled in this sample by age and thus not finding a decline is wholly unremarkable and not the least bit unusual or surprising.

However, in an EL sample, the "invalid" pattern should not result and the scores should decline, UNLESS, as in this case, the sample is comprised of individuals, 97% of whom have disabilities. In such cases, there should be no invalid pattern precisely as was observed. Yet, the pattern, given that SLD does not have a single identifying ability deficit profile, remained largely consistent with the C-LIM classifications.

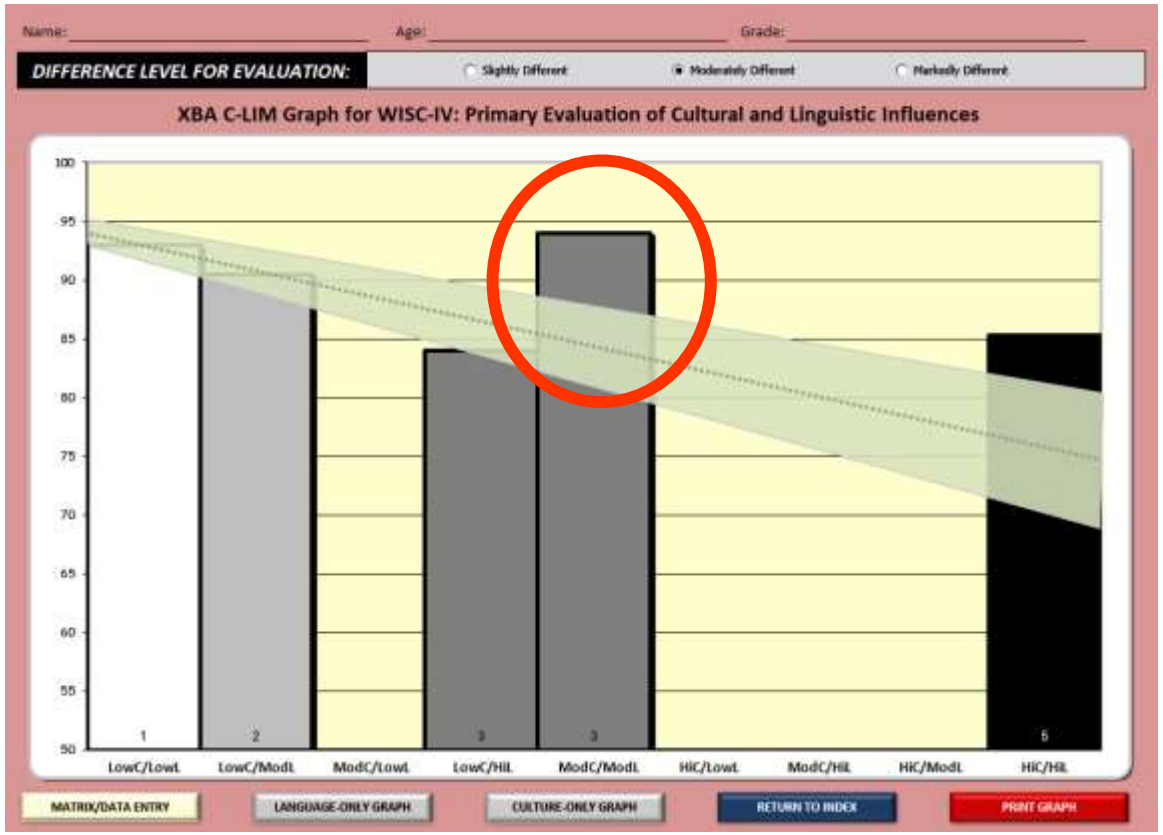
**Source: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382.*

