PEPPER GUIDE 7:

PEPANALYSES

Overview

As indicated in the PEPPER flowchart, the initial procedural step is to determine if one or more PepAnalyses outputs (i.e., from PepAssess or PepClass) might inform your specific educational, clinical, or research question or need. The focus in this guide is on that determination: which one or more of the dozens of PEPPER outputs might be helpful in your work? Each of the following three sections provides a different perspective on PepAnalyses options.

Section I

The first section of this guide is a slightly edited copy of Chapter 7 from the original PEPPER (1986) manual. Before approximately 1990, PEPPER did not include outputs that required users to complete prosody-voice coding and/or acoustic analyses. Because the computations in present PepAssess outputs that require only phonetic transcriptions have not changed from their original development, it was efficient to scan the information in this section from the 1986 text, reformat the text to be consistent with the present set of PEPPER Guides, and slightly update the text. Importantly, each of the sample outputs from the PepAssess tab in PepAnalyses can be completed using only broad or narrow phonetic transcription. All reference data (see Section III below) were obtained using narrow phonetic transcription.

Section II

The second section of this guide includes a table with references to some research that has used PepAssess and PepClass outputs. The reports have used finalized or nearly finalized versions of the Speech Disorders Classification System (Shriberg, Kwiatkowski, & Mabie, 2019). Some of the PepAssess data and all of the PepClass data were obtained from measures that require narrow phonetic transcription, prosody-voice coding, and acoustic analyses.

Section III

The last section of this guide contains the Tables of Contents from ten Phonology Project Technical Reports. These reports provide standardized reference data for measures in the PepAssess and PepClass outputs. The reference data include statistical information for typical speakers, speakers with idiopathic speech delay, and speakers with speech delay in the context of complex neurodevelopmental disorders. The page numbers in each table of contents should be helpful to locate within each reference, information by measure, age, and sex (see RESEARCH > TECHNICAL REPORTS on the Phonology Project website: https://phonology.waisman.wisc.edu/publications-and-presentations/technical-reports/).

SECTION I:

SOME BASIC PEPASSESS OUTPUTS

PEPPER_PepAnalyses tab:
PepAssess > Analyses > Phoneme Analyses: Structural Statistics

STRUCTURAL STATISTICS

Filename Group SPEECHDELAY
Study Identification MADSD
DOB *
Age at Sampling Date 0 yrs 0 mos

Sampling Date *
Sampling Clinician *
Pepfile Entry Date *
Transcriber *

TYPE	CANONICAL FORM	INTENDED (Y)		OBTAINED (Z)		OBTAINED=INTENDED	
		n	%	n	%	n	%
1	V	706	9.01	915	11.67	703	99.58
2	CV	1974	25.18	2303	29.38	1913	96.91
3	VC	1035	13.20	934	11.92	879	84.93
4	CVC	2008	25.62	1672	21.33	1561	77.74
5	CnV	119	1.52	89	1.14	71	59.66
6	CnVC	151	1.93	76	0.97	59	39.07
7	VCn	90	1.15	73	0.93	70	77.78
8	C(n)VCn	330	4.21	236	3.01	206	62.42
9	2-Syllable	1176	15.00	1286	16.41	924	78.57
10	3+-Syllable	170	2.17	172	2.19	72	42.35
0	No Vowel	79	1.01	82	1.05	78	98.73
		7838		7838			

Average Words / Utterance	Type-Token Percentage
9014 / 2647 = 3.41	1001 / 6058 = 16.52

Notes: _____

Description

The data in the sample Structural Statistics output and each of the other sample outputs in Section I were obtained from a group of 28 children, 3-6 years of age, with moderate to severe Speech Delay (SD) of unknown (idiopathic) origin (McSweeny et al., 2012). The Structural Statistics output is based on information in the Y and Z lines of each utterance in a Pepfile. The numbers and percentages of the ten word types (canonical forms) intended by the speaker are taken from the Y line and the numbers and percentages of word types obtained are taken from the Z line. The last two columns in the output are the numbers and percentages of words in which the word types in Y and Z match, i.e. Obtained=Intended. Hence, a child who says [dʌg] for the intended word *dog* produces the same word form (CVC) although the obtained vowel differed from the intended vowel.

Computational Notes

In all of the PepAssess outputs, it is important to know which words are included in the computations and which are excluded. For the Structural Statistics output, the only words in the Y or Z lines removed from consideration are words represented by or containing one or more asterisks. All other words in Y or Z are included, even those that are questionable, that is, a disregard, either/or, or an unsure in X or an unsure in Z. As long as words are represented entirely-by consonant and vowel/diphthong segments in both the Y and Z lines, their canonical forms will be included in each analysis. The reason all words are included is that the results of these analyses are meant to reflect structural-level speech information. Disregards, either/ors or unsures are removed from the phonetic/phonologic analyses because they may affect reliability and validity. In contrast, the reliability and validity of Structural Statistics requires that computations be based on all words the speaker intended within each utterance. That is why you should always enter a phonetic transcription in Y and Z, reserving asterisks only for completely unintelligible words. Sometimes a Structural Statistics output will include data on the number of words that do not contain at least one vowel or syllabic consonant. This information is printed at the bottom of the word form section of the output.

Word Types: Intended, Obtained, and Obtained = Intended

A speaker's percentage of occurrence of each Intended word type (Y line) may be interpreted as reflecting two alternative types of information. One interpretation is that the Intended Word Type percentages may indicate whether the speech sample is structurally representative of continuous speech. For example, if a speaker's percentage of CVC words is much higher than the approximately 30% expected (see Section III), perhaps there may be a problem related to the method used for speech sampling. The reference data for word types (see Section III) should provide a general guide to expected percentages. Speaker values above or below one standard deviation from the mean of typical speakers may be suspect. The source of any differences could be traced to a high frequency of occurrence of questionable words of a certain form. Or perhaps a large section of the transcript includes repetitive, non-questionable forms, such as those that occur with repeated use of a proper noun. If the percentages of intended forms do look

too high or too low, it is useful to inspect the transcript to see if the source of the differences can be identified before proceeding to the phonetic or phonologic analyses. Later, in the discussion of the Percentage Consonants Correct (PCC) analysis, we will see that the PCC itself includes helpful quantitative information for decisions about the representativeness of a speech sample (see following discussion of the PCC Word Summary output).

A second interpretation of structural statistics data taken from the Y line is that they accurately reflect phonologic information about the speaker. It is not some lexical bias in a particular speech sample as above, but rather that the speaker is selectively producing or avoiding certain word forms. For example, children who have lowered proportions of multi-syllable words could be avoiding such word forms. Moreover, a comparison of the actual forms used in Z to the intended forms indicated in Y might suggest a pattern of word form substitutions. For example, if the proportion of obtained CVCs to intended CVCs is low when compared to the proportion of obtained versus intended CVs, the speaker may be substituting CV forms for CVCs.

Especially for severely involved children, data on word forms can be informative and useful. Descriptively, such data allow for statements about level or stage of phonologic development. These structural phonologic data also have been used to determine which of the ten word forms should and should not be used in constructing stimuli for management programming. Relevant issues have been discussed in the clinical literature on management of children with phonologic disorders.

Average Words per Utterance (AWU)

The Average Words per Utterance section of the Structural Statistics analysis consists of three numbers that describe the Pepfile transcript: total number of words, total number of utterances, and total number of words divided by total number of utterances. Pepfile entries for this section of Structural Statistics are taken exclusively from the Y line. All words entered in the Y line are used, even those represented in part or whole by an asterisk, i.e. unintelligibles. The rationale here is that whether or not the word was intelligible or questionable, it was a word intended by the speaker. In the Percentage of Consonants Correct (PCC) output described later, information is provided that quantifies each of the questionable word categories included as 'words' in the AWU calculation. When computed for a grouped file, the Average Words per Utterance reflects the total of the average values divided by the number of Pepfiles in the group. Hence, each Pepfile contributes equally to the group average.

The AWU provides a measure of average total 'words' per utterance, even if some words were unintelligible to the transcriber. In previous work with this metric, it has correlated highly (high .90's) with Mean Length of Utterance (MLU). However, the high positive relationship between the two indices depends on how frequently AWU includes words that would not be included in an MLU count. As a structural statistic, AWU reflects the sampling context and the nature of the speech sample. For serial study of the same child, for example, you may want to require that samples have comparable AWUs before

proceeding to inspect the results of other analyses. Children with intelligibility problems may deliberately reduce their utterance length to help listeners understand them. Therefore, as with the other structural statistics, AWU may reflect either something about a particular sampling context or something stable about the speaker.

Type-Token Percentage (TTP)

The Type-Token Percentage (TTP) describes the percentage of word types in the speech sample. Following conventional use of these terms, a word type is a specific lexical item, whereas tokens, including all repetitions of word types, are all words in a sample. The first occurrence of a non-questionable word in the X line is considered a word type, and all non-questionable words are considered word tokens. Note that the program cannot differentiate words on the basis of their constituent morphemes, so *cat* and *cats* would each be considered a word type the first time they occurred in the sample. The program does ignore case, however, so the words *Cat* and *cat* are considered the same word type. A grouped file percentage, as with Average Words per Utterance, is calculated by summing the individual percentages and dividing by the number of Pepfiles in the grouped file. Hence, each Pepfile contributes equally to the group average percentage. As with the other Structural Statistics output, TTP can also be used to qualify a speech sample for further analysis. Does the TTP obtained suggest that the sample is biased--or does it reflect something about the speaker's typical distribution of word types? If the percentage of word types is too low, the sample might be unrepresentative either due to many word repetitions or because the sample continued too long on the same topic. Recall that the "90-70-225 rule" (PG2) for speech sampling was derived to obtain samples that were neither too short nor too long. In conjunction with the Word Lists output discussed later, you can quickly determine the source of a type-token percentage that appears to be either too low or too high.

