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Tutorial

Verbs Matter: A Tutorial for Determining Verb Difficulty

Lizbeth H. Finestack,[a] Jamie Linert,[a] Elizabeth Ancel,[a] Lisa Hilliard,[a] Benjamin Munson,[a] Kirstin Kuchler,[a] and Olivia Matthys[a]

[a] Department of Speech-Language-Hearing Sciences, University of Minnesota, Minneapolis

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ABSTRACT

Purpose: Research indicates that when teaching grammatical forms to children, the verbs used to model specific grammatical inflections matter. When learning grammatical forms, children have higher performance when they hear many unique verb forms that vary in their frequency and phonological complexity. In this tutorial, we demonstrate a method for identifying and characterizing a large number of verbs based on their frequency and complexity.
Method: We selected verbs from an open-access database of transcribed child language samples. We extracted verbs produced by 5- to 8.9-year-old children in four morphosyntactic contexts: regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions. We ranked verbs based on their frequency of occurrence across transcripts. We also coded the phonological complexity of each verb. We coded each verb as high or low frequency and high or low phonological complexity.
Results: The synthesis yielded 129 unique verbs used in the regular past tense *-ed* context, 107 verbs used in the third person singular *-s* context, 69 verbs used in the *is/are* + verb+*ing* context, and 16 verbs used in the *do/does* question context. We created tables for each form that include the frequency rankings and phonological complexity scores for every verb.
Conclusions: Clinicians may use the verb lists, frequency ratings, and phonological complexity scores to help identify verbs to incorporate into assessment and intervention sessions with children. Researchers and clinicians may use the step-by-step approach presented in the tutorial to identify verbs or other syntactic components used in different morphosyntactic contexts or produced by individuals of different demographics in different speaking contexts.

Research indicates that when teaching grammatical forms to children, the verbs used to model specific grammatical inflections matter. Multiple verb factors have been cited as impacting the acquisition of grammatical forms by monolingual English-speaking children. First, grounded in theory of statistical learning, Plante et al. (2014) found that children had better outcomes when targeted grammatical forms were modeled across a large number of unique verbs. Second, Owen Van Horne et al. (2017) found that when targeting past tense *-ed*, learning was maximized when models and recasts included "hard" verbs initially. "Hard" verbs were defined as those that were highly atelic (i.e., without a clear end point), rarely inflected with past tense, frequently heard in the bare stem form, and ended in obstruent and alveolar consonants. These findings suggest that clinicians need access to verb lists that indicate relevant features to help determine verb difficulty. Here we provide a tutorial to help clinicians identify verbs to use when targeting grammatical forms and present the verb lists we identified for use when targeting four grammatical forms: past tense *-ed*, third person singular *-s*, present progressive *is/are* + verb+*ing*, and *do/does* questions.

Correspondence to Lizbeth H. Finestack: finestack@umn.edu. ***Disclosure:*** *The authors have declared that no competing financial or nonfinancial interests existed at the time of publication.*

Clinical Relevance of Grammatical Forms

One of the core weaknesses of children with developmental language disorder (DLD) is in the development

of morphosyntax and use of grammatical language forms. The production of grammatical forms integrates morphological and syntactic skills that depend on one another. Examples of grammatical skills that have been found to be particularly difficult for English-speaking children with DLD to acquire include regular past tense *-ed* (e.g., Yesterday he jump*ed*), third person singular present tense *-s* (e.g., She run*s*), copula and auxiliary forms of *be* (e.g., She *is* happy, They *are* running), and auxiliary *do* (e.g., He *did* run, *Does* he run?; Bedore & Leonard, 1998; Rice et al., 2004; Rice & Wexler, 1996). Throughout childhood and into adolescence, children with language impairment tend to omit these grammatical inflections on elicitation tasks, in spontaneous speech, and when reading out loud (Rice et al., 2009; Werfel et al., 2017). Grammatical and general language weaknesses have long-term detrimental effects on reading and writing development (Catts et al., 2008; Dockrell et al., 2009; Mackie & Dockrell, 2004), academic achievement (Conti-Ramsden & Botting, 2004; Durkin et al., 2015), social development (Croteau et al., 2015; Fujiki et al., 1996; Mok et al., 2014), quality of life (Eadie et al., 2018), and independence (Conti-Ramsden et al., 2008; Conti-Ramsden & Durkin, 2008) for children with DLD.

Weaknesses in the use of grammatical forms are not limited to children with DLD. For example, Huang and Finestack (2020) compared the morphosyntactic profiles of children with DLD and children on the autism spectrum. The researchers found that there were very few differences in the morphosyntactic profiles of the two groups based on a standardized expressive language assessment (Structured Photographic Expressive Language Test [SPELT]; Dawson et al., 2003) and Index of Productive Syntax (IPSyn; Scarborough, 1990) measures derived from conversational language samples. Children with fragile X syndrome and Down syndrome (DS) have also been shown to have weaknesses with grammatical forms (Eadie et al., 2002; Finestack & Abbeduto, 2010; Finestack et al., 2013; Price et al., 2008). Specifically, an analysis of conversational syntactic complexity in boys with fragile X syndrome and DS showed that both groups scored lower than neurotypical (NT) boys on all subscales of the IPSyn after controlling for mental age and maternal education (Price et al., 2008). Similarly, a study of grammatical morphology that compared NT children to children with DS showed that the participants with DS performed significantly below the NT group on measures of tense inflection (Eadie et al., 2002). These studies indicate that weaknesses in grammatical forms are not specific to children with DLD; people with language disorders associated with other conditions may also benefit from interventions that target weaknesses in grammatical forms. Recent evidence suggests two approaches that clinicians should consider when designing intervention sessions that target grammatical forms: verb variability and specific verb features.

Verb Variability

Plante et al. (2014) researched the impact of intervention outcomes based on verb variability. Eighteen participants with DLD, aged 4 to 5 years, received intervention for a specific grammatical form (e.g., past tense *-ed*, third person singular *-s*). The children were randomly assigned to a high-verb variability or low-verb variability group. Children in both groups participated in up to twenty-five 30-min conversational recast treatment sessions. Participants in the high-verb variability group heard 24 different verbs corresponding to their target morpheme in each intervention session. Participants in the low-verb variability group heard 12 different verbs repeated twice corresponding to their target morpheme. In both conditions, clinicians presented the verbs through recasts of the child's utterances. Clinicians were encouraged to use verbs they thought the child would know in the recasts. Results revealed statistically significant growth for only the high-verb variability group. Plante et al. (2014) suggested that it was likely that the high-verb variability enhanced learning because there were too many different verb morpheme combinations for the children to memorize. Instead, children had to focus on the stable components (e.g., verb + morpheme).

Verb Features

To evaluate the impact of unique verb features on grammatical learning, Owen Van Horne et al. (2017) investigated the effect of unique verb features on the production of the past tense *-ed* grammatical morpheme. In the study, 18 children with DLD aged 4 to 10 years were randomly assigned to receive treatment that began with target verbs that were either easy to inflect or hard to inflect. The "easy to inflect" category consisted of verbs that were high in telicity, verbs frequently heard in the past tense form, and phonologically simpler verbs that had stems ending in nonobstruent and nonalveolar consonants (e.g., *cry*). In contrast, the "hard to inflect" category consisted of verbs that were low in telicity, verbs often heard in the bare stem form, and phonologically complex verbs that had stems ending in obstruent or alveolar consonants (e.g., *rake*). Verbs that are high in telicity, such as *kick* or *jump*, refer to completed events, whereas verbs that are low in telicity (e.g., *walk*, *cry*) refer to events that progress over time.