A Critical Review of C-LIM Research: Styck & Watkins

Results of 2013 EL sample using original C-LIM classifications



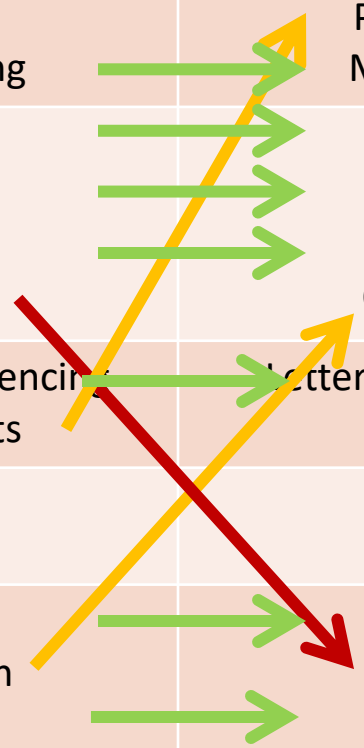
Results of 2014 EL sample using original C-LIM classifications



A Critical Review of C-LIM Research: Styck & Watkins

Comparison of Order of Means for WISC-IV Classifications for ELL Group

	C-LIM Classifications	Styck and Watkins, 2013*	Subtest Means
Tier 1	Matrix Reasoning	Picture Concepts Matrix Reasoning	98 96
Tier 2	Symbol Search Block Design Coding Digit Span	Symbol Search Block Design Coding Comprehension	95 94 94 92
Tier 3	Letter-Number Sequencing Picture Concepts	Letter-Number Sequencing	88
Tier 4			
Tier 5	Similarities Comprehension Vocabulary	Similarities Digit Span Vocabulary	88 87 85

