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Assessing Speech Sound Disorders in Children: Administration, Scoring and Interpretation of the Khan-Lewis Phonological Analysis-Third Edition (KLPA-3), presented in partnership with Pearson Assessments

Presenter: Nancy Lewis, MPA, MS CCC-SLP

Moderated by:

Amy Hansen, M.A., CCC-SLP, Managing Editor, SpeechPathology.com

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Nancy Lewis, MPA, MS CCC-SLP
December 8, 2016
Speechpathology.com Webinar Series

Disclosures

Presenter Disclosures

Course Content

• Focuses on **Assessing Speech Sound Disorders in Children: Administration, Scoring and Interpretation of the Khan-Lewis Phonological Analysis Third Edition**

Financial: Nancy Lewis is the co-author of the Khan-Lewis Phonological Process Analysis-Third Edition and receives a royalty for the sale of this product.

Non-Financial: There are no relevant non-financial relationships to disclose.

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Learner Objectives

- List two conditions for which the KLPA-3 should be added to a child's assessment plan.
- Follow the steps for scoring and analyzing the KLPA-3, including both CORE and SUPPLEMENTAL phonological process usage.
- List at least three factors to consider when evaluating a child's error patterns on KLPA-3 for treatment planning.

Overview of the KLPA-3

- Behind the Scenes Story
- The benefits of updating the Khan-Lewis Phonological Analysis
- What's the Same? What's New?
- Scoring and Analyses
- Print and Digital Choices
- Interpretation and Treatment Planning
- Clinician-to-Clinician Assessment Tool

Behind the Scenes…

- Early 1980's Linda Khan and Nancy Lewis began to develop a phonological analysis as a companion tool to a traditional articulation test: Goldman-Fristoe Test of Articulation
- In the field, strict distinctions between Articulation and Phonology
- Evidence began to surface regarding the outcomes of using a phonological approach to therapy, especially with children with multiple errors
- As clinicians, we understood the value of expanding the results of a traditional articulation matrix to include phonological process profile
- Rather than *Articulation* vs *Phonology*; the GFTA/KLPA act in tandem to provide a comprehensive evaluation of a child's speech sound production; Strong professional collaboration
- Current Terminology in Field: Speech Sound Disorders

Why Update a Test?

- Updated Normative Data
  - KLPA-2 was released in 2002; normative data over 13 years-old
  - Though speech-sound development has remained fairly constant over time, our interpretation of the standardization data reflects current literature in the field
  - Expanded normative data
- Third Edition represents stronger collaboration with GFTA-3 for seamless alignment between the two assessments
- Psychometric characteristics benefit from updated tests
- Data indicators reflect current best practices

What has Stayed the Same?

- Developed as companion tool to GFTA 3
- Allows clinician to complete a phonological process analysis based on the single-word productions elicited via the GFTA-3
- Results in a comprehensive speech sound production profile that is achievable within most clinical/school settings
- Sound Change Map
- Consonant Phonetic Inventory
- Normative data for individuals from 2 years to 21;11
- Normative data set derived from U.S. standardization sample

Administration, Scoring, and Analysis

What is New?

- Sixty stimulus words for the GFTA-3 Sounds-in-Words subtest
- Selected from over 126 target words that were field-tested
- Chosen via collaborative process with GFTA-3 authors, KLPA-3 authors and Pearson test development team
- Include monosyllabic, bisyllabic and multisyllabic target words
  - house
  - duck
  - guitar
  - vegetable
- Diligent effort to limit cultural bias

Clinician-to-Clinician Tool

- KLPA-3 was developed by clinicians for clinicians
- Constructed to be an efficient yet reliable way to derive a speech sound error & phonological process profile for individuals with speech sound disorders
- Designed to facilitate treatment planning and progress monitoring

Core Phonological Processes

Data-driven determination of the phonological processes that were frequently occurring and developmental in nature

- **12 Core Phonological Processes**

- **Deaffrication**
- **Gliding of Liquids**
- **Stopping**
- **Stridency Deletion**
- **Vocalization of Liquids**
- **Palatal Fronting**
- **Velar Fronting**
- **Cluster Simplification**
- **Deletion of Final Consonant**
- **Syllable Reduction**
- **Final Devoicing**
- **Initial Voicing**

Core Phonological Processes: New Normative Data

- Derived Scores based on the performance of individuals in the standardization sample
  - Standard Scores
  - Percentile Ranks
  - Age-Equivalent
  - Confidence Intervals
  - Scores for females and males
- Core Phonological Process Analysis
- Plus qualitative data
  - Percent of Occurrence
  - Processes per Word (PPW)

