

Assessing Writing Skills Using Correct-Incorrect Word Sequences: A National Study

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Abstract

A study of Correct minus Incorrect Word Sequences (CIWS) as a measure of writing skills was conducted with over 1,000 students, including groups of exceptional learners. The study investigated reliability, developmental trends, demographic bias, and how well CIWS discriminates between students with and without learning disabilities and other exceptionalities. Results indicate that CIWS is a relatively unbiased measure with strong inter-scorer reliability. An expected developmental progression was revealed, and the clinical studies indicated that CIWS is an effective measure for differentiating between groups. Participants will learn how to use CIWS to score writing samples, what CIWS measures, how well CIWS discriminates between clinical groups, the strength of its technical properties, and its application to progress monitoring and determining eligibility.

Introduction

- Correct minus Incorrect Word Sequences (CIWS) has traditionally been used as a curriculum-based measure of written grammar and mechanics.
- Previous Research (Espin et al., 2000; Espin, De La Paz, et al., 2008; Espin, Wallace, et al., 2008)
 - CIWS moderately correlated with teacher ratings of student writing samples and performance on state/district writing tests.
 - CIWS is a valid measure of narrative and expository essay writing in the lower and upper grades.
 - CIWS validity coefficients typically range from .6 – .8.
 - CIWS has relatively weaker validity for high performing students (.56 – .6).
 - CIWS inter-scorer agreement is consistently reported between 88% and 92%.
 - CIWS is sensitive to change over time, and is an effective measure for progress monitoring.
- Large-scale studies of CIWS have not been conducted, and many studies have not adequately described and differentiated their clinical samples.

CIWS Scoring Rules

- CWS: A Correct Word Sequence is two adjacent words that are correctly spelled, capitalized, and punctuated, and grammatically and semantically acceptable within the context of the sentence.
A caret (^) is used to mark each CWS.
 - If the first word of a sentence is capitalized, *always* mark a CWS in front of the word.
 - If correct ending punctuation follows the last word of a sentence, *always* mark a CWS after the word.
- IWS: An Incorrect Word Sequence is two adjacent words that do not qualify as a CWS.
A dot (•) is used to mark each IWS.
- CIWS = CWS – IWS: To calculate the CIWS score, sum CWS and IWS separately, and subtract IWS from CWS.

Scoring Example

Essay Composition: Item 1

CWS	IWS	Text
10	1	Hide and Seek is a good game I like playing
5	2	that game at home because there is
9	0	lots of places to hide. You can play
3	3	it anywhere anytime any place. Third
6	2	Reason I like hide and Seek is that
6	2	you can pretend to play that game to
4	1	hide away from your parents.
43	11	

Research Design

Sample

- Nationally stratified and representative sample.
- **1,000** students in **grades 3 – 12** (100 per grade) from the standardization sample of the *Wechsler Individual Achievement Test – Third Edition (WIAT-III®)*.
- 5 special studies:
 - **Academically Gifted and Talented (GT; n = 61)**
 - **Mild Intellectual Disability (Mild Mental Retardation) (MID; n = 35)**
 - **Learning Disorder in Writing (LD-W; n = 44); comorbid LD-R acceptable**
 - **Learning Disorder in Reading (LD-R; n = 78); comorbid LD-W acceptable**
 - **Learning Disorder in Math (LD-M; n = 51); comorbid LD-R acceptable**

Analyses

- **Inter-Scorer Reliability**
 - Correlation: A Pearson correlation between pairs of CIWS raw scores by independent scorers.
 - Percent Agreement: For each pair of raw scores, divided the lower score by the higher score and multiplied by 100.
 - Scale Gradient: Examined the degree of change in standard scores as a result of change in CIWS raw scores.
- **Development Trends** Examined mean CIWS raw scores by grade.
- **Demographic Differences** t test and ANOVA used to examine sex and ethnic differences in performance on CIWS standard scores.
- **Clinical Utility** Matched samples t-tests compared the CIWS standard scores of students in special groups to normally achieving students matched according to grade, age, race/ethnicity, and parent education level.

Results

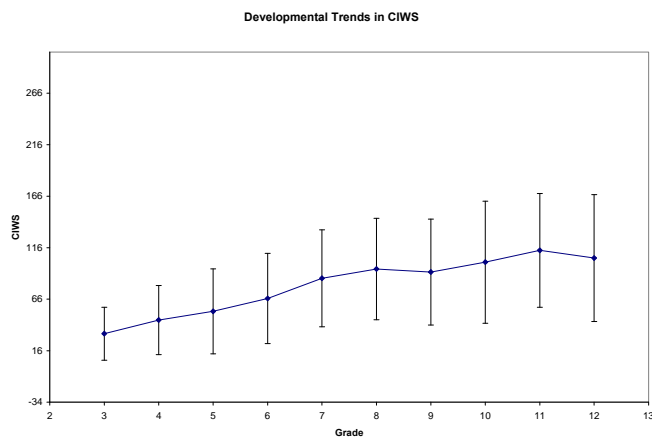
Inter-scorer Reliability

- Correlation: **99 %**
- Percent Agreement: **90 %**
- Scale Gradient: On average, a change of 3 raw score points resulted in a change of 1 std. score point.

Grade	Raw score change for 1 standard score point change	Raw score change for 1 standard deviation change
3 – 4	2	30
5 – 9	3	45
10 – 12	4	60
Avg	3	45

Development Trends

Mean CIWS raw scores generally increase as grade level increases.



Demographic Differences

The Nation's Report Card (NCES, 2003) reported the following statistically significant results from the NAEP writing assessment:

- Females scored higher than males (grades 4, 8, 12).
- White & Asian/Pacific Islander students scored higher than Black and Hispanic students (grades 4, 8, 12).
- Hispanic students scored higher than Black students in grade 12.

