

Supplemental Material S1. Additional information about children’s performance on the GFTA-3 and Whole Word and Phonological Precision Scores.

Below we list each item on the Goldman-Fristoe Test of Articulation–3 (GFTA-3) that are relevant to our target word forms (Table 1). In column 1, we list all of the target forms, and in columns 2-3, we list GFTA-3 items related to each target form.

Table 1. GFTA-3 items that are related to target forms included in the current study.

Target Form	GFTA Correspondence		
	Initial Word Position	Medial Word Position	Final Word Position
/mep/	11: <u>m</u> onkey		4: cu <u>p</u> 26: soa <u>p</u>
/plun/	18: <u>p</u> late		24: <u>l</u> ion 45: <u>g</u> reen 53: <u>c</u> rown 60: <u>s</u> even
/dob/	2: <u>d</u> oor 8: <u>d</u> uck		16: <u>w</u> eb
/gramə/	45: <u>g</u> reen	12: <u>h</u> ammer 50: <u>p</u> ajamas	12: <u>h</u> ammer 15: <u>s</u> pider 28: <u>t</u> iger 30: <u>f</u> inger 36: <u>t</u> eacher 43: <u>b</u> rother
/kint/	4: <u>c</u> up 48: <u>c</u> ookie	52: <u>p</u> rincess	18: <u>p</u> late 46: <u>t</u> hat
/nedɪg/	19: <u>k</u> nife	15: <u>s</u> pider	3: <u>p</u> ig 44: <u>f</u> rog
/topɪn/	10: <u>t</u> able 28: <u>t</u> iger 36: <u>t</u> eacher 51: <u>t</u> eeth	6: <u>a</u> pple	24: <u>l</u> ion 45: <u>g</u> reen 53: <u>c</u> rown 60: <u>s</u> even
/bɪnɪp/	5: <u>b</u> oy	52: <u>p</u> rincess	4: <u>c</u> up 26: <u>s</u> oap
/sɪbɪ/	26: <u>s</u> oap 60: <u>s</u> even		10: <u>t</u> able 39: <u>v</u> egetable

In Tables 2 and 3, we listed GFTA-3 items that children missed that are related to target forms. Table 2 includes performance by children with DLD and Table 3 includes performance by children with TD. In both tables, column 2 includes the item from the GFTA-3 that the child produced in error. The underlined phoneme of the GFTA-3 item is the relevant phoneme to the target word form for initial, medial, or final position of each word form. The child production of the underlined portion is listed in parenthesis afterwards. Column 3 lists the target word form related to the GFTA-3 items. Column 4 indicates the child’s best production of the target form at

any time during training or long-term recall sessions. This is followed by the percentage of phonetic features correct.

Table 2. Items missed on the GFTA-3 that were related to phonemes in the target words for children with DLD.

Participant (DLD)	Goldman-Fristoe Items	Target Word Form	Best Production
18J0483	26: <u>s</u> oap (/θ/) 10: ta <u>b</u> le (/bo/) 39: vege <u>t</u> able (/bo/)	/sibl/	/sibl/ = 100%
18J0513	18: <u>p</u> late (/pw/)	/plun/	/pwum/ = 83%
	45: <u>g</u> reen (/gw/) 12: ha <u>m</u> mer (child omission) 15: sp <u>i</u> der (child omission) 30: fi <u>n</u> ger (/ʌ/) 36: tea <u>ch</u> er (/ʌ/) 43: bro <u>th</u> er (/ʌ/)	/gramə-/	/gwamə/ = 67%
	39: vege <u>t</u> able (/bo/)	/sibl/	/si/ = 40%
18J0550	45: <u>g</u> reen (/gw/)	/gramə-/	/gramə/ = 100%
18J0554	39: vege <u>t</u> able (/do/)	/sibl/	/sibl/ = 100%
18J0581	18: <u>p</u> late (/pw/)	/plun/	/plun/ = 100%
	50: pa <u>j</u> amas (/nə/)	/gramə-/	/gramə/ = 100%
	28: <u>t</u> iger (/k/) 36: tea <u>ch</u> er (/ts/)	/topɪn/	/topɪn/ = 100%
	26: <u>s</u> oap (/θ/) 60: <u>s</u> even (/θ/) 10: ta <u>b</u> le (/bo/) 39: vege <u>t</u> able (/wo/)	/sibl/	/sibl/ = 100%
19J0587	12: ha <u>m</u> mer (/ə/) 15: sp <u>i</u> der (/ə/) 28: <u>t</u> iger (/ə/) 30: fi <u>n</u> ger (/o/) 36: tea <u>ch</u> er (/o/) 43: bro <u>th</u> er (/o/)	/gramə-/	/gramə/ = 72%
	36: tea <u>ch</u> er (/tʃ/)	/topɪn/	/topɪn/ = 100%
	39: vege <u>t</u> able (child omission)	/sibl/	/sibl/ = 100%
Average best production and standard deviation in parentheses			Mean = 89% (19%)

*No errors on items on GFTA-3 that were related to training forms: 18J0474, 18J0511, 18J0563

Table 3. Items missed on the GFTA-3 that were related to phonemes in the target words for children with TD.