Core Phonological Processes: New Normative Data

CORE Phonological Processes

						Manner					Place		Reduction			Voicing	
ITEM	Target Word	IPA Transcription	Individual's Response	Target Sound	Sound Change	Deaffrication	Gliding of liquids	Stopping of fricatives and affricates	Stridency deletion	Vocalization	Palatal fronting	Velar fronting	Cluster simplification	Deletion of final consonant	Syllable reduction	Final devoicing	Initial voicing
1	house	haʊs		h													
				s													
2	door	dor		d													
				r													
3	pig	pɪg		p													
				g													

Close Up of Processes

Manner					Place		Reduction			Voicing	
Deaffrication	Gliding of liquids	Stopping of fricatives and affricates	Stridency deletion	Vocalization	Palatal fronting	Velar fronting	Cluster simplification	Deletion of final consonant	Syllable reduction	Final devoicing	Initial voicing

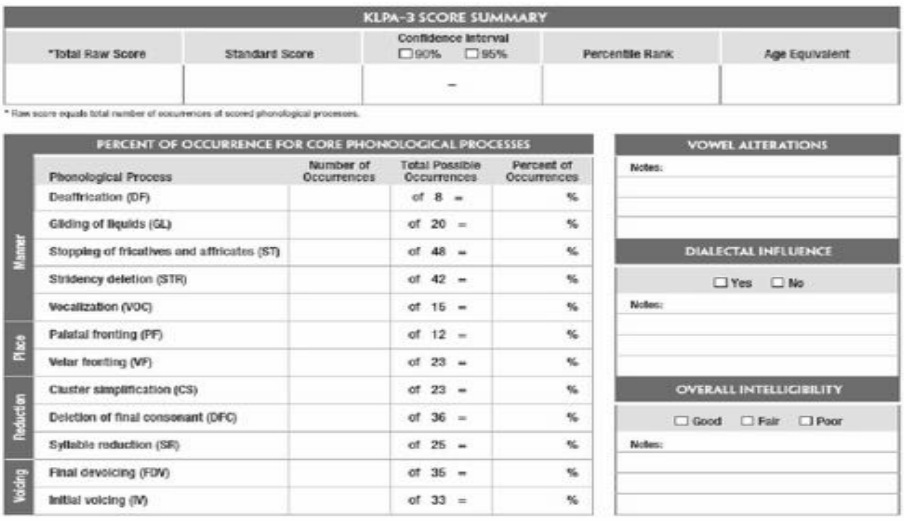
•

12 Core Phonological Processes Summary Raw Scores

	Manner					Place		Reduction			Voicing	
	Deaffrication	Gliding of liquids	Stopping of fricatives and affricates	Stridency deletion	Vocalization	Palatal fronting	Velar fronting	Cluster simplification	Deletion of final consonant	Syllable reduction	Final devoicing	Initial voicing
Subtotal 1												
Subtotal 2												
Subtotal 3												
+ Subtotal 4												
SUMS OF SUBTOTALS												

TOTAL RAW SCORE

Cover Page/Summary Data



KLPA-3 SCORE SUMMARY

*Total Raw Score	Standard Score	Confidence Interval ☐90% ☐95%	Percentile Rank	Age Equivalent
		–		

* Raw score equals total number of occurrences of scored phonological processes.

PERCENT OF OCCURRENCE FOR CORE PHONOLOGICAL PROCESSES

	Phonological Process	Number of Occurrences	Total Possible Occurrences	Percent of Occurrences
Manner	Deaffrication (DF)		of 8 =	%
	Gliding of liquids (GL)		of 20 =	%
	Stopping of fricatives and affricates (ST)		of 48 =	%
	Stridency deletion (STR)		of 42 =	%
	Vocalization (VOC)		of 15 =	%
Place	Palatal fronting (PF)		of 12 =	%
	Velar fronting (VF)		of 23 =	%
Reduction	Cluster simplification (CS)		of 23 =	%
	Deletion of final consonant (DFC)		of 36 =	%
	Syllable reduction (SR)		of 25 =	%
Voicing	Final devoicing (FDV)		of 35 =	%
	Initial voicing (IV)		of 33 =	%

VOWEL ALTERATIONS

Notes:

DIALECTAL INFLUENCE

☐ Yes ☐ No

Notes:

OVERALL INTELLIGIBILITY

☐ Good ☐ Fair ☐ Poor

Notes:

12 Supplemental Phonological Processes

Data-driven determination of the phonological processes that were more clinical in nature

