Supplement: Independent and relational phonological analyses for late talking toddlers' within each of the five clusters*

- Toddlers' consonant inventories and syllable structure inventories were based on their spontaneous (but not imitated) productions of all words they attempted in the PEEPS.
- The PEEPS total PPC was calculated individually for each toddler: the number of phonemes correct in each toddler's best production (whether spontaneous or imitated) of the words they attempted to produce on the PEEPS were tallied, and divided by the total number of phonemes in the words they attempted to produce. For example, if a toddler attempted to produce 20 (of the 60 words) on the PEEPS, the number of phonemes correctly produced for those 20 words was tallied and divided by the total number of phonemes across those 20 words.
- In this supplement, PPC has been reported as percentage of phonemes correct rather than proportion of phonemes correct for ease of readability.

*This is a supplement for article titled: Responses made by late talkers and typically developing toddlers during speech assessments

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Cluster A: “Good responders cluster” (6 late talkers)		
<p>Toddler 1</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, d, k, g, m, n, f, s, z, h, dʒ, j, w] Consonant clusters [fw, pw] <i>Within word:</i> Singleton consonants [p, b, t, k, m, n, s, ʃ, j, ŋ, g] <i>Word final:</i> Singleton consonants [p, t, k, n, f, s, z, l] Consonant clusters - nil <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CCVC, CVCVC, CVCCC, CCVCCVC, CVCCV, CVCC, VCCVC, CCVCVC</p> <p>Relational analysis PEEPS total PPC: 75%</p>	<p>Toddler 2</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, m, n, f, v, z, ʃ, h, j, l, w] Consonant clusters [bw] <i>Within word:</i> Singleton consonants [p, b, t, d, m, n, f, s, l, w] <i>Word final:</i> Singleton consonants [p, t, d, m, n, s, l] Consonant clusters - nil <u>Syllable structure inventory</u> CV, CVC, CVCV, CCV, CVCVC</p> <p>Relational analysis PEEPS total PPC: 57%</p>	<p>Toddler 3</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, d, k, g, m, n, s, ʃ, h, tʃ, dʒ, w,] Consonant clusters [bw, tw, dw, dʒw, ʃw] <i>Within word:</i> Singleton consonants [p, b, k, g, n, j] <i>Word final:</i> Singleton consonants [p, k, n, s, ʃ] Consonant clusters [ŋk] <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CCVCC, CVV, CCVC</p> <p>Relational analysis PEEPS total PPC: 63%</p>
<p>Toddler 4</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, m, n, ʃ, dʒ, l] Consonant clusters – nil <i>Within word:</i> Singleton consonants [b, t] <i>Word final:</i> Singleton consonants [t, m, n, s, z, l] Consonant clusters [nd, ts, ds, gs] <u>Syllable structure inventory</u> VC, CVC, CVCV, CVCVC, CVCC</p> <p>Relational analysis PEEPS total PPC: 62%</p>	<p>Toddler 5</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, k, n, s, ʃ, h] Consonant clusters – nil <i>Within word:</i> Singleton consonants [p, t, d, k, m, n, s, l] <i>Word final:</i> Singleton consonants [p, t, k, g, m, n, ŋ, f, s, z] Consonant clusters [ŋk, nd, nt, nz, lz] <u>Syllable structure inventory</u> VC, CVC, CVCV, VCV, CVCC, VCVCV</p> <p>Relational analysis PEEPS total PPC: 61%</p>	<p>Toddler 6</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, t, d, k, g, m, n, f, h, j, l, w] Consonant clusters [bl, tw, kw] <i>Within word:</i> Singleton consonants [b, k, g, m, n] <i>Word final:</i> Singleton consonants [p, t, d, k, g, m, n, f, s, z, ʃ, l] Consonant clusters [nd, ld] <u>Syllable structure inventory</u> CV, CVC, CVCV, CCVC, CVCVC, CVCC</p> <p>Relational analysis PEEPS total PPC: 66%</p>

Cluster B: “Adequate responders cluster” (5 late talkers)		
<p>Toddler 1</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, t, d, m, n, f, s, ʃ, h, w] Consonant clusters [fw] <i>Within word:</i> Singleton consonants [p, b, t, k, g, n, s, w, ɳ] <i>Word final:</i> Singleton consonants [p, t, k, g, n, s, z, h] Consonant clusters [nt, lz] <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CVCVC, CVCCV, VCVCC</p> <p>Relational analysis PEEPS total PPC: 71%</p>	<p>Toddler 2</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, d, k, g, m, n, f, s, ʃ, h, j] Consonant clusters – nil <i>Within word:</i> Singleton consonants [p, b, k, g, m, n, s, ʃ] <i>Word final:</i> Singleton consonants [t, k, g, n, f, s, z, l] Consonant clusters [ŋk, ld] <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CVCC</p> <p>Relational analysis PEEPS total PPC: 68%</p>	<p>Toddler 3</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, d, g, m, n, f, ʃ, h, w] Consonant clusters [bw, gw] <i>Within word:</i> Singleton consonants [p, b, k, g, n, s, ʃ, l] <i>Word final:</i> Singleton consonants [t, k, m, n, ɳ, f, s, z, l] Consonant clusters [nd, nt] <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CCVC, CVCC, VCVCC, VCVCC</p> <p>Relational analysis PEEPS total PPC: 59%</p>
<p>Toddler 4</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, d, m, n, h, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants [p, b, d, m, n] <i>Word final:</i> Singleton consonants [t, d, m, n, s, z, l] Consonant clusters [ts] <u>Syllable structure inventory</u> VC, CV, CVCV, CVCVC, CVCC</p> <p>Relational analysis PEEPS total PPC: 47%</p>	<p>Toddler 5</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, d, k, g, m, n, ʃ, h, l, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants [p, d, k, g, ʃ, j, l, w] <i>Word final:</i> Singleton consonants [t, m, l] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC, CVCV, VCV, CVV, VCVCV</p> <p>Relational analysis PEEPS total PPC: 39%</p>	