Each child participated in up to 36 treatment sessions focused on the development of past tense *-ed* for 30 different target verbs. These sessions consisted of a

sentence imitation task, observational modeling, and two "syntax stories" that contained several instances of the target form. Before and after the intervention period, the children completed a grammatical probe designed to elicit regular past tense *-ed* that included verbs not targeted in the treatment sessions. Compared to children who began treatment with the "easier to inflect" verbs, children who began treatment with the "hard to inflect" verbs made greater accuracy gains on the past-tense *-ed* verb form with both the target verbs used in intervention and the nontarget verbs used in a grammatical probe. Thus, it appears that not only does the variability of verbs used in treatment matter, but the complexity of the verbs also matters.

Verb Selection

Given the centrality of verbs when teaching grammatical forms to children with language weaknesses and the importance of verb variability and verb features, we sought to identify verb lists appropriate for children 5 through 8 years of age for use when targeting a variety of grammatical forms. This work adds to the list of 60 verbs sorted from "hard" to "easy" developed by Owen Van Horne and Green Fager (2015), which ranked verbs based on telicity, phonological complexity, and frequency, but only for regular past-tense *-ed* inflections. Importantly, Owen Van Horne and Green Fager found differences in accuracy based on the verb context. They found that accuracy increased when the verb frequency was based on the number of occurrences of the verb with past-tense *-ed* inflection, specifically, compared to frequency based on the occurrence of the verb in any morphosyntactic context (e.g., bare form, third person singular *-s*, *is/are* + verb +*ing*). This finding suggests that the same verb lists cannot be used for all grammatical forms. Instead, it is necessary to develop lists by identifying the frequency of verbs used in specific morphosyntactic contexts. Additionally, the phonological complexity of a verb will vary based on the specific morphological composition of the inflection, thus requiring separate calculations and lists. Here, we describe the process we completed to develop verb lists ranked "hard" to "easy" for four grammatical forms based on frequency of use in the targeted context and phonological complexity. The grammatical forms of interest included regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions.

Method

We created four verb lists that characterized the frequency of use in specified morphosyntactic contexts and the phonological complexity of each verb.

Verb Frequency in Target Morphosyntactic Context

We used the CHILDES TalkBank (https://childes.talkbank.org/) database to determine the relative child verb frequency use for each of our targeted contexts (i.e., regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions). We began by identifying all of the available transcripts in the CHILDES TalkBank that included a North American English-speaking child between the ages of 5 and 8.9 years who was engaged in at least one of the following activities: playing with toys, telling stories, talking during mealtime, talking with other children, and/or other activities across the day. We selected these contexts to reflect a child's spontaneous language in natural settings, excluding contexts that potentially constrained the child's language (e.g., describing actions in pictures, adult reading to child, child reading). Appendix contains the Computerized Language Analysis (CLAN; MacWhinney, 2018) code used to identify the transcripts. Our search, completed in Fall of 2020, yielded 886 transcripts from 19 separate databases. Activities included narrative (n = 424), toy play (n = 306), mealtime (n = 109), group (n = 25), and everyday activities (n = 22). Next, we randomly selected 200 of the 886 transcripts to create two transcript sets (100 transcripts per set), which allowed us to calculate averages of frequency occurrences with the aim to have representative estimates of use frequency. Set 1 included narrative (n = 49), toy play (n = 36), mealtime (n = 13), group (n = 1), and everyday activities (n = 1). Set 2 included narrative (n = 43), toy play (n = 40), mealtime (n = 7), group (n = 5), and everyday activities (n = 5). Set 1 and Set 2 transcripts came from 12 unique databases. Although minimal information regarding child demographics is available, all of the transcripts included in our sets were marked as being produced by NT English-speaking children in the United States or Canada who were not users of African American Language. Review of the transcripts where some demographic information was available (66% of samples) indicated that the majority of the children came from White, middle-class families. A complete list of databases and transcripts retrieved with contexts specified is publicly available at https://conservancy.umn.edu/handle/11299/241882.

To identify the verbs children used in our specified contexts, we first used CLAN to create .cha files for each transcript. Next, we ran eight batches of CLAN code on the .cha files: two for each of our targeted contexts, including regular past tense *-ed* (freq +t*CHI +o +u +sm-PAST @), third person singular *-s* (freq +t*CHI +o +u +sm-3S @), *is/are* + verb+*ing* (freq +t*CHI +u +s"m;be |v" +s"m;be |part" +c7 +sm;*,o% +o @), and *do/does* questions (freq +t*CHI +u +s"m;do |sub |v" +s"m;do |pro:per |co"

+s“m;do |pro:per |v” +c7 +sm;*,o% @). Note that our code did not exclude words that were produced in error (i.e., with *error code). See Appendix for step-by-step procedures. Figure 1 displays the CLAN output from one batch of 100 transcripts for regular past tense *-ed*.

After running all eight transcript batches through CLAN, we rank ordered each verb list from most to least frequent and removed any items in each set that were not verbs used in our specified contexts. For past tense *-ed*, we removed three items that were identified as nonverbs (i.e., “cop,” “un#v”) and eight irregular past-tense verbs. For third person singular *-s*, we removed 10 items that were marked as “cop,” “aux,” or “mod,” and one item that was not a verb (“sticker”). For *is/are* + verb+*ing,* we removed 164 items that were marked as “1S,” “PAST,” or “cop.” For *do/does* questions, we removed eight items that were marked as “PAST” or “PRESP.” We combined the frequencies of verbs that appeared in both *is* and *are* contexts and verbs that appeared in both *do* and *does* contexts. For example, if *eating* appeared with *is* one time and *are* three times, we assigned it an overall frequency of four for that verb list. Next, we compared the verb lists. For verbs that appeared on both lists, we averaged the ranks from each list to yield a single rank. We then sorted the list by rank, such that the verbs with the lowest ranks would reflect the verbs that most frequently occurred in the samples.

Phonological Complexity

We used the Word Complexity Measure (WCM) developed by Stoel-Gammon (2010) to determine the phonological complexity of each verb in our corpora. The WCM is a phonological assessment measure typically used for young children as they acquire language, but it can also be used for older children who have speech or language disorders. It assesses the range of sound classes and the structure of syllables of words that appear in children’s language and provides both qualitative and quantitative information about the children’s language production. For the purposes of this tutorial, we only used the quantitative output of this measure.

The WCM assigns points to words or utterances based on three categories of complexity: word patterns, syllable structures, and sound classes. These points are then totaled to determine the word’s WCM score. Higher scores indicate that the word is more complex and therefore more difficult to produce. The rules for assigning points based on each of the three categories are included in Table 1 (see Stoel-Gammon, 2010).