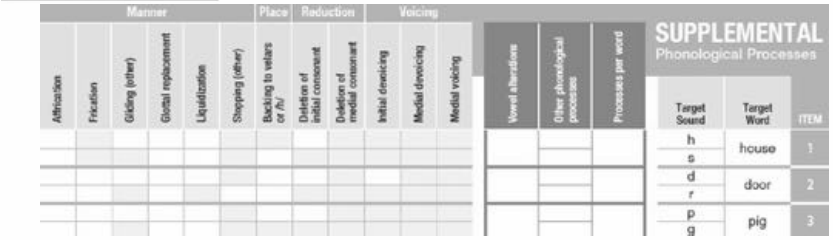
12 Supplemental Phonological Processes

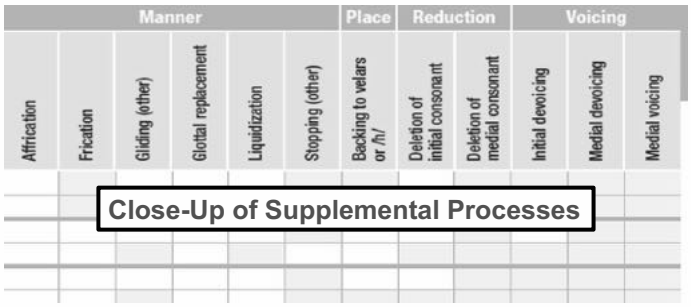
- Affrication
- Frication
- Gliding (other than Liquids)
- Glottal Replacement
- Liquidization
- Stopping (Other than Fricative/Affricates)
- Backing to Velars
- Deletion of Initial Consonants
- Deletion of Medial Consonants
- Initial Devoicing
- Medial Devoicing
- Medial Voicing

Supplemental Phonological Processes

- The 12 Supplemental Phonological Processes are recorded, tallied and converted to Percents of Occurrence
- Generally, Supplemental Phonological Processes occur less frequently in typical development
- Clinical signs that could be diagnostic or prognostic and may be red flags for further consideration
- Contribute to the Processes per Word (PPW)

12 Supplemental Phonological Processes





12 Supplemental Phonological Processes Percent of Occurrence

Manner						Place	Reduction		Voicing		
Affrication	Frication	Gliding (other)	Glottal replacement	Liquidization	Stopping (other)	Backing to velars or /h/	Deletion of initial consonant	Deletion of medial consonant	Initial devoicing	Medial devoicing	Medial voicing
of 151 =	of 111 =	of 81 =	of 159 =	of 124 =	of 59 =	of 134 =	of 58 =	of 27 =	of 41 =	of 22 =	of 11 =
___%	___%	___%	___%	___%	___%	___%	___%	___%	___%	___%	___%

Core & Supplemental Phonological Processes Definitions

Core Phonological Process Definitions

Manner

DF **Deaffrication:** deleting the stop feature of an affricate, with retention of the continuant, or fricative, feature
chair → [sɛr] /tʃ/ → [s]

GL **Gliding of liquids:** producing the liquids /l/ and /r/ as glides /w/ and /j/
giraffe → [dʒəwæf] /r/ → [w]

ST **Stopping of fricatives and affricates:** stopping a fricative, resulting in an affricate, stop, or glottal stop; stopping an affricate, resulting in a stop or glottal stop
pajamas → [pədɑmas] /dʒ/ → [d]

STR **Stridency deletion:** deleting stridency from strident consonants either through deletion or replacement
chair → [tɛr] /tʃ/ → [t]

Supplemental Phonological Process Definitions

Manner

AFF **Affrication:** adding a stop feature to the continuant feature of a fricative
brushing → [bɛʌtʃɪŋ] /ʃ/ → [tʃ]

FRC **Frication:** changing any nonfricative or nonaffricate consonant to a fricative
quack → [kvæk] /w/ → [v]

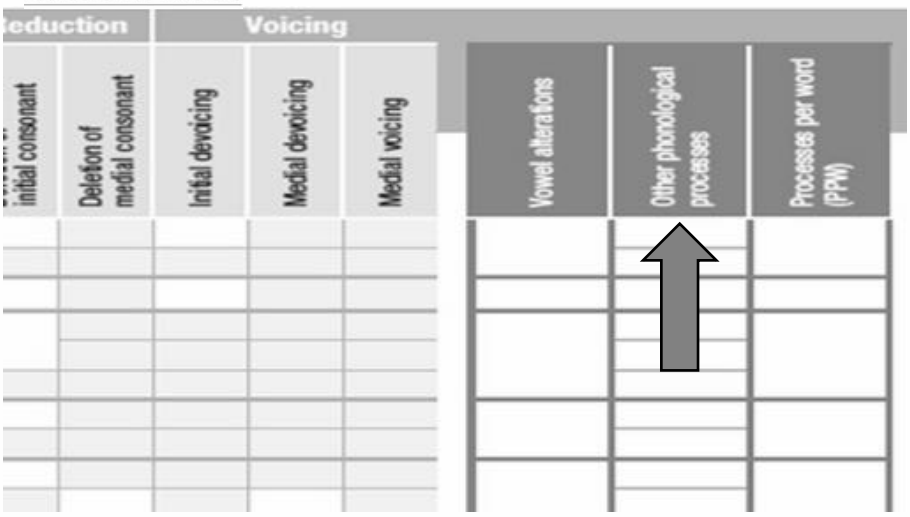
GL(Oth) **Gliding of consonants other than liquids:** changing a nonliquid consonant to a glide in a position other than word-finally
shoe → [ju] /ʃ/ → [j]