PEPPER_PepAnalyses tab:
PepAssess > Analyses > Phoneme Analyses > Vowel/Diphthong Analyses

The outputs that comprise the Phoneme Analyses options in PepAssess provide comprehensive summaries of a speaker's speech errors. The error categories are those typically used in describing the articulation of speech sounds with reference to a normative standard. The outputs include separate tabulations for correct sounds by error types, error positions, and phonetic features. Other PepAssess outputs provide word lists aggregated by user interests.

In the following heading and all other headings in this section, we use the current titles found within the PEPPER menu.

Vowel/Diphthong Analyses_Phonemes

PHONEME ANALYSIS: VOWELS

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
i	Initial	24	100.00							24
	Medial	170	93.92			5	2.76	6	3.31	181
	Final	278	95.53			5	1.72	8	2.75	291
	Total	472	95.16			10	2.02	14	2.82	496
I	Initial	272	93.79	2	0.69	14	4.83	2	0.69	290
	Medial	693	93.15	6	0.81	39	5.24	6	0.81	744
	Final	247	95.74			9	3.49	2	0.78	258
	Total	1212	93.81	8	0.62	62	4.80	10	0.77	1292
e	Initial									
	Medial									
	Final									
	Total									
ɛ	Initial	99	99.00			1	1.00			100
	Medial	401	89.71	1	0.22	40	8.95	5	1.12	447
	Final	8	100.00							8
	Total	508	91.53	1	0.18	41	7.39	5	0.90	555
æ	Initial	230	89.84			26	10.16			256
	Medial	322	92.00			28	8.00			350
	Final	97	97.00					3	3.00	100
	Total	649	91.93			54	7.65	3	0.42	706
ɜ	Initial									
	Medial									
	Final									
	Total									
ɝ	Initial	1	33.33					2	66.67	3
	Medial	19	25.00			17	22.37	40	52.63	76
	Final	14	29.17			9	18.75	25	52.08	48
	Total	34	26.77			26	20.47	67	52.76	127
ə	Initial	231	96.65	3	1.26	4	1.67	1	0.42	239
	Medial	90	90.00	5	5.00	5	5.00			100
	Final	161	95.83			7	4.17			168
	Total	482	95.07	8	1.58	16	3.16	1	0.20	507
ɚ	Initial							1	100.00	1
	Medial	11	20.75	2	3.77	14	26.42	26	49.06	53
	Final	32	18.50	1	0.58	104	60.12	36	20.81	173
	Total	43	18.94	3	1.32	118	51.98	63	27.75	227
ʌ	Initial	59	86.76			7	10.29	2	2.94	68
	Medial	474	92.76	2	0.39	32	6.26	3	0.59	511
	Final	60	96.77			2	3.23			62
	Total	593	92.51	2	0.31	41	6.40	5	0.78	641
a	Initial									
	Medial									
	Final									
	Total									

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
ʉ	Initial	1	100.00							1
	Medial	112	78.87			29	20.42	1	0.70	142
	Final	201	92.63			8	3.69	8	3.69	217
	Total	314	87.22			37	10.28	9	2.50	360
ʊ	Initial									
	Medial	35	77.78			10	22.22			45
	Final	13	100.00							13
	Total	48	82.76			10	17.24			58
o	Initial	1	100.00							1
	Medial	4	100.00							4
	Final	1	100.00							1
	Total	6	100.00							6
ɔ	Initial	40	88.89			5	11.11			45
	Medial	173	90.10			18	9.38	1	0.52	192
	Final	14	100.00							14
	Total	227	90.44			23	9.16	1	0.40	251
ɒ	Initial									
	Medial									
	Final									
	Total									
ɑ	Initial	71	94.67			3	4.00	1	1.33	75
	Medial	296	93.38			19	5.99	2	0.63	317
	Final	6	100.00							6
	Total	373	93.72			22	5.53	3	0.75	398
a͡ɪ	Initial	310	93.09			21	6.31	2	0.60	333
	Medial	274	92.57			22	7.43			296
	Final	178	95.19			6	3.21	3	1.60	187
	Total	762	93.38			49	6.00	5	0.61	816
a͡ʊ	Initial	37	84.09			7	15.91			44
	Medial	54	90.00			5	8.33	1	1.67	60
	Final	23	85.19			4	14.81			27
	Total	114	87.02			16	12.21	1	0.76	131
e͡ɪ	Initial	15	93.75					1	6.25	16
	Medial	124	91.18			12	8.82			136
	Final	130	89.66			12	8.28	3	2.07	145
	Total	269	90.57			24	8.08	4	1.35	297
o͡ʊ	Initial	52	100.00							52
	Medial	139	95.21			7	4.79			146
	Final	204	90.27	1	0.44	19	8.41	2	0.88	226
	Total	395	93.16	1	0.24	26	6.13	2	0.47	424
ɔ͡ɪ	Initial									
	Medial	14	93.33			1	6.67			15
	Final	5	55.56			3	33.33	1	11.11	9
	Total	19	79.17			4	16.67	1	4.17	24

ARTIC TEST: PHONEME ANALYSIS: VOWELS Page: 3

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
Total Row %	Initial	1443	93.22	5	0.32	88	5.68	12	0.78	1548
	Medial	3405	89.25	16	0.42	303	7.94	91	2.39	3815
	Final	1672	85.61	2	0.10	188	9.63	91	4.66	1953
	Total	6520	89.12	23	0.31	579	7.91	194	2.65	7316
Total Col %	Initial	1443	22.13	5	21.74	88	15.20	12	6.19	1548
	Medial	3405	52.22	16	69.57	303	52.33	91	46.91	3815
	Final	1672	25.64	2	8.70	188	32.47	91	46.91	1953
	Total	6520	100.00	23	100.00	579	100.00	194	100.00	7316
Total Sum %	Initial	1443	19.72	5	0.07	88	1.20	12	0.16	1548
	Medial	3405	46.54	16	0.22	303	4.14	91	1.24	3815
	Final	1672	22.85	2	0.03	188	2.57	91	1.24	1953
	Total	6520	89.12	23	0.31	579	7.91	194	2.65	7316

Notes:

The format for the Phoneme Analysis: Vowels is similar to that for the Phoneme Analysis: Consonants. The twelve vowels are sequenced by place (front, mid, back), with vowel height arranged from high to low within each class. The five diphthongs are not ordered by place. Totals for each vowel and diphthong are given in percentages in the same way as described for consonants. Also, the three summary totals are percentaged by row, by column, and for each row x column cell. Initial and final vowels or diphthongs must be the first and last segment in the word, respectively. All other vowels or diphthongs are medial. Only sounds in non-questionable words are entered into the calculations.

Vowel/Diphthong Analyses_Features

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Feature	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
Height	Initial	25	100.00							25
HIGH	Medial	282	87.31			34	10.53	7	2.17	323
	Final	479	94.29			13	2.56	16	3.15	508
	Total	786	91.82			47	5.49	23	2.69	856
MIDDLE	Initial	770	94.48	5	0.61	31	3.80	9	1.10	815
	Medial	2177	88.17	16	0.65	195	7.90	81	3.28	2469
	Final	889	79.02	2	0.18	165	14.67	69	6.13	1125
	Total	3836	87.00	23	0.52	391	8.87	159	3.61	4409
LOW	Initial	648	91.53			57	8.05	3	0.42	708
	Medial	946	92.47			74	7.23	3	0.29	1023
	Final	304	95.00			10	3.13	6	1.88	320
	Total	1898	92.54			141	6.87	12	0.59	2051
Place	Initial	640	93.29	2	0.29	41	5.98	3	0.44	686
FRONT	Medial	1710	92.03	7	0.38	124	6.67	17	0.91	1858
	Final	760	94.76			26	3.24	16	2.00	802
	Total	3110	92.95	9	0.27	191	5.71	36	1.08	3346
CENTRAL	Initial	291	93.57	3	0.96	11	3.54	6	1.93	311
	Medial	594	80.27	9	1.22	68	9.19	69	9.32	740
	Final	267	59.20	1	0.22	122	27.05	61	13.53	451
	Total	1152	76.70	13	0.87	201	13.38	136	9.05	1502
BACK	Initial	512	92.92			36	6.53	3	0.54	551
	Medial	1101	90.47			111	9.12	5	0.41	1217
	Final	645	92.14	1	0.14	40	5.71	14	2.00	700
	Total	2258	91.49	1	0.04	187	7.58	22	0.89	2468

Substitution Summary (In decreasing percentage of occurrence)