To facilitate WCM scoring, trained undergraduate students produced phonetic transcriptions of reference pronunciations for each verb, using the conventions of the International Phonetic Alphabet. These were later

Figure 1. CLAN verb frequency output for one set of 100 transcripts. CLAN = Computerized Language Analyses (MacWhinney, 2018).

```
@UTF8
@Window:    0_0_0_0_-1_-1_8891_0_8891_0
> freq +t*CHI +o +u +sm-PAST @
freq +t*CHI +o +u +sm-PAST @
Mon Mar  8 14:55:32 2021
freq (29-Jan-2021) is conducting analyses on:
 ONLY dependent tiers matching: %MOR;
****************************************
Speaker: *CHI:
 20 v|try-PAST
 17 v|want-PAST
 14 v|look-PAST
 11 v|start-PAST
  8 v|follow-PAST
  8 v|pull-PAST
  7 v|die-PAST
  6 v|ask-PAST
  6 v|play-PAST
  5 v|climb-PAST
  5 v|pop-PAST
  5 v|stop-PAST
  5 v|walk-PAST
  4 v|burn-PAST
  4 v|dry-PAST
  4 v|jump-PAST
  4 v|spill-PAST
  4 v|step-PAST
  3 v|call-PAST
  3 v|kill-PAST
  3 v|knock-PAST
  3 v|mix-PAST
  3 v|pass-PAST
  3 v|push-PAST
  3 v|stay-PAST
  3 v|use-PAST
  2 v|allow-PAST
  2 v|cheat-PAST
  2 v|check-PAST
  2 v|confuse-PAST
  2 v|crash-PAST
  2 v|cross-PAST
  2 v|grab-PAST
  2 v|happen-PAST
  2 v|name-PAST
  2 v|run-PAST
  2 v|save-PAST
  2 v|slip-PAST
  2 v|trip-PAST
  2 v|wait-PAST
  2 v|wiggle-PAST
  2 v|yell-PAST
  1 cop|look-PAST
  1 cop|stay-PAST
  1 un#v|tie-PAST
  1 v|back-PAST
  1 v|belong-PAST
  1 v|brush-PAST
  1 v|carry-PAST
  1 v|catch-PAST
  1 v|change-PAST
  1 v|close-PAST
  1 v|cough-PAST
  1 v|crack-PAST
  1 v|cry-PAST
  1 v|destroy-PAST
  1 v|drop-PAST
  1 v|dump-PAST
  1 v|figure-PAST
  1 v|fix-PAST
  1 v|flatten-PAST
  1 v|gang-PAST
  1 v|gather-PAST
  1 v|learn-PAST
  1 v|lift-PAST
  1 v|like-PAST
  1 v|live-PAST
  1 v|loose-PAST
  1 v|mail-PAST
  1 v|mess-PAST
  1 v|miss-PAST
  1 v|move-PAST
  1 v|pee-PAST
  1 v|peek-PAST
  1 v|pick-PAST
  1 v|punch-PAST
  1 v|rain-PAST
  1 v|reach-PAST
  1 v|rub-PAST
  1 v|scream-PAST
  1 v|show-PAST
  1 v|slam-PAST
  1 v|smash-PAST
  1 v|smell-PAST
  1 v|sneak-PAST
  1 v|spoil-PAST
  1 v|spy-PAST
  1 v|stab-PAST
  1 v|sting-PAST
  1 v|suppose-PAST
  1 v|talk-PAST
  1 v|taste-PAST
  1 v|tip-PAST
  1 v|touch-PAST
  1 v|train-PAST
  1 v|tumble-PAST
  1 v|wax-PAST
  1 v|wonder-PAST
  1 v|work-PAST
  1 v|wrap-PAST
------------------------------
  100  Total number of different item types used
  251  Total number of items (tokens)
0.398  Type/Token ratio
```

Table 1. Word complexity measuring scoring parameters.

Phonological system level	Parameter	Points awarded
Word patterns	Production with greater than two syllables	1 point
	Production with stress on noninitial syllable	1 point
Syllable structures	Production with word-final consonant	1 point
	Production with consonant cluster	1 point per cluster
Sound classes	Production with a velar consonant	1 point per velar consonant
	Production with a liquid, a syllabic liquid, or a rhotic vowel[a]	1 point per liquid, syllabic liquid, or rhotic vowel
	Production with a fricative or affricate	1 point per fricative or affricate
	Production with voiced fricative or affricate	1 point per voiced fricative or affricate

[a]Glides do not receive any points.

reviewed by two graduate students pursuing PhDs and the fifth author who has taught phonetics for more than 25 years. Because WCM scoring considers syllable structure, transcriptionists marked syllable breaks (marked with .), primary stress (marked with ’), and secondary stress (marked with ,) according to the maximal onset principle, so long as the onset clusters of a syllable were phonetically legal in English. Because vowel identity does not factor into WCM scoring and may have substantial variation in different varieties of English, transcriptionists transcribed all single vowels and diphthongs as “_.” The exceptions to this were the rhotic vowels, /ɚ/ and /ɝ/, and rhotic diphthongs. Because rhotic vowels and diphthongs do factor into the word complexity score, these were transcribed simply as “_ɹ.” The agreement between the transcriptions from the graduate students across all verb forms was 95%. Areas of disagreement were reviewed and resolved through discussion. If different transcriptions both represented acceptable phonetic realizations of a verb form, we selected the transcription that represents a more “careful” (i.e., hyperarticulated) production of the word. Although subjective, this selection reflects the fact that these theoretical productions would be used in a clinical setting and may be produced with hyperarticulation (e.g., Sheng et al., 2003).

Guided by the transcriptions, a graduate student and a PhD-level researcher independently assigned WCM points. The WCM points were assigned to every verb that we extracted from the CHILDES TalkBank database (Set 1 and Set 2) based on the inflected form. For example, when scoring past-tense *-ed* verbs, we scored the verb in its past tense form (*walked*, not *walk*). Although the rhotic vowels and diphthongs were transcribed with a symbol for a consonant (_ɹ), these did not count toward the formation of a cluster. They did, however, count toward whether the word contained a liquid. An example of a WCM scoring table can be found in Table 2. Reliability across all forms was 91%. All disagreements were discussed and corrected. Our completed WCM scoring is publicly available at https://conservancy.umn.edu/handle/11299/241882.

After we scored each verb, we coded the verbs based on frequency (i.e., high or low frequency) and phonological complexity (i.e., high or low WCM scores). To assign codes, we counted the number of verbs in the list and divided by two. Next, we sorted the list based on the average frequency rating, smallest to largest values. The smallest values represented the verbs with the highest frequency of occurrence. The largest values represented verbs with the lowest frequency of occurrence. We coded the half of the verbs with the lowest average frequency score as high frequency and the half with the highest average frequency score as low frequency. For example, in the past-tense *-ed* list, the verb *start* occurred 11 times in Set 1 (ranking as the fourth most frequently occurring verb in the set) and 15 times in Set 2 (ranking the most frequently occurring verb in the set). Its average verb frequency rating was the lowest for past tense *-ed* (2.5) and thus was

Table 2. Sample WCM scoring of words.

Word	Abbreviated IPA	> 2 syl	Stress	Cluster	Final C	Velar	Fric/aff	Voiced fric/aff	Liquid/rhotic vowel	Total points
know	n_									0
like	l_k				1	1			1	3
remember	ɹ_.'m_m.b_ɹ	1	1						2	4

Note. “_ɹ” indicates a rhotic vowel. WCM = Word Complexity Measure (Stoel-Gammon, 2010); IPA = International Phonetic Alphabet; syl = syllable; C = consonant; Fric = fricative; aff = affricate.

coded as high frequency. Similarly, we sorted each list by the WCM scores, smallest to largest. The smallest values represented verbs with the least phonological complexity, and the largest values represented verbs with greatest phonological complexity. We coded the half of the verbs with the lowest WCM scores as low complexity and the half with the highest average WCM scores as high complexity. When the halfway point occurred within the same frequency rating or WCM score, we split the list at the next closest value.