GR **Glottal replacement:** using a glottal stop to replace any consonant
vacuum → [vaʔum] /kj/ → [ʔ]

Other Phonological Processes and Sound Change Booklet

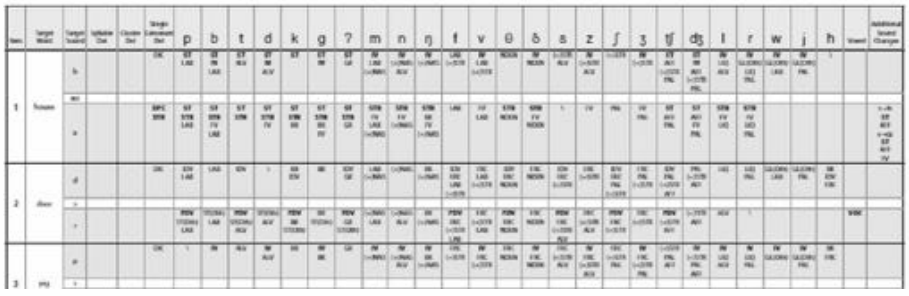
- Individuals may use phonological processes that are not included in the Core or Supplemental Processes
- The KLPA-3 Sound Change Booklet, just like the Second Edition, aids scoring by providing you with phonological processes for many possible sound changes for each target consonant
- Other Phonological Processes may be recorded on the KLPA-3 Analysis Form and may contribute to the PPW

Other Phonological Processes



Sound Change Booklet

Sound Change Booklet



Item	Target Word	Target Sound	Syllable Del	Cluster Del	Single Consonant Del	p	b	t	d	k
1	house	h			DIC	ST LAB	ST IV LAB	ST ALV	ST IV ALV	ST
		au								
		s			DFC STR	ST STR LAB	ST STR FV LAB	ST STR	ST STR FV	ST STR BK

Close up of page

What is New?

- **8 Vowel Phonological Processes**

- Backing
- Fronting
- Centralization
- Decentralization
- Raising
- Lowering
- Diphthongization
- Monophthongization

Vowel Analysis: Definitions

Vowel Phonological Process Definitions

Backing: producing a front vowel as a back vowel
monkey → [mʌŋku] /ɪ/ → [u]

Fronting: producing a back vowel as a front vowel
frog → [freg] /ɔ/ → [e]

Centralization: producing a front or back vowel as a central vowel
cookie → [kukə] /ʊ/ → [ə]

Decentralization: producing a central vowel as a front or back vowel
cup → [kop] /ʌ/ → [o]

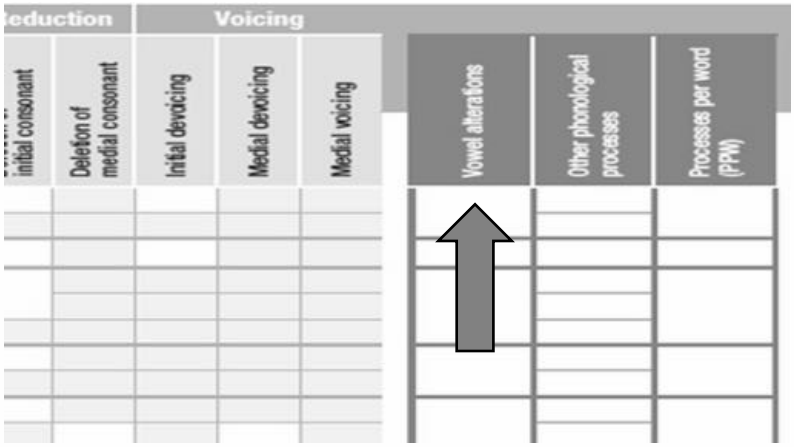
Raising: altering vowel production by raising vowel height
giraffe → [dʒərɪf] /æ/ → [ɪ]