Within- and Across-Class Substitutions		Total Occurrence	Total Possible	Percentage Occurrence
Middle	-> Middle	314	4409	7.12%
Central	-> Back	89	1502	5.93%
High	-> Middle	46	856	5.37%
Low	-> Middle	84	2051	4.10%
Central	-> Central	55	1502	3.66%
Back	-> Back	89	2468	3.61%
Front	-> Front	104	3346	3.11%
Central	-> Front	46	1502	3.06%
Low	-> Low	50	2051	2.44%
Back	-> Central	51	2468	2.07%
Back	-> Front	38	2468	1.54%
Front	-> Central	49	3346	1.46%
Front	-> Back	33	3346	0.99%
Middle	-> Low	39	4409	0.88%
Middle	-> High	21	4409	0.48%
Vowel	-> Synchronic	17	7316	0.23%
Vowel	-> Consonant	8	7316	0.11%

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

	Height	Obtained HIGH	MIDDLE	LOW
Intended	HIGH		46 of = % 47 97.87 856 5.37	
	MIDDLE	21 of = % 391 5.37 4409 0.48	314 of = % 391 80.31 4409 7.12	39 of = % 391 9.97 4409 0.88
	LOW		84 of = % 141 59.57 2051 4.10	50 of = % 141 35.46 2051 2.44

	Place	Obtained FRONT	CENTRAL	BACK
Intended	FRONT	104 of = % 191 54.45 3346 3.11	49 of = % 191 25.65 3346 1.46	33 of = % 191 17.28 3346 0.99
	CENTRAL	46 of = % 201 22.89 1502 3.06	55 of = % 201 27.36 1502 3.66	89 of = % 201 44.28 1502 5.93
	BACK	38 of = % 187 20.32 2468 1.54	51 of = % 187 27.27 2468 2.07	89 of = % 187 47.59 2468 3.61

	Other	Obtained Conso-nant	Tie
Intended	Vowel	8 of = % 579 1.38 7316 0.11	17 of = % 579 2.94 7316 0.23

The format for the Feature Analyses: Vowel is similar to that used in Feature Analysis: Consonants. As in the Feature Analysis: Consonants, only sound substitution errors are included, with summaries provided for each substitution as tabulated by feature class. Substitutions of diphthongs or vowels are printed to the right of the arrow. Place-height description of the 16 vowels are computed and displayed. The computer program calculates the percentage of occurrence of vowel feature substitutions for all non-questionable sounds and provides a ranked list of all feature substitutions that occurred at least once.

PEPPER_PepAnalyses tab:
PepAssess > Analyses > Phoneme Analyses > Consonant Analyses

Percentage Consonants Correct and Percentage of Consonants Correct-Split

PERCENTAGE CONSONANTS CORRECT (PCC)

Child Group SPEECHDELAY
Study Identification MADSD
DOB *
Age at Sampling Date 0 mos
Sampling Date *
Sampling Clinician *
Pepfile Entry Date *

Severity Adjective:

PCC	Adjective
≥86%	Mild
66%-85%	Mild-Moderate
50%-65%	Moderate-Severe
≤49%	Severe

Key:

+ Correct

- Incorrect

Consonant		Initial		Medial		Final		Consonants		Percentage Consonants	
Class	Sound	+	-	+	-	+	-	Correct	Total	Occurrence	Correct
Nasals	m	398	4	169	9	262	21	829	863	7.93	96.06
	n	339	12	153	41	754	155	1246	1454	13.37	85.69
	ŋ	0	0	11	5	38	16	49	70	0.64	70.00
Glides	w	408	60	20	1	0	0	428	489	4.50	87.53
	j	218	20	2	1	0	0	220	241	2.22	91.29
Stops	p	159	18	40	10	67	5	266	299	2.75	88.96
	b	388	10	77	11	3	0	468	489	4.50	95.71
	t	237	62	134	91	481	340	852	1345	12.36	63.35
	d	235	15	107	38	159	71	501	625	5.75	80.16
	k	150	104	72	57	138	94	360	615	5.65	58.54
	g	162	96	34	14	49	29	245	384	3.53	63.80
Fricatives and Affricates	f	135	20	28	13	25	5	188	226	2.08	83.19
	v	4	3	41	5	71	34	116	158	1.45	73.42
	θ	6	44	11	21	9	39	26	130	1.20	20.00
	ð	108	239	7	31	0	0	115	385	3.54	29.87
	s	137	163	85	77	212	138	434	812	7.46	53.45
	z	2	1	12	18	185	184	199	402	3.70	49.50
	ʃ	2	31	6	15	7	16	15	77	0.71	19.48
	ʒ	0	0	2	1	0	0	2	3	0.03	66.67
	h	226	53	60	0	0	0	286	339	3.12	84.37
	tʃ	6	10	1	11	8	19	15	55	0.51	27.27
	ʤ	20	56	4	6	1	5	25	92	0.85	27.17
Liquids	l	85	196	67	72	83	158	235	661	6.08	35.55
	r	68	246	28	107	51	164	147	664	6.10	22.14
Percent Correct		70.48		64.13		63.55		7267	10878		
								Correct	Total		

Word Coding Summary	N	%
"Words" entered	9014	100.00
"Words" used	6130	68.01
Disregard	1910	21.19
Either/Or	10	0.11
Unsure	262	2.91
Unintelligible	702	7.79
INTELLIGIBILITY INDEX		86.29

66.80

Percentage Consonants Correct (PCC)

Severity Adjective

MILD-MODERATE

PERCENTAGE CONSONANTS CORRECT - SPLIT (PCCS)

Child Group SPEECHDELAY
Study Identification MADSD
DOB *
Age at Sampling Date 0 mos
Sampling Date *
Sampling Clinician *
Pepfile Entry Date *

Severity Adjective:

PCC	Adjective
≥86%	Mild
66%-85%	Mild-Moderate
50%-65%	Moderate-Severe
≤49%	Severe

Key:

+ Correct

- Incorrect

Consonant Class	Consonant Sound	Initial				Medial				Final			
		Single		Cluster		Single		Cluster		Single		Cluster	
		+	-	+	-	+	-	+	-	+	-	+	-
Nasals	m	390	4	8	0	83	4	86	5	223	19	39	2
	n	325	10	14	2	70	22	83	19	618	120	136	35
	ŋ	0	0	0	0	0	0	11	5	18	12	20	4
Glides	w	395	52	13	8	10	1	10	0	0	0	0	0
	j	217	20	1	0	0	0	2	1	0	0	0	0
Stops	p	89	3	70	15	24	3	16	7	56	4	11	1
	b	328	7	60	3	50	3	27	8	3	0	0	0
	t	199	37	38	25	47	30	87	61	352	259	129	81
	d	220	14	15	1	49	14	58	24	112	50	47	21
	k	117	75	33	29	44	14	28	43	98	73	40	21
	g	152	78	10	18	29	9	5	5	45	27	4	2
Fricatives and Affricates	f	113	16	22	4	8	5	20	8	13	5	12	0
	v	4	3	0	0	32	2	9	3	66	33	5	1
	θ	4	18	2	26	5	3	6	18	9	39	0	0
	ð	108	239	0	0	7	31	0	0	0	0	0	0
	s	77	75	60	88	24	19	61	58	119	70	93	68
	z	2	1	0	0	10	7	2	11	122	130	63	54
	ʃ	2	31	0	0	5	13	1	2	7	16	0	0
	ʒ	0	0	0	0	2	1	0	0	0	0	0	0
	h	226	53	0	0	23	0	37	0	0	0	0	0
	tʃ	6	10	0	0	1	11	0	0	5	16	3	3
	ʤ	20	56	0	0	2	3	2	3	1	5	0	0
Liquids	l	55	101	30	95	36	33	31	39	69	122	14	36
	r	21	87	47	159	8	39	20	68	39	126	12	38
Percent Correct		75.62		47.21		68.06		60.81		63.69		63.12	

PCCS - Group SPEECHDELAY

Consonant Class	Consonant Sound	Number of Consonants Correct		Total Number of Consonants		Percentage Consonants Correct	
		Single	Cluster	Single	Cluster	Single	Cluster
Nasals	m	696	133	723	140	96.27	95.00
	n	1013	233	1165	289	86.95	80.62
	ŋ	18	31	30	40	60.00	77.50
Glides	w	405	23	458	31	88.43	74.19
	j	217	3	237	4	91.56	75.00
Stops	p	169	97	179	120	94.41	80.83
	b	381	87	391	98	97.44	88.78
	t	598	254	924	421	64.72	60.33
	d	381	120	459	166	83.01	72.29
	k	259	101	421	194	61.52	52.06
	g	226	19	340	44	66.47	43.18
Fricatives and Affricates	f	134	54	160	66	83.75	81.82
	v	102	14	140	18	72.86	77.78
	θ	18	8	78	52	23.08	15.38
	ð	115	0	385	0	29.87	*
	s	220	214	384	428	57.29	50.00
	z	134	65	272	130	49.26	50.00
	ʃ	14	1	74	3	18.92	33.33
	ʒ	2	0	3	0	66.67	*
	h	249	37	302	37	82.45	100.00
	tʃ	12	3	49	6	24.49	50.00
	ʤ	23	2	87	5	26.44	40.00
Liquids	l	160	75	416	245	38.46	30.61
	r	68	79	320	344	21.25	22.97
		5614	1653	7997	2881	70.20	57.38

Single	Cluster	Single	Cluster	Single	Cluster
Number of Consonants Correct		Total Number of Consonants		Percentage Consonants Correct (PCCS)	