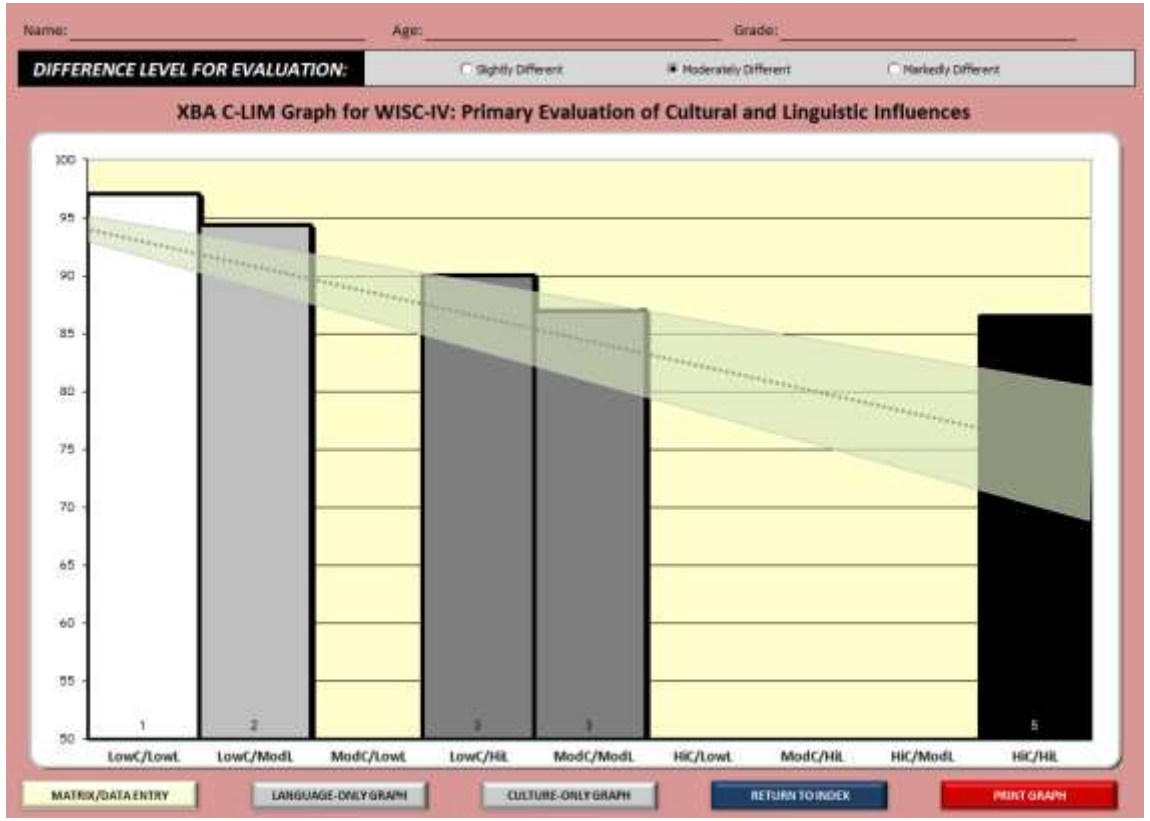


7 of the 10 WISC-IV subtest means follow the exact C-LIM classifications

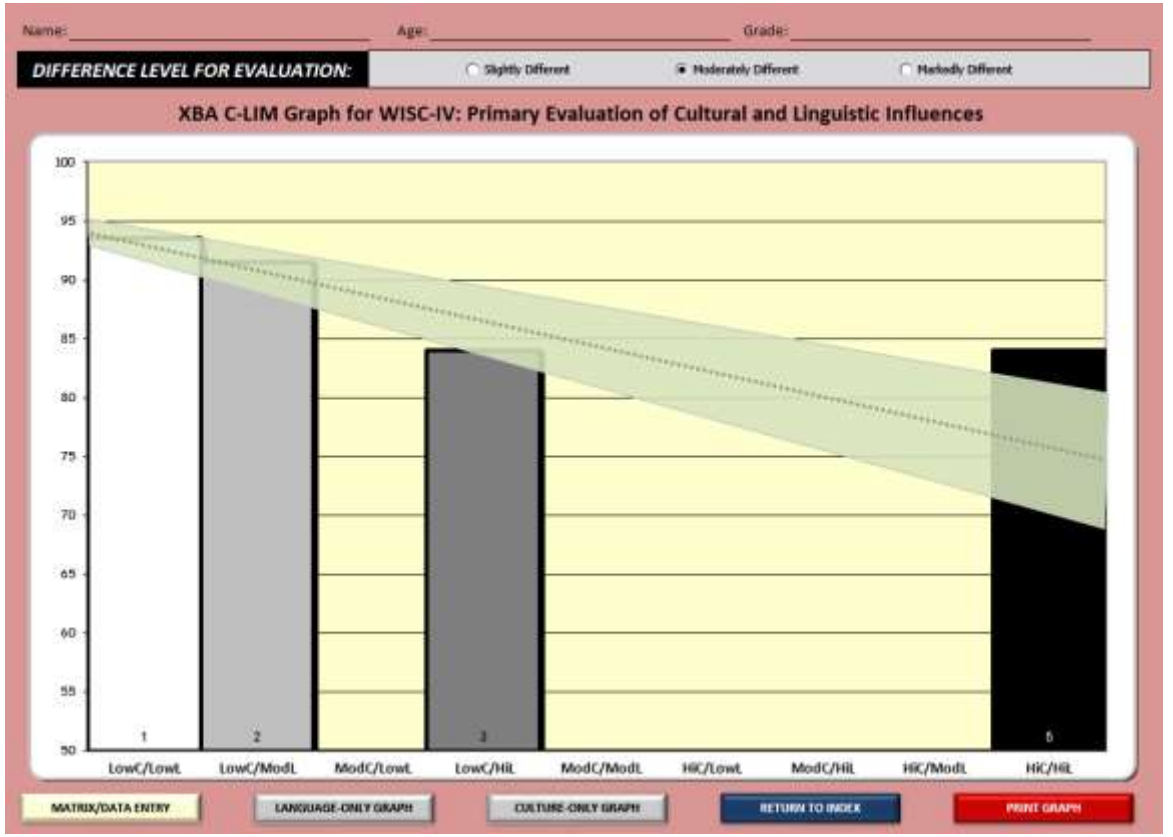
**Table adapted from: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382.*

A Critical Review of C-LIM Research: Styck & Watkins

Results of 2013 EL sample after re-classifying just 3 subtests



Results of 2014 EL sample after re-classifying just 3 subtests



With proper research on non-disabled ELs with a full range of language proficiency, the C-LIM classifications can continue to be refined and improved, particularly as new tests become available.