Results

Tables 3–6 include the calculated verb frequencies, frequency codes, phonological complexity WCM scores, and complexity codes for verbs in each of our targeted contexts: regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions, respectively.

Regular Past Tense -ed

There were a total of 129 unique verbs that children produced with regular past tense *-ed* inflection across our two sets of 100 transcripts (see Table 3). The number of times a specific verb appeared in a transcript set ranged from 1 to 20. The average verb frequencies across sets ranged from 3.5 to 12. We coded 68 verbs as high frequency (average frequencies = 3.5 to 10) and 61 as low frequency (average frequencies = 10.5 to 12). WCM scores ranged from 1 to 7. We coded 45 as low phonological complexity (scores 1 through 3) and 84 as high phonological complexity (scores 4 through 7).

Third Person Singular -s

There were a total of 107 unique verbs that children produced with the third person singular *-s* inflection across our two sets of 100 transcripts (see Table 4). The number of times a specific verb appeared in a transcript set ranged from 1 to 45. The average verb frequencies across sets ranged from 1 to 14. We coded 72 verbs as high frequency (average frequencies = 1 to 13) and 36 as low frequency (average frequencies = 13.5 to 14). WCM scores ranged from 3 to 10. We coded 67 as low phonological complexity (scores 3 through 5) and 40 as high phonological complexity (scores 6 through 10).

Is/Are + Verb+ing

There was a total of 69 unique verbs that children produced in the *is/are* + verb+*ing* context across our two sets of 100 transcripts (see Table 5). The number of times a specific verb appeared in a transcript set ranged from 1 to 56. The average verb frequencies across sets ranged from 1 to 10. We coded 34 verbs as high frequency (average frequencies = 1 to 8) and 35 as low frequency (average frequencies = 8.5 to 10). WCM scores ranged from 3 to 10. We coded 41 as low phonological complexity (scores 3 through 5) and 28 as high phonological complexity (scores 5 through 10).

Do/Does Question Context

There was a total of 16 unique verbs that children produced in the *do/does* question context across our two sets of 100 transcripts (see Table 6). The number of times a specific verb appeared in a transcript set ranged from 1 to 9. The average verb frequencies across sets ranged from 1 to 3. We coded 11 verbs as high frequency (average frequencies = 1 to 3) and 5 as low frequency (average frequency = 4). WCM scores ranged from 0 to 6. We coded 6 as low phonological complexity (scores 0 through 1) and 10 as high phonological complexity (scores 2 through 5).

Discussion

The development of this tutorial and associated verb lists was motivated by two important findings. The first of these from Plante et al. (2014) indicated that children have better grammatical language outcomes when the interventionist incorporated a large number of unique verbs into a session. The second, from Owen Van Horne et al. (2017), concluded that when targeting regular past tense *-ed*, children benefited from interventions that incorporated verbs that were not frequently inflected with *-ed* and that were phonologically complex. Given these findings, it is important for clinicians to have access to lists of verbs used in varying morphosyntactic contexts that differ in their frequency of occurrence and phonological complexity. Thus, we created lists that include verbs produced by children in four different morphosyntactic contexts (i.e., regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions). Within each list, we identified the relative frequency of occurrence of each verb and assigned each verb a phonological complexity score. We also detailed the steps we took to create the verb lists.

Clinicians may immediately use the verb lists presented to identify verbs to incorporate into their child language assessments and interventions. In our own research, we have used the verb lists to create intervention materials to use in a randomized control trial that targets regular past tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions. In each session, the clinician models the target form with 24 different verbs. In our

Table 3. Verb frequency and phonological complexity in regular past tense *-ed* context.

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|pee-PAST	pee	p_d	12	Low	1	Low
v|name-PAST	name	n_md	10.5	Low	2	Low
v|show-PAST	show	ʃ_d	11	Low	2	Low
v|wait-PAST	wait	ˈw_.t_d	11	Low	2	Low
v|dump-PAST	dump	d_mpt	12	Low	2	Low
v|tip-PAST	tip	t_pt	12	Low	2	Low
v|pick-PAST	pick	p_kt	10.5	Low	3	Low
v|yell-PAST	yell	j_ld	10.5	Low	3	Low
v|wonder-PAST	wonder	ˈw_n.d_ɹd	10.5	Low	3	Low
v|cheat-PAST	cheat	ˈʧ_.t_d	11	Low	3	Low
v|peek-PAST	peek	p_kt	11	Low	3	Low
v|talk-PAST	talk	t_kt	11	Low	3	Low
v|wrap-PAST	wrap	ɹ_pt	11	Low	3	Low
v|back-PAST	back	b_kt	12	Low	3	Low
v|mail-PAST	mail	m_ld	12	Low	3	Low
v|mess-PAST	mess	m_st	12	Low	3	Low
v|miss-PAST	miss	m_st	12	Low	3	Low
v|punch-PAST	punch	p_nʧt	12	Low	3	Low
v|rain-PAST	rain	ɹ_nd	12	Low	3	Low
v|rub-PAST	rub	ɹ_bd	12	Low	3	Low
v|spy-PAST	spy	sp_d	12	Low	3	Low
v|touch-PAST	touch	t_ʧt	12	Low	3	Low
v|allow-PAST	allow	_.ˈl_d	10.5	Low	4	High
v|look-PAST	look	l_kt	10.5	Low	4	High
v|like-PAST	like	l_kt	11	Low	4	High
v|trip-PAST	trip	tɹ_pt	11	Low	4	High
v|work-PAST	work	w_ɹkt	11	Low	4	High
v|learn-PAST	learn	l_ɹnd	12	Low	4	High
v|taste-PAST	taste	ˈt_.st_d	12	Low	4	High
v|carry-PAST	carry	ˈk_.ɹ_d	12	Low	4	High
v|cough-PAST	cough	k_ft	12	Low	4	High
v|cry-PAST	cry	kɹ_d	12	Low	4	High
v|gang-PAST	gang	g_ŋd	12	Low	4	High
v|lift-PAST	lift	ˈl_f.t_d	12	Low	4	High
v|move-PAST	move	m_vd	12	Low	4	High
v|reach-PAST	reach	ɹ_ʧt	12	Low	4	High
v|stab-PAST	stab	st_bd	12	Low	4	High
v|train-PAST	train	tɹ_nd	12	Low	4	High
v|tumble-PAST	tumble	ˈt_m.b_ld	12	Low	4	High
v|wax-PAST	wax	w_kst	12	Low	4	High
v|fix-PAST	fix	f_kst	10.5	Low	5	High
v|save-PAST	save	s_vd	11	Low	5	High
v|slip-PAST	slip	sl_pt	11	Low	5	High
v|wiggle-PAST	wiggle	ˈw_.g_ld	11	Low	5	High
v|brush-PAST	brush	bɹ_ʃt	12	Low	5	High
v|change-PAST	change	ʧ_nʤd	12	Low	5	High
v|live-PAST	live	l_vd	12	Low	5	High
v|slam-PAST	slam	sl_md	12	Low	5	High
v|smash-PAST	smash	sm_ʃt	12	Low	5	High
v|smell-PAST	smell	sm_ld	12	Low	5	High

(*table continues*)