Lowering: altering vowel production by lowering vowel height
blue → [blɑ] /u/ → [ɑ]

Diphthongization: producing a monophthong as a diphthong
go → [gɔɪ] /o/ → [ɔɪ]

Monophthongization: producing a diphthong as monophthong
boy → [bɔ] /ɔɪ/ → [ɔ]

Vowel Alterations



Vowel Analysis: Inventory and Usage

Vowel Analysis

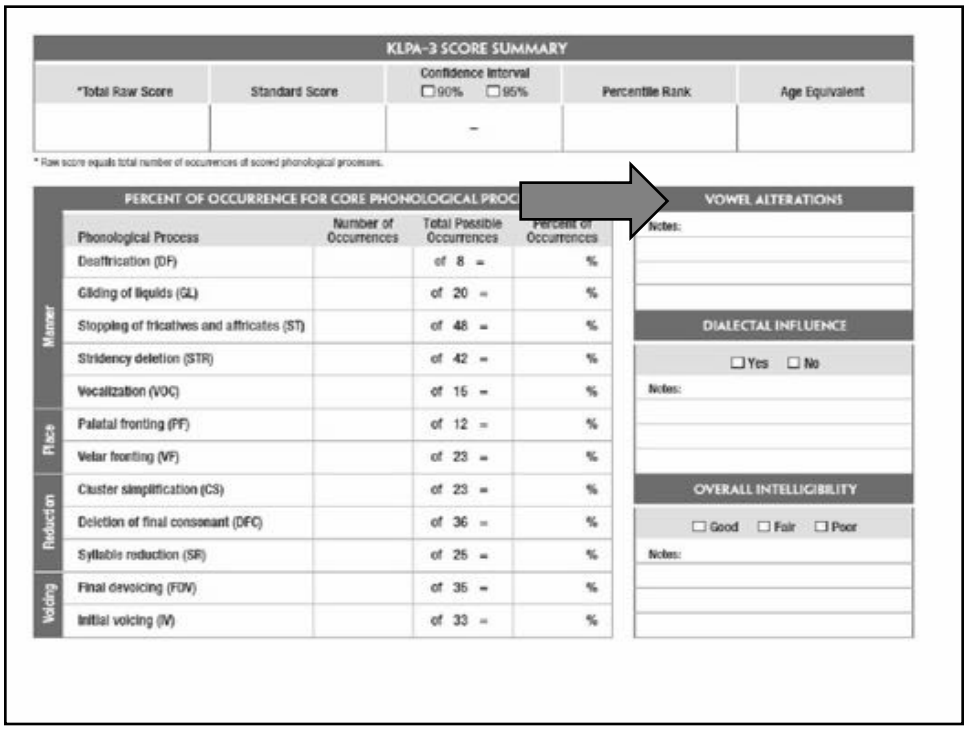
Phonetic Inventory for Vowels in Single Words

Vowels Produced

	Front	Central	Back
High	i leaf		u zoo
	ɪ pig		ʊ cookie
Mid	e plate	ə zebra	o soap
	ɛ web	ʌ cup	ɔ frog
Low	æ hammer		ɑ watch

Diphthongs		
au house	aɪ knife	ɔɪ boy

Vowel Phonological Processes	Individual's Vowel Usage
Backing	
Fronting	
Centralization	
Decentralization	
Raising	
Lowering	
Diphthongization	
Monophthongization	



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		–		

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	Stridency deletion (STR)		of 42 =	%
	Vocalization (VOC)		of 15 =	%
Place	Palatal fronting (PF)		of 12 =	%
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Reduction	Cluster simplification (CS)		of 23 =	%
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Voicing	Final devoicing (FDV)		of 35 =	%
	Initial voicing (IV)		of 33 =	%

VOWEL ALTERATIONS

Notes:

DIALECTAL INFLUENCE

☐ Yes ☐ No

Notes:

OVERALL INTELLIGIBILITY

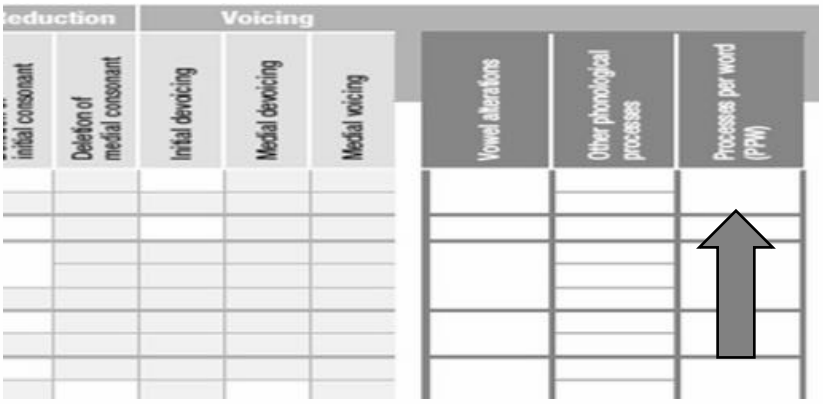
☐ Good ☐ Fair ☐ Poor

Notes:

KLPA3 KHAN-LEWIS PHONOLOGICAL ANALYSIS

What is New?