A Critical Review of C-LIM Research: Styck & Watkins

Of most importance perhaps, the 2013 study noted that:

"roughly 97% of (n = 83) of participants were identified as meeting criteria for an educational disability (86% as SLD)" (p. 371).

As noted previously, this suggests that individual C-LIM profiles for the EL sample should display ***valid*** results (i.e., non-declining), not invalid (i.e., declining), since valid results are needed to support the district's identification of a disability.

Thus, when individual C-LIM's for the EL sample were examined, they found that nearly 89.5% of the ELs did in fact display valid (i.e., non-declining) results contrary to their incorrect expectation that the score patterns should be invalid (i.e., declining). This indicates that because low scores were likely valid, they may very well have reflected a disability and demonstrates a very high degree of consistency with the clinical decisions made by the district's eligibility team, up to 93% overall.

In short, Styck & Watkins interpreted the expected pattern for ELs backwards and thus failed to note the impressive support for the C-LIM in their own data.

**Source: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382.*

A Critical Review of C-LIM Research: Styck & Watkins

		Different (EL Group)	Standard (Norm Group)
WISC-IV C-LIM Analysis	Invalid Scores (decline)	N=9 (N=6, 7.0%) (N=3, 3.5%)	N = 100 (4.9%)
	Valid Scores (no decline)	N = 77 (89.5%)	N = 1,933 (95.1%)

The authors noted that *"roughly 97% of (n = 83) of participants were identified as meeting criteria for an educational disability (86% as SLD)" (p. 371).* Yet, only 9 ELL cases (10.5%) resulted in invalid scores (no disability). Thus, the C-LIM suggested invalid scores in 9 cases, 3 of which were likely correct (those without disabilities) so that the C-LIM was consistent with and supported the placement decision of the child by the district in 93% of the cases (89.5% + 3.5%). Moreover, the results of analyses with the WISC-IV normative sample show that declines relative to language are unusual, perhaps even indications of potential SLI in monolingual, native English speakers as described by Cormier et al. (2014).

To summarize, far from undermining the validity of the C-LIM, the Styck & Watkins studies provide strong and powerful support for the clinical utility and validity of the C-LIM when evaluating EL test performance.

**Table adapted from: Styck, K. M. & Watkins, M. W. (2013). Diagnostic Utility of the Culture-Language Interpretive Matrix for the Wechsler Intelligence Scales for Children—Fourth Edition Among Referred Students. School Psychology Review, 42(4), 367-382.*

A Critical Review of C-LIM Research: Cormier et al.

Table 1. Sample Sizes by Race Category and Age Group.

	Sex		Foreign born status		English spoken at home		English first language	
Race	Male	Female	No	Yes	No	Yes	No	Yes
Caucasian	1,536	1,443	2,909	64	65	2,914	49	2,930
African American	280	362	615	24	31	611	30	612
Native American[a]	51	40	88	3	9	82	4	87
Asian/Pacific Islander[b]	108	114	153	67	122	100	102	120
Hispanic	236	240	400	75	263	213	193	283
Totals	2,211	2,199	4,165	233	490	3,920	378	4,032

[a]Includes American Indian, Eskimo, Aleut.
[b]Includes Chinese, Filipino, Japanese, Asian Indian, Korean, Vietnamese, Other Asian, Pacific Islander.

5% 11% 8.5%

Due to the norming requirements for the WJIII (English administration) even the 8.5% of ELs included in the sample had to have sufficient English proficiency for inclusion. Therefore, there is very little variability in the developmental English proficiency level of English learners as they are all likely to have been excluded unless they were “highly proficient” in English.

**Source: Cormier, D.C., McGrew, K.S. & Ysseldyke, J. E. (2014). The Influences of Linguistic Demand and Cultural Loading on Cognitive Test Scores. Journal of Psychoeducational Assessment, 32(7), 610-623.*

A Critical Review of C-LIM Research: Cormier et al.

The Influence of Language on Test Performance: Subtest level

Table 3. Variance Explained by Exogenous Variables (Individual Test Performance) by Age Group.