Total "words" entered 9014
Total "words" used 6130
Percent "words" used 68.01

Single: MILD-MODERATE

Cluster: MODERATE-SEVERE

PCCS - Group SPEECHDELAY

MONOSYLLABLE WORDS

	Number of Consonants Correct	Total Number of Consonants	Percentage Consonants Correct
Single	Initial: 2499 Final: 1683 Total: 4182	Initial: 3311 Final: 2626 Total: 5937	Initial: 75.48 Final: 64.09 Total: 70.44
Cluster	Initial: 259 Final: 500 Total: 759	Initial: 584 Final: 765 Total: 1349	Initial: 44.35 Final: 65.36 Total: 56.26
Total	Initial: 2758 Final: 2183 Total: 4941	Initial: 3895 Final: 3391 Total: 7286	Initial: 70.81 Final: 64.38 Total: 67.81

MULTISYLLABLE WORDS

	Number of Consonants Correct	Total Number of Consonants	Percentage Consonants Correct
Single	Initial: 571 Medial: 569 Final: 292 Total: 1432	Initial: 749 Medial: 836 Final: 475 Total: 2060	Initial: 76.23 Medial: 68.06 Final: 61.47 Total: 69.51
Cluster	Initial: 164 Medial: 602 Final: 128 Total: 894	Initial: 312 Medial: 990 Final: 230 Total: 1532	Initial: 52.56 Medial: 60.81 Final: 55.65 Total: 58.36
Total	Initial: 735 Medial: 1171 Final: 420 Total: 2326	Initial: 1061 Medial: 1826 Final: 705 Total: 3592	Initial: 69.27 Medial: 64.13 Final: 59.57 Total: 64.76

Notes: _____

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PEPPER Guide 1 includes information on conversational speech sampling for the purposes of PCC and other speech, prosody, and voice analyses. The sample PCC and PCC-Split outputs are two formats that have been used for individual and group PCC data. It is important to keep in mind when formatting a Pepfile for PCC analyses that all Y-Z sound correspondences are inspected, except for sounds that occur in a word that is either questionable in the X line (a disregard or either/or word), or partially questionable in the X line (at least one segment in the word is an unsure or at least one syllable is 'unintelligible'), or sounds in the Z-line that are unsure.

The PCC output provides a Word Coding Summary, including an Intelligibility Index at the bottom of the form. The Intelligibility Index results from the following steps: (1) subtract from the total number of 'words' in the sample, all disregard words in the X line, (2) subtract from this result, the total of all either/or, unsure, and unintelligible words, and (3) divide (2) by (1) and multiply by 100. Essentially, the Intelligibility Index is based on the percentage of intelligible words, with disregards (fillers, false starts, repeated words, etc.) removed from both the numerator and the denominator.

The three-page output for the PCC-Split provides more detail than provided in the PCC analyses. Percentage of Consonants Correct information is tabled separately for each sound as it occurs as a singleton or as part of a cluster, by word position, and by monosyllable and multi-syllable words.

Consonant Analyses_Phonemes

PHONEME ANALYSIS: CONSONANTS

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
m	Initial	398	99.00	1	0.25	2	0.50	1	0.25	402
	Medial	169	94.94	1	0.56	7	3.93	1	0.56	178
	Final	262	92.58	6	2.12	9	3.18	6	2.12	283
	Total	829	96.06	8	0.93	18	2.09	8	0.93	863
n	Initial	339	96.58	1	0.28	8	2.28	3	0.85	351
	Medial	153	78.87	32	16.49	8	4.12	1	0.52	194
	Final	754	82.95	109	11.99	39	4.29	7	0.77	909
	Total	1246	85.69	142	9.77	55	3.78	11	0.76	1454
ŋ	Initial									
	Medial	11	68.75	3	18.75	2	12.50			16
	Final	38	70.37	11	20.37	5	9.26			54
	Total	49	70.00	14	20.00	7	10.00			70
w	Initial	408	87.18	11	2.35	18	3.85	31	6.62	468
	Medial	20	95.24			1	4.76			21
	Final									
	Total	428	87.53	11	2.25	19	3.89	31	6.34	489
j	Initial	218	91.60	5	2.10	10	4.20	5	2.10	238
	Medial	2	66.67	1	33.33					3
	Final									
	Total	220	91.29	6	2.49	10	4.15	5	2.07	241
p	Initial	159	89.83	3	1.69	5	2.82	10	5.65	177
	Medial	40	80.00	4	8.00	5	10.00	1	2.00	50
	Final	67	93.06	2	2.78	3	4.17			72
	Total	266	88.96	9	3.01	13	4.35	11	3.68	299
b	Initial	388	97.49	3	0.75	5	1.26	2	0.50	398
	Medial	77	87.50	2	2.27	8	9.09	1	1.14	88
	Final	3	100.00							3
	Total	468	95.71	5	1.02	13	2.66	3	0.61	489
t	Initial	237	79.26	18	6.02	24	8.03	20	6.69	299
	Medial	134	59.56	53	23.56	35	15.56	3	1.33	225
	Final	481	58.59	227	27.65	111	13.52	2	0.24	821
	Total	852	63.35	298	22.16	170	12.64	25	1.86	1345
d	Initial	235	94.00	5	2.00	10	4.00			250
	Medial	107	73.79	19	13.10	19	13.10			145
	Final	159	69.13	44	19.13	26	11.30	1	0.43	230
	Total	501	80.16	68	10.88	55	8.80	1	0.16	625
k	Initial	150	59.06	7	2.76	94	37.01	3	1.18	254
	Medial	72	55.81	18	13.95	38	29.46	1	0.78	129
	Final	138	59.48	41	17.67	52	22.41	1	0.43	232
	Total	360	58.54	66	10.73	184	29.92	5	0.81	615
g	Initial	162	62.79	9	3.49	85	32.95	2	0.78	258
	Medial	34	70.83	4	8.33	10	20.83			48
	Final	49	62.82	10	12.82	18	23.08	1	1.28	78
	Total	245	63.80	23	5.99	113	29.43	3	0.78	384

ARTIC TEST: PHONEME ANALYSIS: CONSONANTS Page: 2

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
f	Initial	135	87.10			18	11.61	2	1.29	155
	Medial	28	68.29	2	4.88	11	26.83			41
	Final	25	83.33			5	16.67			30
	Total	188	83.19	2	0.88	34	15.04	2	0.88	226
v	Initial	4	57.14			3	42.86			7
	Medial	41	89.13			5	10.87			46
	Final	71	67.62	26	24.76	8	7.62			105
	Total	116	73.42	26	16.46	16	10.13			158
θ	Initial	6	12.00	5	10.00	39	78.00			50
	Medial	11	34.38	3	9.38	17	53.13	1	3.13	32
	Final	9	18.75	7	14.58	32	66.67			48
	Total	26	20.00	15	11.54	88	67.69	1	0.77	130
ð	Initial	108	31.12	11	3.17	224	64.55	4	1.15	347
	Medial	7	18.42	4	10.53	24	63.16	3	7.89	38
	Final									
	Total	115	29.87	15	3.90	248	64.42	7	1.82	385
s	Initial	137	45.67	47	15.67	62	20.67	54	18.00	300
	Medial	85	52.47	14	8.64	32	19.75	31	19.14	162
	Final	212	60.57	19	5.43	36	10.29	83	23.71	350
	Total	434	53.45	80	9.85	130	16.01	168	20.69	812
z	Initial	2	66.67			1	33.33			3
	Medial	12	40.00	5	16.67	6	20.00	7	23.33	30
	Final	185	50.14	17	4.61	69	18.70	98	26.56	369
	Total	199	49.50	22	5.47	76	18.91	105	26.12	402
ʃ	Initial	2	6.06	4	12.12	24	72.73	3	9.09	33
	Medial	6	28.57			12	57.14	3	14.29	21
	Final	7	30.43	1	4.35	13	56.52	2	8.70	23
	Total	15	19.48	5	6.49	49	63.64	8	10.39	77
ʒ	Initial									
	Medial	2	66.67			1	33.33			3
	Final									
	Total	2	66.67			1	33.33			3
h	Initial	226	81.00	44	15.77	4	1.43	5	1.79	279
	Medial	60	100.00							60
	Final									
	Total	286	84.37	44	12.98	4	1.18	5	1.47	339
tʃ	Initial	6	37.50			10	62.50			16
	Medial	1	8.33			9	75.00	2	16.67	12
	Final	8	29.63			19	70.37			27
	Total	15	27.27			38	69.09	2	3.64	55
dʒ	Initial	20	26.32	5	6.58	51	67.11			76
	Medial	4	40.00			6	60.00			10
	Final	1	16.67			5	83.33			6
	Total	25	27.17	5	5.43	62	67.39			92