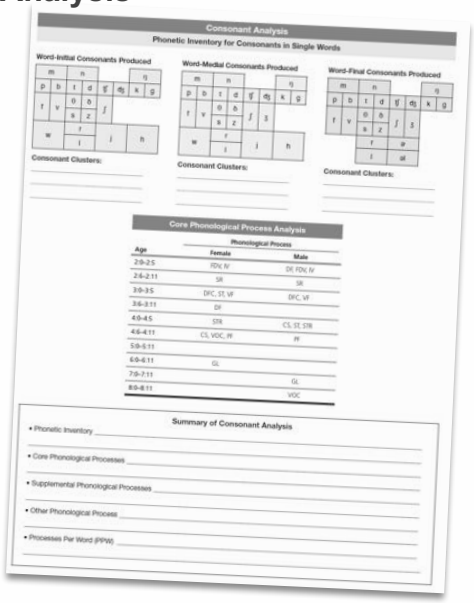
- **PPW: Processes Per Word Calculation**



Consonant Analysis

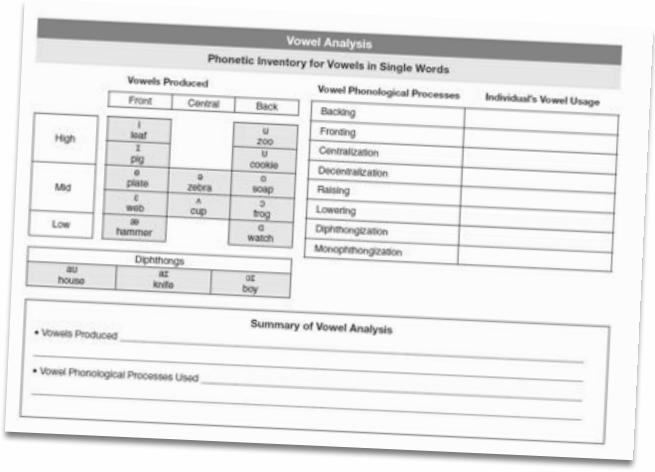
Includes:
Phonetic Inventory for Consonants
Core Phonological Process Analysis
Summary of Consonant Analysis:

- Phonetic inventory
- Core phonological processes
- Supplemental phonological processes
- Other phonological processes
- Processes per word (PPW)



Vowel Analysis

- Eight phonological processes that impact vowel production
- Analysis Form includes column for Vowel Alterations
- Vowel Phonetic Inventory
- Vowel Production Summary page



Summary of Scores Provided

Core Processes

- Standard scores
- Confidence bands
- Percentiles
- Age equivalents
- Occurrence and suppression of phonological processes in the normative sample by age

Scores Are Only Valuable When Assessment Tools are Reliable and Valid

Psychometric Characteristics and Technical Information: Initial Development

- Test feedback
  - GFTA-2 and KLPA-2 test users
  - Content and bias review panel
  - Field test examiner feedback
- Literature review
  - Review of current best practices, including the ASHA Scope of Practice
  - Review of the research literature, especially information related to articulation/phonological process assessment

Psychometric Information

Based on 2013 U.S. Census American Community Survey

N = 1500

198 sites in the U.S.

13.2% of the sample was bilingual
(English as primary language)

Special Education representation *(as well as Gifted and Talented)* in the normative sample

KLPA3
KHAN-LEWIS
PHONOLOGICAL ANALYSIS

Psychometric Information

Reliability
Internal Consistency:
Alphas ranged from .81 to .99
Overall alphas range from .94–.95

Test-retest Stability .94

Inter-scorer Agreement for Core Processes .97–1.0 *(Overall: 1.0)*

Validity
Evidence based on test content

Evidence based on response processes

Evidence based on relationships to other variables:
Correlation with KLPA-2: .73
(Mean of 4.5 standard score points lower than KLPA-2)