		Variance explained		
	Individual test	7-10	11-14	15-18
Level 5	Verbal Comprehension	.79[c]	.86[c]	.81[c]
	General Information	.71[c]	.85[c]	.86[c]
Level 4	Concept Formation	.67[c]	.71[c]	.67[c]
	Visual–Auditory Learning	.40[b]	.37[b]	.41[b]
	Delayed Recall Visual–Auditory Learning	.39[b]	.32[b]	.37[b]
	Analysis Synthesis	.29[b]	.44[b]	.47[b]
Level 3	Sound Blending	.25[b]	.32[b]	.35[b]
	Auditory Working Memory	.22[b]	.44[b]	.32[b]
	Retrieval Fluency	.22[b]	.22[b]	.28[b]
	Memory for Words	.18[b]	.32[b]	.23[b]
	Numbers Reversed	.17[b]	.26[b]	.30[b]
	Pair Cancelation	.17[b]	.11[b]	.11[b]
	Rapid Picture Naming	.16[b]	.07[a]	.16[b]
Level 2	Incomplete Words	.13[b]	.31[b]	.23[b]
	Visual Matching	.13[b]	.15[b]	.16[b]
	Decision Speed	.12[b]	.15[b]	.19[b]
	Auditory Attention	.10[b]	.20[b]	.15[b]
Level 1	Spatial Relations	.08[a]	.16[b]	.16[b]
	Planning	.07[a]	.12[b]	.11[b]
	Picture Recall	.02[a]	.06[a]	.10[b]

Highest Language Demands

Lowest Language Demands

*Source: Cormier, D.C., McGrew, K.S. & Ysseldyke, J. E. (2014). The Influences of Linguistic Demand and Cultural Loading on Cognitive Test Scores. Journal of Psychoeducational Assessment, 32(7), 610-623.

A Critical Review of C-LIM Research: Cormier et al.

The use of a normative sample allowed for the modeling of the complete spectrum of linguistic abilities and how they may interact with individual test performance from a cognitive battery (i.e., linguistic demand). Initially, the implications of the findings suggest that the linguistic loadings associated with particular tests would primarily affect CLD students. However, the findings are also important for some native English speakers, such as children and adolescents who have speech and language difficulties, given that their scores may also be attenuated due to this testing variable.

The WJIII Normative Sample is comprised primarily of native English speakers, not English learners.

It is important to note that while native-English speakers have their own degree of variability in terms of what is “average” language development at a given age, there is significantly more variability among English learners in this regard and a different level of “average” development.

Therefore, the “complete spectrum of linguistic abilities” was not captured in this sample but instead was restricted to the spectrum associated only with native English speakers.

Nevertheless, the authors conclude that language is a variable that can affect test performance even for native English speakers (e.g., those with speech-language impairments).

**Source: Cormier, D.C., McGrew, K.S. & Ysseldyke, J. E. (2014). The Influences of Linguistic Demand and Cultural Loading on Cognitive Test Scores. Journal of Psychoeducational Assessment, 32(7), 610-623.*

A Critical Review of C-LIM Research: Cormier et al.

Conclusion

The primary conclusion drawn from this study and previous research is that linguistic demand is an important consideration when selecting and interpreting tests of cognitive abilities. The implications of this study go beyond a re-classification of the C-LIM to emphasizing one of the underlying motivations of the C-LIM's initial inception—the importance of considering a student's linguistic background and abilities prior to selecting, administering, and interpreting tests of cognitive abilities. A comprehensive evaluation that takes a student's linguistic ability into consideration should consider that a student's language ability (i.e., conversational proficiency)

Practitioners must do what they must do. There is no option for ignoring the importance of language and its impact on test performance. The C-LIM represents only an initial attempt to quantify research in a manner that makes it translatable into practice. Test score validity cannot be evaluated in any other manner and informal attempts to do so will remain indefensible.

depth as his or her peers (Cummins, 2008). Moreover, as suggested by the results of this study, considering the influence of linguistic ability when assessing cognitive abilities should continue to be supported by empirical evidence, instead of school psychologists continuing to rely on informal measures of linguistic ability through language samples and student interviews to gain