ARTIC TEST: PHONEME ANALYSIS: CONSONANTS Page: 3

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Sound	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
l	Initial	85	30.25	55	19.57	98	34.88	43	15.30	281
	Medial	67	48.20	24	17.27	31	22.30	17	12.23	139
	Final	83	34.44	49	20.33	97	40.25	12	4.98	241
	Total	235	35.55	128	19.36	226	34.19	72	10.89	661
r	Initial	68	21.66	88	28.03	30	9.55	128	40.76	314
	Medial	28	20.74	31	22.96	16	11.85	60	44.44	135
	Final	51	23.72	52	24.19	49	22.79	63	29.30	215
	Total	147	22.14	171	25.75	95	14.31	251	37.80	664
Total Row %	Initial	3493	70.48	322	6.50	825	16.65	316	6.38	4956
	Medial	1171	64.13	220	12.05	303	16.59	132	7.23	1826
	Final	2603	63.55	621	15.16	596	14.55	276	6.74	4096
	Total	7267	66.80	1163	10.69	1724	15.85	724	6.66	10878
Total Col %	Initial	3493	48.07	322	27.69	825	47.85	316	43.65	4956
	Medial	1171	16.11	220	18.92	303	17.58	132	18.23	1826
	Final	2603	35.82	621	53.40	596	34.57	276	38.12	4096
	Total	7267	100.00	1163	100.00	1724	100.00	724	100.00	10878
Total Sum %	Initial	3493	32.11	322	2.96	825	7.58	316	2.90	4956
	Medial	1171	10.76	220	2.02	303	2.79	132	1.21	1826
	Final	2603	23.93	621	5.71	596	5.48	276	2.54	4096
	Total	7267	66.80	1163	10.69	1724	15.85	724	6.66	10878

Notes:

The sample analysis output titled Phoneme Analysis: Consonants can be run on any type of speech behavior. It is perfectly appropriate to run Arctic Test analyses on speech samples consisting of syllables, phrases, sentences or utterances from continuous speech. The only restriction for the analysis to be computed is that each 'word' must contain a vowel. The four columns in the output provide number and percentage data for correct and incorrect segments. The 24 consonants are classified by manner, with place features within each class progressing anterior to posterior in the vocal tract, that is, from the lips to the glottis. The order of manner classes is consistent with most normative data on consonant acquisition. Summary percentages are given for consonants across each row. The three summary total areas are percentaged in three alternatives ways: by row, by column, and for each row x column cell. Only those sounds occurring in non-questionable words are entered into the computations.

Consonant Analyses_Features

FEATURE ANALYSIS: CONSONANTS

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Feature	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
Class	Initial	1516	73.81	161	7.84	166	8.08	211	10.27	2054
Sonorant	Medial	450	65.60	92	13.41	65	9.48	79	11.52	686
	Final	1188	69.80	227	13.34	199	11.69	88	5.17	1702
	Total	3154	71.00	480	10.81	430	9.68	378	8.51	4442
Obstruent	Initial	1977	68.13	161	5.55	659	22.71	105	3.62	2902
	Medial	721	63.25	128	11.23	238	20.88	53	4.65	1140
	Final	1415	59.11	394	16.46	397	16.58	188	7.85	2394
	Total	4113	63.91	683	10.61	1294	20.11	346	5.38	6436
Voice	Initial	2435	71.77	194	5.72	545	16.06	219	6.45	3393
Voiced	Medial	734	67.09	126	11.52	144	13.16	90	8.23	1094
	Final	1656	66.43	324	13.00	325	13.04	188	7.54	2493
	Total	4825	69.13	644	9.23	1014	14.53	497	7.12	6980
Voiceless	Initial	1058	67.69	128	8.19	280	17.91	97	6.21	1563
	Medial	437	59.70	94	12.84	159	21.72	42	5.74	732
	Final	947	59.08	297	18.53	271	16.91	88	5.49	1603
	Total	2442	62.65	519	13.31	710	18.21	227	5.82	3898
Manner	Initial	737	97.88	2	0.27	10	1.33	4	0.53	753
Nasal	Medial	333	85.82	36	9.28	17	4.38	2	0.52	388
	Final	1054	84.59	126	10.11	53	4.25	13	1.04	1246
	Total	2124	88.98	164	6.87	80	3.35	19	0.80	2387
Glide	Initial	626	88.67	16	2.27	28	3.97	36	5.10	706
	Medial	22	91.67	1	4.17	1	4.17			24
	Final									
	Total	648	88.77	17	2.33	29	3.97	36	4.93	730
Stop	Initial	1331	81.36	45	2.75	223	13.63	37	2.26	1636
	Medial	464	67.74	100	14.60	115	16.79	6	0.88	685
	Final	897	62.47	324	22.56	210	14.62	5	0.35	1436
	Total	2692	71.65	469	12.48	548	14.59	48	1.28	3757
Fricative	Initial	620	52.81	111	9.45	375	31.94	68	5.79	1174
	Medial	252	58.20	28	6.47	108	24.94	45	10.39	433
	Final	509	55.03	70	7.57	163	17.62	183	19.78	925
	Total	1381	54.54	209	8.25	646	25.51	296	11.69	2532
Affricate	Initial	26	28.26	5	5.43	61	66.30			92
	Medial	5	22.73			15	68.18	2	9.09	22
	Final	9	27.27			24	72.73			33
	Total	40	27.21	5	3.40	100	68.03	2	1.36	147
Liquid	Initial	153	25.71	143	24.03	128	21.51	171	28.74	595
	Medial	95	34.67	55	20.07	47	17.15	77	28.10	274
	Final	134	29.39	101	22.15	146	32.02	75	16.45	456
	Total	382	28.83	299	22.57	321	24.23	323	24.38	1325

ARTIC TEST: FEATURE ANALYSIS: CONSONANTS Page: 2

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Feature	Position In Word	Correct N	Correct %	Deletion N	Deletion %	Substitution N	Substitution %	Distortion N	Distortion %	Total Sounds
Place	Initial	1353	93.63	18	1.25	30	2.08	44	3.04	1445
Bilabial	Medial	306	90.80	7	2.08	21	6.23	3	0.89	337
	Final	332	92.74	8	2.23	12	3.35	6	1.68	358
	Total	1991	93.04	33	1.54	63	2.94	53	2.48	2140
Labiodental	Initial	139	85.80			21	12.96	2	1.23	162
	Medial	69	79.31	2	2.30	16	18.39			87
	Final	96	71.11	26	19.26	13	9.63			135
	Total	304	79.17	28	7.29	50	13.02	2	0.52	384
Dental	Initial	114	28.72	16	4.03	263	66.25	4	1.01	397
	Medial	18	25.71	7	10.00	41	58.57	4	5.71	70
	Final	9	18.75	7	14.58	32	66.67			48
	Total	141	27.38	30	5.83	336	65.24	8	1.55	515
Alveolar	Initial	1035	69.74	126	8.49	203	13.68	120	8.09	1484
	Medial	558	62.35	147	16.42	131	14.64	59	6.59	895
	Final	1874	64.18	465	15.92	378	12.95	203	6.95	2920
	Total	3467	65.43	738	13.93	712	13.44	382	7.21	5299
Palatal	Initial	314	46.38	102	15.07	125	18.46	136	20.09	677
	Medial	43	23.37	32	17.39	44	23.91	65	35.33	184
	Final	67	24.72	53	19.56	86	31.73	65	23.99	271
	Total	424	37.46	187	16.52	255	22.53	266	23.50	1132
Velar	Initial	312	60.94	16	3.13	179	34.96	5	0.98	512
	Medial	117	60.62	25	12.95	50	25.91	1	0.52	193
	Final	225	61.81	62	17.03	75	20.60	2	0.55	364
	Total	654	61.18	103	9.64	304	28.44	8	0.75	1069
Glottal	Initial	226	81.00	44	15.77	4	1.43	5	1.79	279
	Medial	60	100.00							60
	Final									
	Total	286	84.37	44	12.98	4	1.18	5	1.47	339

Substitution Summary (In decreasing percentage of occurrence)

Within- and Across-Class Substitutions	Total Occurrence	Total Possible	Percentage Occurrence
Dental -> Alveolar	267	515	51.84%
Affricative -> Stop	55	147	37.41%
Velar -> Alveolar	263	1069	24.60%
Obstruent -> Obstruent	1199	6436	18.63%
Unvoiced -> Unvoiced	559	3898	14.34%
Affricative -> Fricative	21	147	14.29%
Fricative -> Stop	353	2532	13.94%
Stop -> Stop	451	3757	12.00%
Voiced -> Voiced	718	6980	10.29%
Fricative -> Fricative	252	2532	9.95%
Palatal -> Alveolar	112	1132	9.89%
Liquid -> Glide	128	1325	9.66%
Dental -> Labiodental	44	515	8.54%

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Substitution Summary (In decreasing percentage of occurrence)

Within- and Across-Class Substitutions	Total Occurrence	Total Possible	Percentage Occurrence
Labiodental -> Bilabial	21	384	5.47%
Sonorant -> Sonorant	213	4442	4.80%
Labiodental -> Alveolar	15	384	3.91%
Alveolar -> Alveolar	179	5299	3.38%
Palatal -> Bilabial	34	1132	3.00%
Unvoiced -> Voiced	114	3898	2.92%
Alveolar -> Bilabial	123	5299	2.32%
Alveolar -> Glottal	111	5299	2.09%
Nasal -> Nasal	50	2387	2.09%
Glide -> Liquid	14	730	1.92%
Labiodental -> Labiodental	7	384	1.82%
Voiced -> Unvoiced	110	6980	1.58%
Dental -> Glottal	8	515	1.55%
Dental -> Bilabial	8	515	1.55%
Consonant -> Pure Vowel	151	10878	1.39%
Stop -> Fricative	51	3757	1.36%
Alveolar -> Velar	66	5299	1.25%
Dental -> Velar	6	515	1.17%
Velar -> Glottal	12	1069	1.12%
Velar -> Velar	12	1069	1.12%
Sonorant -> Obstruent	46	4442	1.04%
Alveolar -> Dental	54	5299	1.02%
Palatal -> Palatal	10	1132	0.88%
Nasal -> Stop	20	2387	0.84%
Liquid -> Stop	11	1325	0.83%
Bilabial -> Bilabial	17	2140	0.79%
Labiodental -> Palatal	3	384	0.78%
Liquid -> Liquid	10	1325	0.75%
Liquid -> Fricative	9	1325	0.68%
Obstruent -> Sonorant	43	6436	0.67%
Alveolar -> Palatal	35	5299	0.66%
Fricative -> Glide	15	2532	0.59%
Glottal -> Glottal	2	339	0.59%
Dental -> Palatal	3	515	0.58%
Consonant -> Synchronic	61	10878	0.56%
Bilabial -> Alveolar	12	2140	0.56%
Glide -> Nasal	4	730	0.55%
Palatal -> Glottal	6	1132	0.53%
Palatal -> Dental	6	1132	0.53%
Labiodental -> Dental	2	384	0.52%
Bilabial -> Labiodental	10	2140	0.47%
Liquid -> Nasal	6	1325	0.45%
Palatal -> Velar	5	1132	0.44%