This study found similar statistically significant results for CIWS performance:

- Females scored higher than males overall (and in each grade except 9 and 11).
- White and Other students scored higher than Black and Hispanic students overall, but almost never by grade (White students outperformed Black students in grades 5 and 7).
- Hispanic students scored higher than Black students overall, but *not* by grade.

Score	Females		Males		diff	t	Sig.	d
	Mean	SD	Mean	SD				
CIWS Std. Score	103.51	15.01	96.50	14.05	7.01	-7.63	<.001**	.39

** $p < .01$.

Comparison		Mean Difference	Std. Error	Sig.	d
(x)	(y)	(x-y)			
White	Black	8.14	1.39	<.001**	.47
	Hispanic	3.76	1.23	.013*	.20
Other	Black	10.50	2.23	<.001**	.67
	Hispanic	6.12	2.14	.023*	.36
	White	2.36	1.94	.615	.14
Black	Hispanic	-4.38	1.66	.042*	-.27

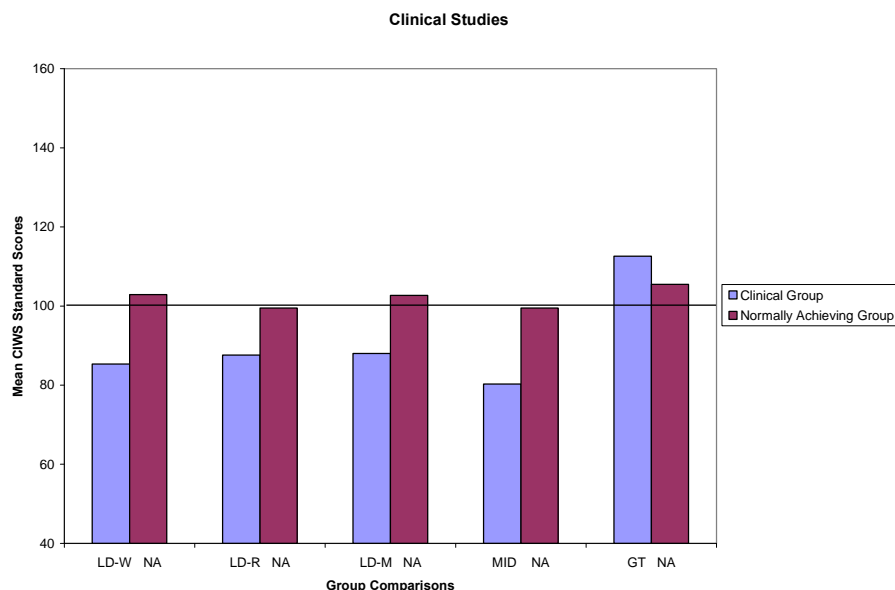
* $p < .05$. ** $p < .01$.

Clinical Utility

Matched t-tests revealed significant differences between the NA group and each of the special groups; this finding supports previous research (Espin, Wallace, et al., 2008).

Comparison	n	Clinical		Normal		diff	t	Sig.	d
		Mean	SD	Mean	SD				
LD-W / NA	44	85.3	9.7	102.9	14.6	17.66	6.40	<.001**	1.43
LD-R / NA	78	87.6	8.9	99.5	11.7	11.83	7.04	<.001**	1.14
LD-M / NA	51	88.0	12.3	102.7	15.3	14.67	5.46	<.001**	1.06
MID / NA	35	80.3	7.2	99.5	13.7	19.17	6.50	<.001**	1.76
GT / NA	61	112.6	15.6	105.5	14.1	-7.16	-2.81	<.01**	-.48

** $p < .01$



Conclusions

This research supports **CIWS** as a valid and reliable measure of written expression (grammar and mechanics) for use with a diverse student population.

- **Inter-scorer Reliability** **CIWS** is a robust and highly reliable measure that is not sensitive to small amounts of variance in scoring.
- **Development Trends** **CIWS** means and standard deviations increase expectedly with grade level.
- **Demographic Bias** **CIWS** is an unbiased measure that is sensitive to validated gender and ethnic differences in writing ability. Such differences may be explained by cultural, environmental, and developmental factors.
- **Clinical Utility** **CIWS** differentiates between NA students and LD–W, LD–R, LD–M, MID, and GT groups.

Applications

- **Comprehensive Evaluation:** **CIWS** can be converted to a norm–referenced score.
 - The **WIAT–III®** includes **CIWS** as a measure of written expression, yielding a supplemental standard score to assist practitioners in determining eligibility, diagnosing writing disorders, and/or planning intervention.
- **Progress Monitoring:** The **WIAT–III®** yields percentile ranks for **CIWS**, which can be used in conjunction with **CIWS** raw scores to track progress over time.

References

- Espin, C.A., De La Paz, S., Scierka, B.J., and Roelofs, L. (2008). The relationship between curriculum-based measures in written expression and quality and completeness of expository writing for middle school students. *The Journal of Special Education, 38*(4), 208–217.
- Espin, C., Shin, J., Deno, S.L., Skare, S., Robinson, S., and Benner, B. (2000). Identifying indicators of written expression proficiency for middle school students. *The Journal of Special Education, 34*(3), 140–153.
- Espin, C., Wallace, T., Campbell, H., Lembke, E.S., Long, J.D., and Ticha, R. (2008). Curriculum-based measurement in writing: Predicting the success of high-school students on state standards tests. *Exceptional Children, 74*(2), 174–193.
- National Center for Education Statistics (ED). (2003). *The Nation’s Report Card: Writing Highlights, 2002* (Report No. NCES-2003-531). Washington, DC: Author.