Until and unless test publishers make direct attempts to control for the impact of language on test performance as well as the vast differences in development that can exist among English learners at any age, use of the C-LIM remains the only manner in which these variables can be examined. And finally, there is hope on the horizon…

**Source: Cormier, D.C., McGrew, K.S. & Ysseldyke, J. E. (2014). The Influences of Linguistic Demand and Cultural Loading on Cognitive Test Scores. Journal of Psychoeducational Assessment, 32(7), 610-623.*

Large Scale Examination of the Influence of Language on Test Performance

Stratification Variables in Dual Standardization Norm Samples of the Ortiz PVAT

English Speakers (*N* = 1,530)

- Ages 2:6 to 22:11
- Gender: equal split
- Stratification:
  - Geographic region
  - Parental education level (PEL)
  - Race/ethnicity

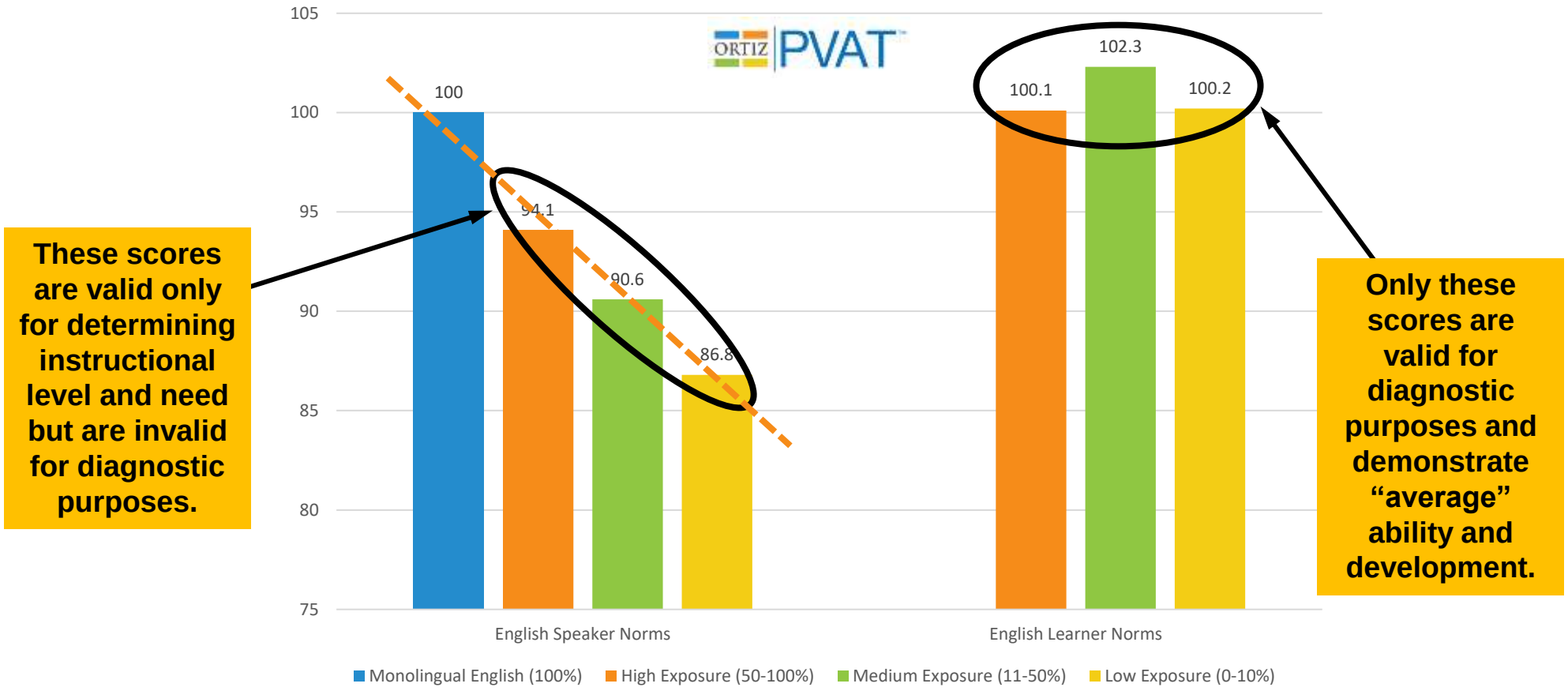
English Learners (*N* = 1,190)