Filename Group SPEECHDELAY Sampling Date *
Date of Birth * Sampling Clinician *
Age at Sampling Date 0 yrs 0 mos Analysis Date

Intended \ Obtained	Sonorant	Obstruent
Sonorant	213 of = % 430 49.53 4442 4.80	46 of = % 430 10.70 4442 1.04
Obstruent	43 of = % 1294 3.32 6436 0.67	1199 of = % 1294 92.66 6436 18.63

Intended \ Obtained	Voiced	Voiceless
Voiced	718 of = % 1014 70.81 6980 10.29	110 of = % 1014 10.85 6980 1.58
Voiceless	114 of = % 710 16.06 3898 2.92	559 of = % 710 78.73 3898 14.34

Intended \ Obtained	Nasal	Glide	Stop	Fricative	Affricate	Liquid
Nasal	50 of = % 80 62.50 2387 2.09	1 of = % 80 1.25 2387 0.04	20 of = % 80 25.00 2387 0.84	2 of = % 80 2.50 2387 0.08		
Glide	4 of = % 29 13.79 730 0.55		1 of = % 29 3.45 730 0.14	3 of = % 29 10.34 730 0.41		14 of = % 29 48.28 730 1.92
Stop	12 of = % 548 2.19 3757 0.32	5 of = % 548 0.91 3757 0.13	451 of = % 548 82.30 3757 12.00	51 of = % 548 9.31 3757 1.36	10 of = % 548 1.82 3757 0.27	1 of = % 548 0.18 3757 0.03
Fricative	4 of = % 646 0.62 2532 0.16	15 of = % 646 2.32 2532 0.59	353 of = % 646 54.64 2532 13.94	252 of = % 646 39.01 2532 9.95	6 of = % 646 0.93 2532 0.24	6 of = % 646 0.93 2532 0.24
Affricate			55 of = % 100 55.00 147 37.41	21 of = % 100 21.00 147 14.29		
Liquid	6 of = % 321 1.87 1325 0.45	128 of = % 321 39.88 1325 9.66	11 of = % 321 3.43 1325 0.83	9 of = % 321 2.80 1325 0.68		10 of = % 321 3.12 1325 0.75

Intended \ Obtained	Bilabial	Labiodental	Dental	Alveolar	Palatal	Velar	Glottal
Bilabial	17 of = % 63 26.98 2140 0.79	10 of = % 63 15.87 2140 0.47		12 of = % 63 19.05 2140 0.56	9 of = % 63 14.29 2140 0.42	4 of = % 63 6.35 2140 0.19	3 of = % 63 4.76 2140 0.14
Labiodental	21 of = % 50 42.00 384 5.47	7 of = % 50 14.00 384 1.82	2 of = % 50 4.00 384 0.52	15 of = % 50 30.00 384 3.91	3 of = % 50 6.00 384 0.78	1 of = % 50 2.00 384 0.26	1 of = % 50 2.00 384 0.26
Dental	8 of = % 336 2.38 515 1.55	44 of = % 336 13.10 515 8.54		267 of = % 336 79.46 515 51.84	3 of = % 336 0.89 515 0.58	6 of = % 336 1.79 515 1.17	8 of = % 336 2.38 515 1.55
Alveolar	123 of = % 712 17.28 5299 2.32	13 of = % 712 1.83 5299 0.25	54 of = % 712 7.58 5299 1.02	179 of = % 712 25.14 5299 3.38	35 of = % 712 4.92 5299 0.66	66 of = % 712 9.27 5299 1.25	111 of = % 712 15.59 5299 2.09
Palatal	34 of = % 255 13.33 1132 3.00	4 of = % 255 1.57 1132 0.35	6 of = % 255 2.35 1132 0.53	112 of = % 255 43.92 1132 9.89	10 of = % 255 3.92 1132 0.88	5 of = % 255 1.96 1132 0.44	6 of = % 255 2.35 1132 0.53
Velar	4 of = % 304 1.32 1069 0.37	1 of = % 304 0.33 1069 0.09	4 of = % 304 1.32 1069 0.37	263 of = % 304 86.51 1069 24.60	2 of = % 304 0.66 1069 0.19	12 of = % 304 3.95 1069 1.12	12 of = % 304 3.95 1069 1.12
Glottal	1 of = % 4 25.00 339 0.29					1 of = % 4 25.00 339 0.29	2 of = % 4 50.00 339 0.59

Intended \ Obtained	Pure Vowel	Diphthong	Tie
Consonant	151 of = % 1724 8.76 10878 1.39	11 of = % 1724 0.64 10878 0.10	61 of = % 1724 3.54 10878 0.56

The format for the feature analyses is generally similar to that used for the analysis of individual phonemes. The phonetic feature system selected to classify the consonant phonemes of English consists of the traditional six manner features (nasals, stops, fricatives, affricates, glides and liquids) and the six place features (bilabial, labiodental, lingua-alveolar, palatal, velar, and glottal). Sounds are also categorized by the higher-order linguistic concepts of obstruents (stops, fricatives, affricates) versus sonorants (nasals, glides, liquids) and by voiced versus voiceless. Summary formats for each feature category and a summary category are provided. Feature Analysis: Consonants also computes and presents, in ranked order, a Substitution Summary by features. The features corresponding to sound substitutions are computed, rank ordered, and arranged on the second section of the output for visual inspection. The computer program looks at the features for non-questionable sounds (main characters) in the Z line and calculates the percentage of occurrence of feature changes from those intended for the corresponding sounds (main characters) in the Y line. The summary ranked list includes all feature changes that occurred at least once in the speech sample. If the substituted sound is not another consonant, the program prints "other" to the right of the arrow.

PEPPER_PepAnalyses tab:
PepAsses > Analyses > Phoneme Analyses > Natural Process Analysis (NPA)

PEPPER's extensive series of natural process analyses have been retained in PepAssess primarily for their possible value for some contemporary educational, clinical, or research question.

SECTION II:

SOME ADDITIONAL PEPASSESS AND SOME PEPCLASS OUTPUTS

The second section of this guide includes a table with some references to research that has used PepAssess and PepClass outputs. The reports have used finalized (Shriberg, Kwiatkowski, & Mabie, 2019) or nearly finalized versions of the Speech Disorders Classification System.

Phonology Project Articles: Tables and Figures with PEPPER-related content.

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
Shriberg, Kwiatkowski, and Mabie (2019)	X	X	Consonants		X	1	**PCC** raw values (*M*, *SD*) for 415 participants with idiopathic Speech Delay
	X	X	Vowels & Consonants				**II** raw values (*M*, *SD*) for 415 participants with idiopathic Speech Delay
		X	Multiple		X	4	**DSI** percentile scores for 14 participants classified as CD from a group of 415 children with idiopathic Speech Delay.
		X	Multiple		X	5	**Prevalence estimates of Motor Speech Disorders** in 415 children with idiopathic Speech Delay
		X	Multiple	X		2	**SDCSS** for individual and Down syndrome group
		X	Multiple	X		3	**SDCSS** for group of 415 children with idiopathic Speech Delay
Shriberg, Strand, Jakielski, and Mabie (2019)		X	Multiple		X	3	**DI** and 5 **DSI** percentages for seven groups with Complex Neurodevelopmental Disorders
		X	Multiple	X		3	**SDCSS** for individual and group with Childhood Apraxia of Speech
		X	Multiple	X		4	**SDCSS** for participants in eight Complex Neurodevelopmental groups
		X	Multiple	X		5	SDCSS graphed findings of **three speech classification** percentages for participants in eight Complex Neurodevelopmental groups
		X	Multiple	X		6	SDCSS graphed findings of **five motor speech classification** percentages for participants in eight Complex Neurodevelopmental groups
Shriberg, Campbell, Mabie, and McGlothlin (2019)	X	X	Consonants		X	1	**PCC** raw values (*M*, *SD*) for 415 participants with idiopathic Speech Delay by Motor Speech classification status
	X	X	Vowels & Consonants				**II** raw values (*M*, *SD*) for 415 participants with idiopathic Speech Delay by Motor Speech classification status