Table 3. *(Continued).*

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|cross-PAST	cross	kɹ_st	11	Low	6	High
v|scream-PAST	scream	skɹ_md	11	Low	6	High
v|belong-PAST	belong	b_.'l_ŋd	12	Low	6	High
v|crack-PAST	crack	kɹ_kt	12	Low	6	High
v|destroy-PAST	destroy	d_.'stɹ_d	12	Low	6	High
v|figure-PAST	figure	'f_.gj_ɹd	12	Low	6	High
v|flatten-PAST	flatten	'fl_.t_nd	12	Low	6	High
v|gather-PAST	gather	'g_.ð_ɹd	12	Low	6	High
v|spoil-PAST	spoil	'sp_._ld	12	Low	6	High
v|close-PAST	close	kl_zd	10.5	Low	7	High
v|confuse-PAST	confuse	k_n.'fj_zd	10.5	Low	9	High
v|die-PAST	die	d_d	7.5	High	1	Low
v|want-PAST	want	'w_n.t_d	4	High	2	Low
v|pop-PAST	pop	p_pt	7.5	High	2	Low
v|pump-PAST	pump	p_mpt	9	High	2	Low
v|bore-PAST	bore	b_ɹd	10	High	2	Low
v|paint-PAST	paint	'p_n.t_d	10	High	2	Low
v|pour-PAST	pour	p_ɹd	10	High	2	Low
v|try-PAST	try	tɹ_d	3.5	High	3	Low
v|play-PAST	play	pl_d	4.5	High	3	Low
v|pull-PAST	pull	p_ld	6.5	High	3	Low
v|knock-PAST	knock	n_kt	7	High	3	Low
v|turn-PAST	turn	t_ɹnd	8	High	3	Low
v|walk-PAST	walk	w_kt	8	High	3	Low
v|pass-PAST	pass	p_st	8.5	High	3	Low
v|push-PAST	push	p_ʃt	8.5	High	3	Low
v|bug-PAST	bug	b_gd	9	High	3	Low
v|burn-PAST	burn	b_ɹnd	9	High	3	Low
v|dry-PAST	dry	dɹ_d	9	High	3	Low
v|open-PAST	open	'_.p_nd	9	High	3	Low
v|bang-PAST	bang	b_ŋd	10	High	3	Low
v|pack-PAST	pack	p_kt	10	High	3	Low
v|rip-PAST	rip	ɹ_pt	10	High	3	Low
v|stay-PAST	stay	st_d	10	High	3	Low
v|thump-PAST	thump	θ_mpt	10	High	3	Low
v|tug-PAST	tug	t_gd	10	High	3	Low
v|plant-PAST	plant	'pl_n.t_d	4	High	4	High
v|chase-PAST	chase	ʧ_st	5	High	4	High
v|follow-PAST	follow	'f_.l_d	6	High	4	High
v|ask-PAST	ask	_skt	7.5	High	4	High
v|help-PAST	help	h_lpt	8	High	4	High
v|jump-PAST	jump	ʤ_mpt	8	High	4	High
v|stop-PAST	stop	st_pt	8	High	4	High
v|trap-PAST	trap	tɹ_pt	8	High	4	High
v|call-PAST	call	k_ld	8.5	High	4	High
v|drop-PAST	drop	dɹ_pt	8.5	High	4	High
v|happen-PAST	happen	'h_.p_nd	8.5	High	4	High
v|mix-PAST	mix	m_kst	8.5	High	4	High
v|step-PAST	step	st_pt	8.5	High	4	High
v|check-PAST	check	ʧ_kt	10	High	4	High

(*table continues*)

Table 3. *(Continued).*

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|cook-PAST	cook	k_kt	10	High	4	High
v|decide-PAST	decide	d_.'s_.d_d	10	High	4	High
v|dial-PAST	dial	'd_._ld	10	High	4	High
v|dream-PAST	dream	dɹ_md	10	High	4	High
v|fire-PAST	fire	'f_._ɹd	10	High	4	High
v|hammer-PAST	hammer	'h_.m_ɹd	10	High	4	High
v|kill-PAST	kill	k_ld	10	High	4	High
v|lock-PAST	lock	l_kt	10	High	4	High
v|ski-PAST	ski	sk_d	10	High	4	High
v|slow-PAST	slow	sl_d	10	High	4	High
v|stamp-PAST	stamp	st_mpt	10	High	4	High
v|use-PAST	use	j_zd	10	High	4	High
v|start-PAST	start	'st_ɹ.t_d	2.5	High	5	High
v|color-PAST	color	'k_.l_ɹd	3	High	5	High
v|scare-PAST	scare	sk_ɹd	6	High	5	High
v|climb-PAST	climb	kl_md	8	High	5	High
v|grab-PAST	grab	gɹ_bd	8.5	High	5	High
v|spill-PAST	spill	sp_ld	8.5	High	5	High
v|attach-PAST	attach	_.'t_ʧt	10	High	5	High
v|compare-PAST	compare	k_m.'p_ɹd	10	High	5	High
v|float-PAST	float	'fl_.t_d	10	High	5	High
v|screw-PAST	screw	skɹ_d	10	High	5	High
v|stuff-PAST	stuff	st_ft	10	High	5	High
v|trick-PAST	trick	tɹ_kt	10	High	5	High
v|crash-PAST	crash	kɹ_ʃt	9	High	6	High
v|blast-PAST	blast	'bl_.st_d	10	High	6	High
v|cover-PAST	cover	'k_.v_ɹd	10	High	6	High
v|rescue-PAST	rescue	'ɹ_.skj_d	10	High	6	High
v|suppose-PAST	suppose	s_.'p_zd	10	High	7	High

Note. CLAN = Computerized Language Analyses (MacWhinney, 2018); WCM = Word Complexity Measure (Stoel-Gammon, 2010); IPA = International Phonetic Alphabet.

study, we include a mix of high and low frequency verbs and a mix of verbs with high and low phonological complexity to ensure that there is a high level of verb variability. In our sessions, clinicians model the targeted forms with the identified verbs using a variety of activities, such as sentence imitation, story model and retell, structured play, and auditory bombardment.

Additionally, clinicians may use the instructions included to create word lists that draw from a greater number of transcripts (we limited our search to 200 transcripts) or to modify procedures to identify verbs or other language forms tailored to their clients' needs. For example, they can identify verbs used in other morphosyntactic contexts (e.g., modal+verb, first person); verbs produced by children of different ages or adults; or verbs produced in activities other than playing with toys, telling stories, talking during mealtime, talking with other children, and/or other activities across the day.

It is important to note that our search was limited to monolingual English-speaking children, with little information available regarding race and ethnicity. Additionally, we did not include transcripts of children who spoke African American Language and we do not know the specific dialects of the children whose language was sampled. It is likely that a variety of dialects were included in our samples given that the databases came from both the United States and Canada. As more transcripts are included in the database, additional searches may be conducted to include children with broader demographics, specified dialects, or other varieties of English to create lists that more fully reflect the individual being served.

In addition to using the lists and tutorial in similar ways as clinicians, researchers may want to use this tutorial when designing assessments or developing stimuli to include in various studies. For example, we used the lists to design a probe to elicit child production of regular past

Table 4. Verb frequency and phonological complexity in third person singular present tense context.