NEW! Sensitivity/Specificity
-1 SD: .93/.83
-1.5 SD: .81/.94
-2 SD: .67/1.0

	Normative sample (%)	US population (%)
Parent Education Level		
0–12 years of school, no diploma	6.5	11.3
High school diploma or equivalent	18.7	22.4
Some college or technical school, associate's degree	38.5	34.8
Bachelor's degree or more	36.4	31.6
Race/Ethnicity		
African American	11.4	14.7
Asian	2.1	3.7
Hispanic	22.3	20.1
Other	7.1	5.8
White	57.1	55.6
Region		
Midwest	23.6	22.3
Northeast	13.1	16.1
South	40.5	38.5
West	22.9	23.1

Digital and Print Choices

More Information About Print and Digital Choices

- PearsonClinical.com/SLDigitalChoices

Interpretation and Treatment Planning

- KLPA-3 provides *quantitative* data and *qualitative* data
  - Both play a part in treatment plans

Quantitative Scores

- Allow you to compare client's performance to others of same gender and age
- Reliability and validity ensure the KLPA-3 is a reliable instrument and it measures the intended construct

12 Core Phonological Processes

Interpretation and Treatment Planning

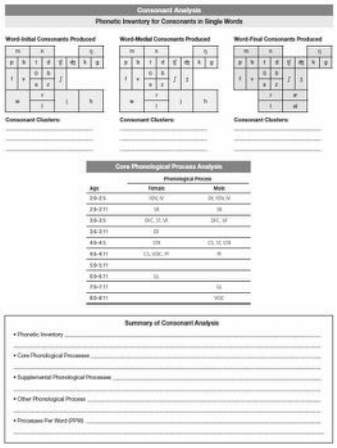
Qualitative Scores for Core, Supplemental, Other and Vowel Phonological Processes

- Percent of Occurrence
- Processes per Word
- Phonetic Inventory for Consonants and Vowels

KLPA3 KHAN-LEWIS PHONOLOGICAL ANALYSIS

Treatment Planning

Consonant Analysis Page


Consonant Analysis
Phonetic Inventory for Consonants in Single Words
Word-Initial Consonants Produced
Word-Medial Consonants Produced
Word-Final Consonants Produced
Consonant Clusters:
Core Phonological Process Analysis
Phonological Process
Age
Female
Male
Summary of Consonant Analysis
• Phonetic Inventory
• Core Phonological Processes
• Supplemental Phonological Processes
• Other Phonological Process
• Processes Per Word (PPW)

Vowel Analysis Page


Vowel Phonological Process Definitions
Backing: producing a front vowel as a back vowel
Fronting: producing a back vowel as a front vowel
Centralization: producing a front or back vowel as a central vowel
Decentralization: producing a central vowel as a front or back vowel
Raising: altering vowel production by raising vowel height
Lowering: altering vowel production by lowering vowel height
Diphthongization: producing a monophthong as a diphthong
Monophthongization: producing a diphthong as monophthong
Vowel Analysis
Phonetic Inventory for Vowels in Single Words
Vowels Produced
Front
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High
Mid
Low
Vowel Phonological Processes
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Decentralization
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Diphthongization
Monophthongization
Diphthongs
Summary of Vowel Analysis
• Vowels Produced
• Vowel Phonological Processes Used
PEARSON

KLPA3 KHAN-LEWIS PHONOLOGICAL ANALYSIS

Interpretation & Treatment Planning

Articulation Approach

- Targets each sound error
- Child's errors are assumed to be motor-based
- The aim is correct production of the target sound(s)
- SHOE: t/ʃ
  Target = ʃ
  Accept only [ʃ]

Phonological Approach

- Targets patterns/groups of sounds
- Child's errors are assumed to be linguistic
- The aim is suppression of the process(es)
- SHOE → [tu]
  Target = supress ST
  Accept any fric/aff

Name: Ella G. ☑ Female ☐ Male

Grade/Ed. Level: _____ School/Agency: _____

Language(s) Spoken in the Home: _____

Examiner: _____

Reason for Testing: _____

AGE CALCULATION

	Year	Month	Day
Test Date	16	10	23
Birth Date	13	12	22
Age	2	10	1

Reminder: Do not round up to next month or year.

KLPA-3 SCORE SUMMARY

*Total Raw Score	Standard Score	Confidence Interval ☐ 90% ☑ 95%	Percentile Rank	Age Equivalent
116	58	55 - 63	3rd	<2;0

* Raw score equals total number of occurrences of scored phonological processes.

KLPA-3 SCORE SUMMARY

*Total Raw Score	Standard Score	Confidence Interval ☐ 90% ☑ 95%	Per
116	58	55 - 63	3

Raw score equals total number of occurrences of scored phonological processes.