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
	X	X	Consonants		X	2	**PCC** raw values (*M*, *SD*) for 14 longitudinal participants with idiopathic Speech Delay from the earliest available conversational sample
	X	X	Vowels & Consonants				**II** raw values (*M*, *SD*) for 14 longitudinal participants with idiopathic Speech Delay from the earliest available conversational sample
	X		Vowels		X	3	**PVC** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
	X	X	Consonants				**PCC** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
	X	X	Consonants - SRT				**SRT Performance, Encoding, and Memory** z-sores for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
	X	X	Vowels & Consonants				**II** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
	X	X	Vowels & Consonants				**OII % Lowered Intelligibility** for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
	X		Phrasing				**Average Words/Utterance** z-sores for participant samples of idiopathic Speech Delay with high (Sample 1) and low (Sample 2) prevalence of Speech Motor Delay (SMD)
		X	PSI		X	4	Ten most frequent earliest available **PSI signs** for participant samples of idiopathic Speech Delay with

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
							Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X		Vowels		X	5	**PVC** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X	X	Consonants				**PCC** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X	X	Consonants - SRT				**SRT Performance, Encoding, and Memory** z-sores for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X	X	Vowels & Consonants				**II** raw values and z-scores (*M*, *SD*) for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X	X	Vowels & Consonants				**OII % Lowered Intelligibility** for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X		Phrasing				**Average Words/Utterance** z-sores for participant samples of idiopathic Speech Delay with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD)
	X		Vowels		X	6	**PVC** raw values and z-scores (*M*, *SD*) for 11 participants with concurrent Speech Delay and normalized Speech Motor Delay (SMD) by 9 years of age and 3 participants with concurrent Speech Delay and persistent SMD after 9 years of age
	X	X	Consonants				**PCC** raw values and z-scores (*M*, *SD*) for 11 participants with concurrent Speech Delay and

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
							normalized Speech Motor Delay (SMD) by 9 years of age and 3 participants with concurrent Speech Delay and persistent SMD after 9 years of age
	X	X	Consonants				**PCCR** raw values and z-scores (*M*, *SD*) for 11 participants with concurrent Speech Delay and normalized Speech Motor Delay (SMD) by 9 years of age and 3 participants with concurrent Speech Delay and persistent SMD after 9 years of age
	X	X	Vowels & Consonants				**II** raw values and z-scores (*M*, *SD*) for 11 participants with concurrent Speech Delay and normalized Speech Motor Delay (SMD) by 9 years of age and 3 participants with concurrent Speech Delay and persistent SMD after 9 years of age
	X	X	Vowels & Consonants				**OII % Lowered Intelligibility** for 11 participants with concurrent Speech Delay and normalized Speech Motor Delay (SMD) by 9 years of age and 3 participants with concurrent Speech Delay and persistent SMD after 9 years of age
		X	PSI	X		1	Scatterplot of persistence of Speech Motor Delay (SMD) based on the **PSI** in 14 participants treated for idiopathic Speech Delay (SD).
Shriberg and Wren (2019)	X		Vowels		X	1	**PVC** raw values (*M*, *SD*) for three groups of speakers (i.e., two groups with idiopathic Speech Delay from the USA and England and a group with Complex Neurodevelopmental Disorders) with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD) in two of the three groups
	X	X	Consonants				**PCC** raw values (*M*, *SD*) for three groups of speakers (i.e., two groups with idiopathic Speech Delay from the USA and England and a group with Complex Neurodevelopmental Disorders) with Speech Motor Delay (SMD) and No Motor Speech Disorder (No MSD) in two of the three groups

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
		X	PSI		X	2	**PSI** Sign No. 5 findings for participants in the USA and Complex Neurodevelopmental Disorder (CND) groups with idiopathic Speech Delay and Speech Motor Delay (SMD) compared to control participants with idiopathic Speech Delay and No Motor Speech Disorder (No MSD) in two speech tasks.
		X	PSI	X		1	**The Precision-Stability Index (PSI): Individual** output
		X	PSI	X		2	The 19 **PSI** acoustic signs of Speech Motor Delay in two groups with idiopathic Speech Delay from the USA and England and a group with Complex Neurodevelopmental Disorders
	X	X	Vowels & PSI	X		3	Average duration (ms) of the 11 phonemes in **PSI 5: Increased Duration of Mid-Vowels and Diphthongs** in the continuous speech tasks from participants with idiopathic Speech Delay and Speech Motor Delay compared to durations of these phonemes from the continuous speech of participants with SD and No Motor Speech Disorder
Wilson, Abbeduto, Camarata, and Shriberg (2019a)	X		Vowels		X	2	**PVC** raw values (*M*, *SD*, Range) for DS group
	X	X	Consonants				**PCC** raw values (*M*, *SD*, Range) for DS group
	X	X	Vowels & Consonants				**II** raw values (*M*, *SD*, Range) for DS group
	X		Phrasing				**Average Words/Utterance** raw scores (*M*, *SD*, Range) for 45 participants with Down syndrome (DS)
		X	Multiple	X		1	**SDCSS** for Down syndrome group
		X	Multiple	X		2	5 **DSI** subtype percentages and percentiles for participants with Down syndrome (DS)

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
Wilson, Abbeduto, Camarata, and Shriberg (2019b)	X		Phrasing		X	1	**Average Words/Utterance** raw scores (*M*, *SD*) for participants with Down syndrome by Ordinal Intelligibility Index classification
		X	Vowels & Consonants		X	2	**Ordinal Intelligibility Index** findings for a Down syndrome group classified by their speech and motor speech status.
		X	Vowels & Consonants		X	3	**Ordinal Intelligibility Index** findings for a Down syndrome group classified by their motor speech status.
	X	X	Vowels & Consonants	X		1	**Intelligibility Index** scores and **Ordinal Intelligibility Index** classification findings for a Down syndrome group.
		X	Multiple	X		2	Bar graphs of 5 **DSI** subtype percentages and percentiles for participants with Down syndrome by High and Low Ordinal Intelligibility Index classification
		X	Multiple	X		3	Bar graphs of **Motor Speech Classification** percentages from the **SDCSS** for three participants groups (Down syndrome, Complex Neurodevelopmental Disorders, and Idiopathic Speech Delay) by **Ordinal Intelligibility Index** classification (High, Moderate, and Low)
	X	X	Vowels & Consonants	X		4	Four measures of consonant and vowel production in Conversational Speech in a Down syndrome group by High and Low **Ordinal Intelligibility Index** classification
	X	X	Consonants	X		5	Sibilant distortions in Conversational Speech in a Down syndrome group by High and Low **Ordinal Intelligibility Index** classification
	X	X	Prosody& Voice	X		6	Inappropriate prosody and voice in Conversational Speech in a Down syndrome group by High and Low **Ordinal Intelligibility Index** classification

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
Baylis and Shriberg (2018)	X		Vowels		X	1	**PVC** raw values and z-scores (*M*, *SD*, Range)
	X	X	Consonants				**PCC** raw values and z-scores (*M*, *SD*, Range)
	X	X	Vowels & Consonants				**II** raw values and z-scores (*M*, *SD*, Range)
		X	Multiple		X	2	**SDCS** speech and motor speech classifications described
	X	X	Multiple		X	3	Transcription, **PVSP**, and acoustic analyses reliability estimates
		X	Multiple	X		1	**SDCSS** (22q and DS)
		X	Multiple	X		2	**SDCSS** (FXS and GALT)
		X	Multiple	X		3	Bar graphs for speech and motor speech classifications percentage of participants (22q, DS, FXS, GALT)
Shriberg et al. (2017a)		X	Multiple		X	3	**SDCS** speech and motor speech classifications described
		X	Multiple		X	4	**DI** and 5 **DSI** defined and described
		X	Multiple		X	6	8 subtypes of inappropriate pauses descriptions
		X	Multiple	X		1	**SDCS**
		X	Multiple	X		2	**SDCSS** for individual
Shriberg et al. (2017b)	X	X	Multiple		X	2	17 MSAP tasks
	X		Vowels		X	3	**PVC** raw values (*M*, *SD*, Range) for CAS groups
	X	X	Consonants		X	3	**PCC** raw values (*M*, *SD*, Range) for CAS groups
		X	Pauses		X	3	Opportunities; Inappropriate Type I; **PM** score for CAS groups
	X	X	SPMS		X	3	Rate, Stress, Transcoding data for CAS groups
	X		Vowels		X	4	**PVC** raw values (*M*, *SD*, Range) for AAS groups
	X	X	Consonants		X	4	**PCC** raw values (*M*, *SD*, Range) for AAS groups
		X	Pauses		X	4	Opportunities; Inappropriate Type I; **PM** score for AAS groups
	X	X	SPMS		X	4	Rate, Stress, Transcoding data for AAS groups
	X		Vowels		X	5	**PVC** raw values (*M*, *SD*, Range) for PM+/PM- groups
	X	X	Consonants		X	5	**PCC** raw values (*M*, *SD*, Range) for PM+/PM- groups