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|buy-3S	buys	b_z	13.5	Low	3	Low
v|toy-3S	toys	t_z	13.5	Low	3	Low
v|tie-3S	ties	t_z	14	Low	3	Low
v|need-3S	needs	n_dz	13.5	Low	4	Low
v|shoot-3S	shoots	ʃ_ts	13.5	Low	4	Low
v|back-3S	backs	b_ks	14	Low	4	Low
v|cheat-3S	cheats	ʧ_ts	14	Low	4	Low
v|sit-3S	sits	s_ts	14	Low	4	Low
v|blow-3S	blows	bl_z	13.5	Low	5	Low
v|build-3S	builds	b_ldz	14	Low	5	Low
v|drop-3S	drops	dɹ_ps	14	Low	5	Low
v|hand-3S	hands	h_ndz	14	Low	5	Low
v|help-3S	helps	h_lps	14	Low	5	Low
v|kick-3S	kicks	k_ks	14	Low	5	Low
v|land-3S	lands	l_ndz	14	Low	5	Low
v|laugh-3S	laughs	l_fs	14	Low	5	Low
v|mess-3S	messes	ˈm_.s_z	14	Low	5	Low
v|rhyme-3S	rhymes	ɹ_mz	14	Low	5	Low
v|sound-3S	sounds	s_ndz	14	Low	5	Low
v|pinch-3S	pinches	ˈp_n.ʧ_z	14	Low	5	Low
v|break-3S	breaks	bɹ_ks	13.5	Low	6	High
v|feel-3S	feels	f_lz	13.5	Low	6	High
v|fly-3S	flies	fl_z	13.5	Low	6	High
v|happen-3S	happens	ˈh_.p_nz	13.5	Low	6	High
v|reach-3S	reaches	ˈɹ_.ʧ_z	13.5	Low	6	High
v|appear-3S	appears	_.ˈp_ɹz	14	Low	6	High
v|babble-3S	babbles	ˈb_.b_lz	14	Low	6	High
v|card-3S	cards	k_ɹdz	14	Low	6	High
v|sleep-3S	sleeps	sl_ps	14	Low	6	High
v|truck-3S	trucks	tɹ_ks	14	Low	6	High
v|balloon-3S	balloons	b_.ˈl_nz	13.5	Low	7	High
v|change-3S	changes	ˈʧ_n.ʤ_z	14	Low	7	High
v|love-3S	loves	l_vz	14	Low	7	High
v|drive-3S	drives	dɹ_vz	13.5	Low	8	High
v|slice-3S	slices	ˈsl_.s_z	14	Low	8	High
v|want-3S	wants	w_nts	8.5	High	3	Low
v|bite-3S	bites	b_ts	12	High	3	Low
v|die-3S	dies	d_z	12	High	3	Low
v|beat-3S	beats	b_ts	13	High	3	Low
v|bump-3S	bumps	b_mps	13	High	3	Low
v|eat-3S	eats	_ts	13	High	3	Low
v|know-3S	knows	n_z	13	High	3	Low
v|meet-3S	meets	m_ts	13	High	3	Low
v|go-3S	goes	ɡ_z	1	High	4	Low
v|get-3S	gets	ɡ_ts	4.5	High	4	Low
v|say-3S	says	s_z	6.5	High	4	Low
v|see-3S	sees	s_z	6.5	High	4	Low
v|mean-3S	means	m_nz	9	High	4	Low
v|keep-3S	keeps	k_ps	10.5	High	4	Low
v|let-3S	lets	l_ts	11	High	4	Low

(*table continues*)

Table 4. *(Continued).*

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|make-3S	makes	m_ks	11	High	4	Low
v|end-3S	ends	_ndz	11.3	High	4	Low
v|lie-3S	lies	l_z	12	High	4	Low
v|take-3S	takes	t_ks	12	High	4	Low
v|fit-3S	fits	f_ts	13	High	4	Low
v|hit-3S	hits	h_ts	13	High	4	Low
v|knock-3S	knocks	n_ks	13	High	4	Low
v|pin-3S	pins	p_nz	13	High	4	Low
v|talk-3S	talks	t_ks	13	High	4	Low
v|walk-3S	walks	w_ks	13	High	4	Low
v|look-3S	looks	l_ks	2	High	5	Low
v|come-3S	comes	k_mz	2.5	High	5	Low
v|run-3S	runs	ɹ_nz	3.5	High	5	Low
v|hurt-3S	hurts	h_ɹts	9	High	5	Low
v|try-3S	tries	tɪ_z	9	High	5	Low
v|like-3S	likes	l_ks	10.5	High	5	Low
v|jump-3S	jumps	ʤ_mps	12	High	5	Low
v|stay-3S	stays	st_z	12	High	5	Low
v|turn-3S	turns	t_ɹnz	12	High	5	Low
v|work-3S	works	w_ɹks	12	High	5	Low
v|pull-3S	pulls	p_lz	12.5	High	5	Low
v|tell-3S	tells	t_lz	12.5	High	5	Low
v|arm-3S	arms	_ɹmz	13	High	5	Low
v|find-3S	finds	f_ndz	13	High	5	Low
v|lift-3S	lifts	l_fts	13	High	5	Low
v|match-3S	matches	ˈm_.ʧ_z	13	High	5	Low
v|push-3S	pushes	ˈp_.ʃ_z	13	High	5	Low
v|read-3S	reads	ɹ_dz	13	High	5	Low
v|stomp-3S	stomps	st_mps	13	High	5	Low
v|teach-3S	teaches	ˈt_.ʧ_z	13	High	5	Low
v|touch-3S	touches	ˈt_.ʧ_z	13	High	5	Low
v|wing-3S	wings	w_ŋz	13	High	5	Low
v|yell-3S	yells	j_lz	13	High	5	Low
v|hear-3S	hears	h_ɹz	13	High	5	Low
v|tower-3S	towers	ˈt_.w_ɹz	13	High	5	Low
v|start-3S	starts	st_ɹts	10	High	6	High
v|stitch-3S	stitches	st_ks	10	High	6	High
v|block-3S	blocks	bl_ks	12	High	6	High
v|call-3S	calls	k_lz	12	High	6	High
v|fall-3S	falls	f_lz	12.5	High	6	High
v|catch-3S	catches	ˈk_.ʧ_z	13	High	6	High
v|follow-3S	follows	ˈf_.l_z	13	High	6	High
v|hold-3S	holds	h_ldz	13	High	6	High
v|smoke-3S	smokes	sm_ks	13	High	6	High
v|thank-3S	thanks	θ_ŋks	13	High	6	High
v|use-3S	uses	ˈj_.z_z	13	High	6	High
v|stick-3S	sticks	ˈst_.ʧ_z	11.5	High	7	High
v|begin-3S	begins	b_.ˈg_nz	12	High	7	High
v|climb-3S	climbs	kl_mz	13	High	7	High
v|give-3S	gives	g_vz	13	High	7	High

(*table continues*)

Table 4. *(Continued).*

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
v|leave-3S	leaves	l_vz	13	High	7	High
v|live-3S	lives	l_vz	13	High	7	High
v|lose-3S	loses	ˈl_.z_z	13	High	7	High
v|picture-3S	pictures	ˈp_k.ʧ_ɹz	13	High	7	High
v|smell-3S	smells	sm_lz	13	High	7	High
v|snatch-3S	snatchs	ˈsn_.ʧ_z	13	High	7	High
v|explode-3S	explodes	_k.ˈspl_dz	13	High	10	High

Note. CLAN = Computerized Language Analyses (MacWhinney, 2018); IPA = International Phonetic Alphabet; WCM = Word Complexity Measure (Stoel-Gammon, 2010).