- Ages 2:6 to 22:11
- Gender: equal split
- Stratification:
  - Geographic region
  - Parental education level (PEL)
  - Language spoken at home (53 different languages)
  - Proportion of lifetime exposure to English (i.e., opportunity to learn English):
    - 11 categories for length of exposure to English
    - 0-6 months up to 16+ years

Inclusion of these variables in the stratification of the EL Norm Sample is a completely unique feature of the Ortiz PVAT not found in any other test.

Large Scale Examination of the Influence of Language on Test Performance

Developmental Language/Exposure-based Comparison Provides Validity and Fairness for ELs



Large Scale Examination of the Influence of Language on Test Performance

No evidence of bias regarding native or first language spoken.

English language acquisition is an invariant process, irrespective of the native language. The sequence of learning English remains the same but the rate may be subject to other factors.

Form	Language Spoken	*N*	*M*	*SD*	*F* (*df*)	*p*	Pairwise Comparisons ($p < .01$)	Partial η^2
Form A	Spanish & Spanish Creole	872	101.5	15.5	1.63 (3, 1183)	.181	*ns*	.004
	Indo-European Languages	161	99.4	15.7				
	Asian & Pacific Islander Languages	129	98.8	15.4				
	All Other Languages	28	99.9	15.4				
Form B	Spanish & Spanish Creole	872	101.7	15.5	1.52 (3, 1183)	.208	*ns*	.004
	Indo-European Languages	161	99.8	15.7				
	Asian & Pacific Islander Languages	129	99.0	15.4				
	All Other Languages	28	99.9	15.4				

Large Scale Examination of the Influence of Language on Test Performance

No evidence of bias regarding race or ethnicity

Norm sample for native English speakers demonstrates negligible effect of race/ethnicity, likely due to careful control of monolingual, native-English speaking status in the sample.

Form	Racial/Ethnic Group	*N*	*M*	*SD*	*F (df)*	*p*	Pairwise Comparisons ($p < .01$)	Partial η^2
Form A	Black	280	99.4	15.2	2.60 (3, 1523)	.051	*ns*	.005
	Hispanic	126	99.5	15.4				
	White	1,018	100.5	15.3				
	Other	106	96.3	15.3				
Form B	Black	280	99.6	15.1	2.47 (3, 1523)	.060	*ns*	.005
	Hispanic	126	99.7	15.3				
	White	1,018	100.6	15.2				
	Other	106	96.4	15.2				

The Culture-Language Interpretive Matrix (C-LIM)

Important Facts for Use and Practice

The C-LIM is not a test, scale, measure, or mechanism for making diagnoses. The C-LIM is a dynamic and modifiable visual representation of both current and prior research on the test performance of English learners arranged by mean values that permits examination of the combined influence of acculturative knowledge acquisition and limited English proficiency and its impact on test score validity.

The C-LIM is not a language proficiency measure and will not "distinguish" between native English speakers and English learners and is not designed to determine if someone is or is not an English learner. Moreover, the C-LIM is not for use with individuals who are native English speakers.

The C-LIM is valid as long as the research upon which it is based is valid. Even research critical of the C-LIM continues to provide data that supports its use in evaluation. The failure of researchers to understand the C-LIM or ELs is unfortunate and their criticisms serve only to cloud best practice by unnecessarily alarming practitioners who would otherwise be unable to conduct evidence-based practice without the C-LIM.

The C-LIM's primary purpose is to assist evaluators in ruling out cultural and linguistic influences as exclusionary factors that may have undermined the validity of test scores, particularly in evaluations of SLD or other cognitive-based disorders. Being able to make this determination is the primary and main hurdle in evaluation of ELs and the C-LIM represents an evidence-based method that assists clinician's regarding interpretation of test score data in a nondiscriminatory manner.

Free C-LIM and resources available at: http://facpub.stjohns.edu/~ortizs/CLIM/index.html