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
		X	Pauses		X	5	Opportunities; Inappropriate Type I; **PM** score for PM+/PM- groups
	X	X	SPMS		X	5	Rate, Stress, Transcoding data for PM+/PM- groups
Shriberg et al. (2017c)	X	X	Consonants		X	2	**PCC** raw values (*M*, *SD*, Range) for CAS, PPAOS, and SD groups
	X	X	Consonants - SRT		X	3	Performance, Encoding, Memory, and Transcoding raw and z-sores for CAS, AAS, and SD groups
	X	X	Pauses, PVSP		X	4	Groping, Repetition/revision pauses, and **PVSP** repetition/revision raw and z-scores for CAS, AAS, and SD groups
		X	PSI, DMI		X	5	**PSI** and **DMI** (place/duration/addition changes) raw and z-sores for CAS, AAS, and SD groups
	X		Rate		X	6	Speaking and articulation rate raw and z-scores for CAS, AAS, and SD groups
	X		Stress			6	Sentential stress raw and z-scores for CAS, AAS, and SD groups
		X	Multiple	X		1	**SDCS**
		X	Pauses	X		2	Bar graphs for Appropriate and Inappropriate Abrupt pauses for SD, CAS&CND, and AAS groups
Shriberg et al. (2017d)		X	PM		X	1	**PM** Non-marginal and Marginal counts for CAS, CND, AAS, Longitudinal participants, and SD groups
	X	X	Consonants		X	1	**PCC** raw values (*M*, *SD*, Range) for CAS, CND, AAS, Longitudinal participants, and SD groups
		X	SCI		X	2	Pearson r correlation coefficients for CAS and AAS participants with nonmarginal PM+ scores by CPSA and Transcription/PVSP/Acoustic methods of data reduction
		X	PSI		X	2	
	X	X	Multiple		X	2	
	X	X	SPMS		X	3	**SPMS** Signs scores and classification for Longitudinal participants
		X	PM			3	**PM** scores and classification for Longitudinal participants
		X	PM	X		1	**PM** scores plotted low to high for participants with CAS, DS, GALT, CNDs, AOS, and PPAOS

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
		X	PMI	X		3	Bar graphs of **PMI** categories for participants with CAS, CND, and AAS
	X	X	PVSP	X		4	**PVSP** Profiles for CAS participants by PMI category
	X	X	PVSP	X		5	**PVSP** Profiles for CND participants by PMI category
	X	X	PVSP	X		6	**PVSP** Profiles for AAS participants by PMI category
Carrigg et al. (2016)	X	X	SRT		X	5	Median and range scores on the **SRT** for Persistent and Resolved SSD groups
Vick et al. (2014)		X	Multiple	X		1	**SDCS**
Shriberg et al. (2012)	X	X	TLDA		X	2	**TLDA** signs for classification of CAS and DYS.
	X		Vowels		X	3	**PVC** raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Consonants		X	3	**PCC** raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Vowels & Consonants		X	3	**PPC** and **II** raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Phrasing		X	3	% Appropriate Phrasing raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Rate		X	3	% Appropriate Rate raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Stress		X	3	% Appropriate Stress raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Loudness		X	3	% Appropriate Loudness raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Pitch		X	3	% Appropriate Pitch raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Laryngeal quality		X	3	% Appropriate LQ raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	Resonance quality		X	3	% Appropriate RQ raw values for participants with typical speech, SD, typical language, LI, and CAS
	X	X	SRT		X	4	Correlations for SRT Encoding, Memory, Transcoding, and Competence scores for participants

Reference[a]	PepAnalyses		Domain or Measure[b]	Location			Output(s)
	PepAssess	PepClass		Figure	Table	No.	
							with typical speech, SD, typical language, LI, and CAS
	X	X	Multiple and SRT		X	5	Correlations for SRT Encoding, Memory, Transcoding, and Competence scores with speech-prosody measures (PVC, PCC, II, Phrasing, Rate, Stress) for participants with typical speech, SD, typical language, LI, and CAS
	X	X	SRT		X	5	Pair-wise comparisons for SRT Encoding, Memory, Transcoding, and Competence scores for participants with typical speech, SD, typical language, LI, and CAS
		X	Multiple	X		1	**SDCS**
	X	X	SRT	X		2	Box plots for percentage of Encoding, Memory, Transcoding, and Competence for participants with typical speech, SD, typical language, LI, and CAS
Shriberg, Paul et al. (2011)	X	X	PVSP	X		2	**PVSP** Profiles for participants with ASD, Typical Development, SD, and CAS.
Shriberg (2010)		X	Multiple	X		1-2	**SDCS**
	X		Consonants	X		1-7	**PCCR** Profiles for two OME study groups

[a] See **REFERENCES** section.
[b] Ten Linguistic Domains (Shriberg et al., 2010).

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SECTION III:

SOME REFERENCE DATA FOR PEPANALYSES OUTPUTS

The last section of this guide includes Tables of Contents from ten Phonology Project Technical Reports. These reports provide standardized reference data for measures in the PepAssess and PepClass outputs. The reference data include statistical information for typical speakers, speakers with idiopathic speech delay, and speakers with speech delay in the context of complex neurodevelopmental disorders. The page numbers in each table of contents should be helpful to locate within each reference, information by measure, age, and sex (see RESEARCH > TECHNICAL REPORTS on the Phonology Project website:
https://phonology.waisman.wisc.edu/publications-and-presentations/technical-reports/).

REFERENCE DATA FOR

THE SYLLABLE REPETITION TASK (SRT)

Technical Report No. 17

Heather L. Lohmeier

Lawrence D. Shriberg

Revised November 2011

Phonology Project, Waisman Center
University of Wisconsin-Madison

Development of the Syllable Repetition Task (SRT) and preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and the Australian Research Council Discovery Grant (DP0773978). We thank the following colleagues for their contributions to the development and validation of the SRT and/or for their contribution of reference data obtained in the context of collaborative research: Richard Boada, Roger Brown, Thomas Campbell, Christine Dollaghan, Lisa Freebairn, Jordan Green, Linda J. Harrison, Christine Hollar, Joan Kwiatkowski, Barbara Lewis, Lindy McAllister, Jane McCormack, Sharynne McLeod, Jane McSweeny, Christopher Moore, Bruce Pennington, Steven Pittelko, Heather Leavy Rusiewicz, Christine Tilkens, Sonja Wilson, and David Wilson.

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Reference Data for the Madison Speech Assessment Protocol (MSAP):

A Database of 150 Participants 3-to-18 Years of Age with Typical Speech

Technical Report No. 18

Nancy L. Potter

Sheryl Hall

Heather B. Karlsson

Marios Fourakis

Heather L. Lohmeier

Jane L. McSweeny

Christine M. Tilkens

David L. Wilson

Lawrence D. Shriberg

May, 2012

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator).

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Reference Data for the Madison Speech Assessment Protocol (MSAP):

A Database of 28 Participants, 3-to-6 Years of Age, with Speech Delay

Technical Report No. 19

Jane L. McSweeny

Marios Fourakis

Sheryl D. Hall

Heather B. Karlsson

Heather L. Lohmeier

Christine M. Tilkens

David L. Wilson

Lawrence D. Shriberg

June, 2012

Phonology Project, Waisman Center
University of Wisconsin-Madison

The preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and by a core grant from the National Institute of Child Health and Development (HD03352) to the Waisman Center.

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Reference Data for the Madison Speech Assessment Protocol (MSAP):

A Database of Fifty 20-to-80 Year Participants with Typical Speech

Technical Report No. 20

Alison R. Scheer-Cohen

Andrew S. Holt

Heather B. Karlsson

Heather L. Mabie

Jane L. McSweeny

Christine M. Tilkens

Lawrence D. Shriberg

November, 2013

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator)

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Conversational Speech Reference Data for Children with Speech Delay:

A Database of 180 Participants, 3-to-5 Years of Age

Technical Report No. 21

Heather L. Mabie

Marios Fourakis

Sheryl D. Hall

Heather B. Karlsson

Jane L. McSweeny

Christine M. Tilkens

David L. Wilson

Lawrence D. Shriberg

February, 2015

Phonology Project, Waisman Center
University of Wisconsin-Madison

The preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and by a core grant from the National Institute of Child Health and Development (HD03352) to the Waisman Center.

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Technical Report No. 22

Christie M. Tilkens

Heather B. Karlsson

Marios Fourakis

Sheryl D. Hall

Heather L. Mabie

Jane L. McSweeny

David L. Wilson

Lawrence D. Shriberg

April, 2017

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and by a core grant from the National Institute of Child Health and Development (HD03352) to the Waisman Center.

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Speech and Motor Speech Measures and Reference Data

for the Speech Disorders Classification System (SDCS)

Technical Report No. 23

Heather L. Mabie

Lawrence D. Shriberg

November, 2017

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and in part by a core grant to the Waisman Center from the National Institute of Child Health and Human Development (P30 HD03352).

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Speech and Motor Speech Assessment Findings

In Eight Complex Neurodevelopmental Disorders

Technical Report No. 24

Lawrence D. Shriberg

Heather L. Mabie

December, 2017

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and in part by a core grant to the Waisman Center from the National Institute of Child Health and Human Development (P30 HD03352).

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Idiopathic Intellectual Disability

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Technical Report No. 25

Lawrence D. Shriberg

Edythe A. Strand

February, 2018

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC00496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and in part by a core grant to the Waisman Center from the National Institute of Child Health and Human Development (P30 HD03352).

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With and Without Concurrent Speech Motor Delay

Technical Report No. 26

Lawrence D. Shriberg

Thomas F. Campbell

Heather L. Mabie

Jenny H. McGlothlin

May, 2019

Phonology Project, Waisman Center
University of Wisconsin-Madison

Preparation of this technical report was supported by research grant DC000496 from the National Institute on Deafness and Other Communication Disorders, National Institutes of Health (Lawrence D. Shriberg, Principal Investigator) and in part by a core grant to the Waisman Center from the National Institute of Child Health and Human Development (U54 HD090256).

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