Table 5. Verb frequency and phonological complexity in *is/are* + verb+*ing* context.

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
aux|be&PRES part|die-PRESP	die	ˈd_._ŋ	10	Low	3	Low
aux|be&PRES part|pop-PRESP	pop	ˈp_.p_ŋ	10	Low	3	Low
aux|be&3S part|mess-PRESP (&PRES)	mess	ˈm_.s_ŋ	9	Low	4	Low
aux|be&3S part|say-PRESP	say	ˈs_._ŋ	9	Low	4	Low
aux|be&3S part| + n|baby+v|sit-PRESP	babysit	ˈb_.b_.,s_.t_ŋ	10	Low	4	Low
aux|be&3S part|let-PRESP	let	ˈl_.t_ŋ	10	Low	4	Low
aux|be&3S part|lie-PRESP	lie	ˈl_._ŋ	10	Low	4	Low
aux|be&3S part|peek-PRESP	peek	ˈp_.k_ŋ	10	Low	4	Low
aux|be&3S part|rain-PRESP	rain	ˈɹ_.n_ŋ	10	Low	4	Low
aux|be&PRES part|show-PRESP	show	ˈʃ_._ŋ	10	Low	4	Low
aux|be&3S part|touch-PRESP	touch	ˈt_.ʧ_ŋ	10	Low	4	Low
aux|be&3S part|whack-PRESP	whack	ˈw_.k_ŋ	10	Low	4	Low
aux|be&3S part|wonder-PRESP	wonder	ˈw_n.d_ɹ._ŋ	10	Low	4	Low
aux|be&3S part|yell-PRESP	yell	ˈj_.l_ŋ	10	Low	4	Low
aux|be&3S part|call-PRESP	call	ˈk_.l_ŋ	9	Low	5	High
aux|be&PRES part|chase-PRESP	chase	ˈʧ_.s_ŋ	9	Low	5	High
aux|be&3S part|move-PRESP	move	ˈm_.v_ŋ	9	Low	5	High
aux|be&3S part|roll-PRESP	roll	ˈɹ_.l_ŋ	9	Low	5	High
aux|be&PRES part|spy-PRESP	spy	ˈsp_._ŋ	9	Low	5	High
aux|be&3S part|choke-PRESP	choke	ˈʧ_.k_ŋ	10	Low	5	High
aux|be&PRES part|fall-PRESP	fall	ˈf_.l_ŋ	10	Low	5	High
aux|be&PRES part|follow-PRESP	follow	ˈf_.l_._ŋ	10	Low	5	High
aux|be&3S part|reach-PRESP	reach	ˈɹ_.ʧ_ŋ	10	Low	5	High
aux|be&3S part|ring-PRESP	ring	ˈɹ_ŋ._ŋ	10	Low	5	High
aux|be&PRES part|use-PRESP	use	ˈj_.z_ŋ	10	Low	5	High
aux|be&3S part|waive-PRESP	waive	ˈw_.k_ŋ	10	Low	5	High
aux|be&PRES part|have-PRESP	have	ˈh_.v_ŋ	8.5	Low	6	High
aux|be&3S part|hold-PRESP	hold	ˈh_l.d_ŋ	8.5	Low	6	High
aux|be&3S part|break-PRESP	break	ˈbɹ_.k_ŋ	9	Low	6	High
aux|be&PRES part|give-PRESP	give	ˈg_.v_ŋ	10	Low	6	High
aux|be&PRES part|jump-PRESP	jump	ˈdʒ_m.p_ŋ	10	Low	6	High
aux|be&3S part|leave-PRESP	leave	ˈl_.v_ŋ	10	Low	6	High
aux|be&PRES part|sneak-PRESP	sneak	ˈsn_.k_ŋ	10	Low	6	High

(*table continues*)

Table 5. *(Continued).*

CLAN output	Verb	Abbreviated IPA with inflection	Average frequency rating	Frequency code	WCM score	Complexity code
aux|be&3S part|start-PRESP	start	ˈst_ɹ.t_ŋ	10	Low	7	High
aux|be&3S part|survive-PRESP	survive	s_ɹ.ˈv_.v_ŋ	10	Low	10	High
aux|be&3S part|do-PRESP (&PRES)	do	ˈd_._ŋ	7	High	3	Low
aux|be&3S part|eat-PRESP	eat	ˈ_.t_ŋ	7.5	High	3	Low
aux|be&3S part|go-PRESP (&PRES)	go	ˈg_._ŋ	1	High	4	Low
aux|be&3S part|run-PRESP (&PRES)	run	ˈɹ_.n_ŋ	2.5	High	4	Low
aux|be&PRES part|hide-PRESP	hide	ˈh_.d_ŋ	5	High	4	Low
aux|be&PRES part|make-PRESP	make	ˈm_.k_ŋ	6	High	4	Low
aux|be&3S part|fight-PRESP (&PRES)	fight	ˈf_.t_ŋ	6.5	High	4	Low
aux|be&3S part|come-PRESP (&PRES)	come	ˈk_.m_ŋ	7	High	4	Low
aux|be&PRES part|pull-PRESP	pull	ˈp_.l_ŋ	7	High	4	Low
aux|be&3S part|talk-PRESP (&PRES)	talk	ˈt_.k_ŋ	7	High	4	Low
aux|be&3S part|watch-PRESP (&PRES)	watch	ˈw_.v_ŋ	7	High	4	Low
aux|be&3S part|get-PRESP (&PRES)	get	ˈg_.t_ŋ	7.5	High	4	Low
aux|be&3S part|cut-PRESP	cut	ˈk_.t_ŋ	8	High	4	Low
aux|be&3S part|hit-PRESP	hit	ˈh_.t_ŋ	8	High	4	Low
aux|be&3S part|miss-PRESP	miss	ˈm_.s_ŋ	8	High	4	Low
aux|be&PRES part|push-PRESP	push	ˈp_.ʃ_ŋ	8	High	4	Low
aux|be&PRES part|ride-PRESP	ride	ˈɹ_.d_ŋ	8	High	4	Low
aux|be&PRES part|shoot-PRESP	shoot	ˈʃ_.t_ŋ	8	High	4	Low
aux|be&3S part|take-PRESP (&PRES)	take	ˈt_.k_ŋ	8	High	4	Low
aux|be&3S part|tell-PRESP	tell	ˈt_.l_ŋ	8	High	4	Low
aux|be&3S part|walk-PRESP	walk	ˈw_.ʧ_ŋ	8	High	4	Low
aux|be&3S part|try-PRESP (&PRES)	try	ˈtɹ_._ŋ	2.5	High	5	High
aux|be&3S part|look-PRESP (&PRES)	look	ˈl_.k_ŋ	4	High	5	High
aux|be&PRES part|wreck-PRESP	wreck	ˈɹ_.k_ŋ	7	High	5	High
aux|be&3S part|drip-PRESP	drip	ˈdɹ_.p_ŋ	8	High	5	High
aux|be&PRES part|listen-PRESP	listen	ˈl_.s_.n_ŋ	8	High	5	High
aux|be&3S part|spin-PRESP	spin	ˈsp_.n_ŋ	8	High	5	High
aux|be&PRES part|climb-PRESP	climb	ˈkl_.m_ŋ	6	High	6	High
aux|be&3S part|sleep-PRESP	sleep	ˈsl_.p_ŋ	7.5	High	6	High
aux|be&3S part|smile-PRESP	smile	ˈsm_.l_ŋ	8	High	6	High
aux|be&PRES part|stick-PRESP	stick	ˈst_.k_ŋ	8	High	6	High
aux|be&3S part|throw-PRESP	throw	ˈθɹ_._ŋ	8	High	6	High
aux|be&3S part|record-PRESP	record	ɹ_.ˈk_ɹ.d_ŋ	7	High	8	High