PERCENT OF OCCURRENCE FOR CORE PHONOLOGICAL PROCESSES

	Phonological Process	Number of Occurrences	Total Possible Occurrences	Percent of Occurrences
Manner	Deaffrication (DF)	0	of 8 =	ø %
	Gliding of liquids (GL)	13	of 20 =	65 %
	Stopping of fricatives and affricates (ST)	15	of 48 =	31 %
	Stridency deletion (STR)	19	of 42 =	45 %
	Vocalization (VOC)	13	of 15 =	87 %
Place	Palatal fronting (PF)	7	of 12 =	58 %
	Velar fronting (VF)	15	of 23 =	65 %
Reduction	Cluster simplification (CS)	11	of 23 =	48 %
	Deletion of final consonant (DFC)	5	of 36 =	14 %
	Syllable reduction (SR)	0	of 25 =	ø %
Voicing	Final devoicing (FDV)	4	of 35 =	11 %
	Initial voicing (IV)	14	of 33 =	42 %

Consonant Analysis: Phonetic Inventory

Consonant Analysis

Phonetic Inventory for Consonants in Single Words

Word-Initial Consonants Produced

m	n						ŋ
p	b	t	d	tʃ	dʒ	k	g
f	v	θ	ð	ʃ			
		s	z				
w		r		j		h	
		l					

Consonant Clusters:

Word-Medial Consonants Produced

m	n						ŋ
p	b	t	d	tʃ	dʒ	k	g
f	v	θ	ð	ʃ	ʒ		
		s	z				
w		r		j		h	
		l					

Consonant Clusters:

Word-Final Consonants Produced

m	n						ŋ
p	b	t	d	tʃ	dʒ	k	g
f	v	θ	ð	ʃ	ʒ		
		s	z				
		r		ɚ			
		l		əl			

Consonant Clusters:

Consonant Analysis

Phonetic Inventory for Consonants in Single Words

Word-Initial Consonants Produced

(m)	(n)						ŋ
(p)	(b)	(t)	(d)	tʃ	dʒ	k	g
(f)	(v)	θ	ð	ʃ			
		s	z				
(w)		r		(j)		h	
		(l)					

Consonant Clusters:

bj ts
bw
dw

Word-Medial Consonants Produced

(m)	(n)						ŋ
p	(b)	(t)	(d)	tʃ	dʒ	k	g
(f)	v	θ	ð	ʃ	ʒ		
		s	(z)				
(w)		r		j		h	
		l					

Consonant Clusters:

nS
tj
nt

Word-Final Consonants Produced

(m)	(n)						ŋ
(p)	b	(t)	d	tʃ	dʒ	(k)	(g)
(f)	v	θ	ð	ʃ	ʒ		
		(s)	z				
		r		ɚ			
		l		əl			

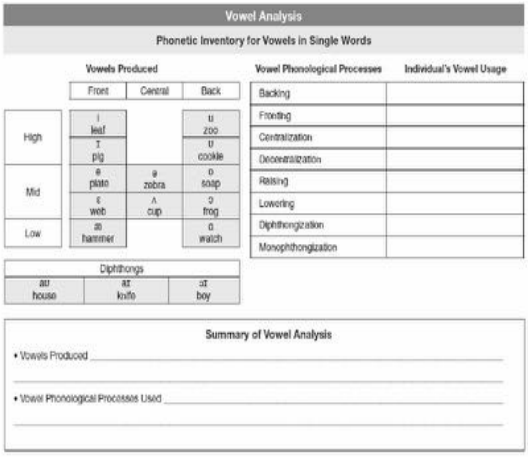
Consonant Clusters:

ts

Vowel Analysis

Includes:

- Eight PPs that impact vowel production
- Vowel Phonetic Inventory
- Vowel Usage Section
- Summary of Vowel Analysis



Vowel Analysis

Phonetic Inventory for Vowels in Single Words

Vowels Produced				Vowel Phonological Processes	Individual's Vowel Usage
	Front	Central	Back		
High	i leaf		u zoo	Backing	
	ɪ pig		ʊ cookie	Fronting	
Mid	e plate	ə zebra	o soap	Centralization	
	ɛ web	ʌ cup	ɔ frog	Decentralization	
Low	æ hammer		ɑ watch	Raising	
				Lowering	
				Diphthongization	
				Monophthongization	

Diphthongs		
aʊ house	aɪ knife	ɔɪ boy

Summary of Vowel Analysis

- Vowels Produced _____
- Vowel Phonological Processes Used _____

Planning for Treatment

Treatment Planning

- Target Selection
- Treatment Strategies
- Treatment Approaches

Treatment Considerations

- Dosage
- Format
- Provider
- Setting
- Timing

http://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=Treatment#Target_Selection.

Questions & Answers