Participant (TD)	Goldman-Fristoe Items	Target Words	Best Production
18J0580	26: <u>so</u> ap (/θ/)	/sibl/	/sibl/ = 100%
18J0549	45: <u>gr</u> een (/gw/) 12: <u>ham</u> mer (/ə/) 15: <u>spid</u> er (/ə/) 28: <u>tig</u> er (child omission) 30: <u>fin</u> ger (/ə/) 36: <u>teach</u> er (/ə/) 43: <u>broth</u> er (/ə/)	/gramə-/	/gwamə/ = 67%
18J0576	18: <u>pl</u> ate (/pw/)	/plun/	/plun/ = 100%
	45: <u>gr</u> een (/gw/) 12: <u>ham</u> mer (/ə/) 15: <u>spid</u> er (/ə/) 28: <u>tig</u> er (/ə/) 30: <u>fin</u> ger (/ə/) 36: <u>teach</u> er (/ə/) 43: <u>broth</u> er (/ə/)	/gramə-/	/gwamə/ = 67%
19J0584	18: <u>pl</u> ate (/pw/)	/plun/	/pwun/ = 92% /plun/ = 92%
	45: <u>gr</u> een (/gw/) 12: <u>ham</u> mer (/ə/) 15: <u>spid</u> er (/ə/) 28: <u>tig</u> er (/ə/) 30: <u>fin</u> ger (/ə/) 36: <u>teach</u> er (/ə/) 43: <u>broth</u> er (/ə/)	/gramə-/	/gwamə/ = 67%
19J0611	12: <u>ham</u> mer (/ə/) 15: <u>spid</u> er (/ə/) 28: <u>tig</u> er (/ə/) 30: <u>fin</u> ger (/ə/) 36: <u>teach</u> er (/ə/) 43: <u>broth</u> er (/ə/)	/gramə-/	/gwamə/ = 67%
	26: <u>so</u> ap (/θ/) 60: <u>se</u> ven (/θ/)	/sibl/	/sibl/ = 100%
19J0673	12: <u>ham</u> mer (/ə/) 15: <u>spid</u> er (/ə/) 28: <u>tig</u> er (/ə/) 30: <u>fin</u> ger (/ə/) 36: <u>teach</u> er (/ə/) 43: <u>broth</u> er (/ə/)	/gramə-/	/gramə/ = 72%
	4: <u>cu</u> p (/t/) 48: <u>coo</u> kie: (/t/)	/kint/	/kint/ = 100%
Average best production and standard deviation in parentheses			Mean = 83% (16%)

*No errors on items on GFTA-3 that were related to training forms: 15C0194, 19J0603, 19J0620

Additional Information About Whole Word and Phonological Precision Scores Coding

One form, /gramə/, proved to be considerably difficult to articulate for several children. The phonological process of liquid simplification in the initial consonant cluster and final /ə/, or any combination there-of, was accepted as a correct verbal response. This resulted in forms such as /gwamʊ/ə/, /gramʊ/ə/, and /gwamə/ being reinforced with affirmative verbal examiner feedback. However, the examiner would produce the correct target articulation of the form (i.e., “Yes, that’s right. This is a /gramə/”). If the child omitted /r/ in the initial consonant cluster or final /ə/, these forms were counted as errors. If this occurred during the beginning of session free recall task, children were trained on this form. If this occurred at the end of session free recall task, children received the initial CV cue. However, these variations were counted as correct when determining criterion, in that children retrieved and produced all forms correctly at the end of one training day. Some children were noted to resolve these articulation errors as they demonstrated increased learning of the form. However, not all children demonstrated articulation resolve by the time they reached criteria for all other forms, or by the end of the sixth training day. For coding, children’s productions of this form were coded in the same way as all other forms.

For the coding of all forms, when children produced the phonetic features of the target form with 100% accuracy but produced additional phonemes, this production was coded as incorrect for the whole word score. This was a strict coding of whether children fully knew the form in that they could successfully retrieve it and produce it with complete accuracy. However, this production was coded as 100% features produced correctly for the phonological precision score because they could successfully retrieve and produce all of the phonemes of the target form. This type of error was incredibly rare. It only occurred for eight productions across all children at all time points.