Cluster C: “Varied responders cluster” (7 late talkers)		
<p>Toddler 1</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, g, m, n, w] Consonant clusters – nil <i>Within word:</i> Singleton consonant [b, k, g, h] <i>Word final:</i> Singleton consonants [t, k, m, f, s, z, l] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, VCV</p> <p>Relational analysis PEEPS total PPC: 37%</p>	<p>Toddler 2</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, t, k, g, m, ʃ, h, w] Consonant clusters - nil <i>Within word:</i> Singleton consonants [b, t, k, h, j, w] <i>Word final:</i> Singleton consonants [b, m] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CVC, CVCV, VCVC, CVCVC</p> <p>Relational analysis PEEPS total PPC: 7%</p>	<p>Toddler 3</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, k, g, m, n, f, w] Consonant clusters [bw] <i>Within word:</i> Singleton consonants [b, d, m] <i>Word final:</i> Singleton consonants [p, b, k, m, f, s, ʃ] Consonant clusters - nil <u>Syllable structure inventory</u> VC, CVC, CVCV, VCV, CCV</p> <p>Relational analysis PEEPS total PPC: 25%</p>
<p>Toddler 4</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, k, g, m, n, f, s, h] Consonant clusters – nil <i>Within word:</i> Singleton consonants [p, t, d, k, g, m, n] <i>Word final:</i> Singleton consonants [t, k, n, z, ʃ] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, VCV, CVCVC</p> <p>Relational analysis PEEPS total PPC: 23%</p>	<p>Toddler 5</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, k, g, m, ŋ, h, j, l, w] Consonant clusters [dw, kw] <i>Within word:</i> Singleton consonants [b, t, d, g, m, n, ŋ, l, w] <i>Word final:</i> Singleton consonants [p, d, k, g, n, ŋ, s, ʃ, l] Consonant clusters [ŋk, nt] <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, CCV, VCV, CVCVC, CVV, CVCC, CVCCV, VCVC, VCCVCC, CVCCVC, CCVCC, CVCCVCV</p> <p>Relational analysis PEEPS total PPC: 47%</p>	<p>Toddler 6</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, d, g, m, n, h, j, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants [b, d, g, m, n, w] <i>Word final:</i> Singleton consonants [k, z, ʃ, l] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CV, CVC, CVCV, VCV, CVCVC, VCVV</p> <p>Relational analysis PEEPS total PPC: 27%</p>

<p>Toddler 7</p> <p>Independent analysis</p> <p><u>Spontaneous consonant inventory</u></p> <p><i>Word initial:</i></p> <p>Singleton consonants [b, d, m, n, f, tʃ, dʒ, w]</p> <p>Consonant clusters [bw]</p> <p><i>Within word:</i></p> <p>Singleton consonants [b, n]</p> <p><i>Word final:</i></p> <p>Singleton consonants [d, g, n, s, ʃ, tʃ]</p> <p>Consonant clusters – nil</p> <p><u>Syllable structure inventory</u></p> <p>VC, CV, CVC, CCV, CVCCV</p> <p>Relational analysis</p> <p>PEEPS total PPC: 30%</p>		
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Cluster D: “Protoword responders cluster” (3 late talkers)		
Toddler 1	Toddler 2	Toddler 3
Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants – nil <i>Word final:</i> Singleton consonants [m, n, ŋ] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CV Relational analysis PEEPS total PPC: 0%	Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [d, k, g, m, h, j] Consonant clusters – nil <i>Within word:</i> Singleton consonants – nil <i>Word final:</i> Singleton consonants [m, z] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC Relational analysis PEEPS total PPC: 2%	Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, t, d, g, m, n, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants [t, d, g, n, w] <i>Word final:</i> Singleton consonants [p, k, g, n] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC, CVCV, VCV Relational analysis PEEPS total PPC: 7%

Cluster E: “No responders cluster” (5 late talkers)		
<p>Toddler 1</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, d, k, g, n, s, j] Consonant clusters – nil <i>Within word:</i> Singleton consonants [b, d, s] <i>Word final:</i> Singleton consonants [z] Consonant clusters – nil <u>Syllable structure inventory</u> VC, CV, CVCV, CVV, VCV</p> <p>Relational analysis PEEPS total PPC: 26%</p>	<p>Toddler 2</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, t, d, m, n] Consonant clusters – nil <i>Within word:</i> Singleton consonants – nil <i>Word final:</i> Singleton consonants [g, n] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC</p> <p>Relational analysis PEEPS total PPC: 19%</p>	<p>Toddler 3</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [b, d, j, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants – nil <i>Word final:</i> Singleton consonants [m] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC</p> <p>Relational analysis PEEPS total PPC: 26%</p>
<p>Toddler 4</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [p, b, t, d, m, n, f, h, w] Consonant clusters – nil <i>Within word:</i> Singleton consonants [b, n] <i>Word final:</i> Singleton consonants [p, k, n, l] Consonant clusters – nil <u>Syllable structure inventory</u> CV, CVC, CVCV, CVV</p> <p>Relational analysis PEEPS total PPC: 40%</p>	<p>Toddler 5</p> <p>Independent analysis <u>Spontaneous consonant inventory</u> <i>Word initial:</i> Singleton consonants [d] Consonant clusters – nil <i>Within word:</i> Singleton consonants – nil <i>Word final:</i> Singleton consonants – nil Consonant clusters – nil <u>Syllable structure inventory</u> CV</p> <p>Relational analysis PEEPS total PPC: 11%</p>	