Note. CLAN = Computerized Language Analyses (MacWhinney, 2018); IPA = International Phonetic Alphabet; WCM = Word Complexity Measure (Stoel-Gammon, 2010).

tense *-ed*, third person singular *-s*, *is/are* + verb+*ing*, and *do/does* questions. We wanted our items to include verbs that varied in frequency of occurrence and phonological complexity to understand the depth of the child's acquisition of each morphosyntactic form. Thus, we had a mix of verbs with low frequency/high phonological complexity, low frequency/low phonological complexity, high frequency/high phonological complexity, and high frequency/low phonological complexity. For other uses, researchers may want to identify a set of "easy" verbs that are of high frequency and low phonological complexity, potentially reducing the language demands placed on the individual. Additionally, we used simple "high" and "low" categories. Researchers may want to use more continuous metrics when considering frequency of occurrence and phonological complexity. Because our tutorial outlines steps to acquire a full ranking of the frequency and phonological complexity of the target verbs, the procedure can be easily adapted by researchers who are interested in continuous metrics. It should also be noted that the WCM is only one way to quantify a verb's difficulty. In the future, researchers and clinicians may want to consider using metrics that account for other features that

Table 6. Verb frequency and phonological complexity in *do/does* question context.

CLAN output	Verb	Abbreviated IPA	Average frequency rating	Frequency code	WCM score	Complexity code
mod|do pro:per|you v|mean	mean	m_n	4	Low	1	Low
mod|do pro:per|you v|need	need	n_d	4	Low	1	Low
mod|do pro:per|you v|see	see	s_	4	Low	1	Low
mod|do pro:per|you v|keep	keep	k_p	4	Low	2	High
mod|do pro:per|you v|drop	drop	dɹ_p	4	Low	3	High
mod|do pro:per|you v|know	know	n_	1.5	High	0	Low
mod|do pro:per|you v|do	do	d_	3	High	0	Low
mod|do pro:per|you v|say	say	s_	3	High	1	Low
mod|do pro:per|you v|want	want	w_nt	1	High	2	High
mod|do pro:per|you v|open	open	ˈ_.p_n	2	High	2	High
mod|do pro:per|you v|pick	pick	p_k	3	High	2	High
mod|do pro:per|you v|take	take	t_k	3	High	2	High
mod|do pro:per|you v|walk	walk	w_k	3	High	2	High
mod|do pro:per|you v|like	like	l_k	3	High	3	High
mod|do pro:per|you v|have	have	h_v	3	High	4	High
v|do pro:per|you v|remember	remember	ɹ_.ˈm_m.b_ɹ	3	High	4	High

Note. CLAN = Computerized Language Analyses (MacWhinney, 2018); IPA = International Phonetic Alphabet; WCM = Word Complexity Measure (Stoel-Gammon, 2010).

may impact a verb's difficulty, such as sentence position and specific phonetic or acoustic contexts (e.g., Davies et al., 2017; Hsieh et al., 1999; Sundara et al., 2011).

Conclusions

Empirical evidence demonstrates the importance of verbs in the assessment and intervention of children's use of morphosyntactic forms. While further research is needed to fully optimize clinical services focused on morphosyntax, this tutorial provides resources and modifiable instructions to support clinical services and research activities related to grammar and specific morphosyntactic forms.

Author Contributions

Lizbeth H. Finestack: Conceptualization (Lead), Formal analysis (Supporting), Funding acquisition (Lead), Methodology (Lead), Writing – original draft (Lead), Writing – review & editing (Lead). **Jamie Linert:** Formal analysis (Supporting), Writing – original draft (Supporting), Writing – review & editing (Supporting). **Elizabeth Ancel**: Formal analysis (Lead), Writing – original draft (Supporting), Writing – review & editing (Supporting). **Lisa Hilliard**: Formal analysis (Lead), Methodology (Supporting), Writing – original draft (Supporting), Writing – review & editing (Supporting). **Benjamin Munson:** Formal analysis (Supporting), Writing – review & editing (Supporting). **Kirstin Kuchler**: Formal analysis (Supporting), Writing – original draft (Supporting), Writing – review & editing (Supporting). **Olivia Matthys:** Formal analysis (Supporting), Writing – original draft (Supporting), Writing – review & editing (Supporting).

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Identifying Child TalkBank Transcripts

1. Go to http://talkbank.org/DB/
   Or go to talkbank.org → Other → Search the Database
2. If needed, see instructions in Manual (Link in top right corner)
3. Enter search terms as listed below and click the green "search TalkBankDB" button. Note the "corpora" option can be found under the Collection drop-down list.
   a. TalkBank: CHILDES
   b. Corpora: childes/Eng-NA
   c. Lang: English (eng)
   d. Activity Type: Playing with toys, Telling stories, Talk during mealtime, Several children talking with each other, Activities across the day
   e. groupType: Typically developing children
   f. Age: 60–107 months
4. Transfer text from all transcripts into CLAN to make .cha files

Identifying Verb Frequency in Target Context

1. Open CLAN: Enter desired code in command window
   a. Regular past tense *-ed:* freq +t*CHI +o +u +sm-PAST @
      - freq = creates a frequency table of language target
      - +t*CHI = pulls data from only child utterances of transcript
      - +o = sorts table in frequency order
      - +u = combines input of multiple transcript into one output file
      - +sm-PAST = specifies regular past tense words on %mor line
      - @ = runs code on imputed files
   b. Third person singular *-s:* freq +t*CHI +o +u +sm-3S @
      - freq = creates a frequency table of language target
      - +t*CHI = pulls data from only child utterances of transcript
      - +o = sorts table in frequency order
      - +u = combines input of multiple transcript into one output file
      - +sm-3S = specifies regular 3rd person singular words on %mor line
      - @ = runs code on imputed files
   c. *Is/are* + verb: freq +t*CHI +o +u +s"m;be |v" +s"m;be |part" +c7 +sm;*,o% +o @
      - freq = creates a frequency table of language target
      - +t*CHI = pulls data from only child utterances of transcript
      - +o = sorts table in frequency order
      - +u = combines input of multiple transcript into one output file
      - +s"m;be |v" = specifies combination of 'be' forms + verb on %mor line
      - +s"m;be |part" = specifies combination of 'be' forms + participle on %mor line
      - +c7 = for multi-word groups
      - +sm;*,o% = searched for roots or lemmas
      - @ = runs code on imputed files

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Identifying Child TalkBank Transcripts

d. *Do* + verb questions: freq +t*CHI +u + s“m;do |sub |v” +s“m;do |pro:per |co” +s“m;do |pro:per |v” +c7 +sm;*,o% @
   - freq = creates a frequency table of language target
   - +t*CHI = pulls data from only child utterances of transcript
   - +o = sorts table in frequency order
   - +u = combines input of multiple transcript into one output file
   - +s“m;do |sub |v” = specifies do + subject + verb combination on %mor line
   - +s“m;do |pro:per |co” = specifies do + personal pronoun + ?????????
   - +s“m;do |pro:per |v” = specifies do + personal pronoun + verb combination on %mor line
   - @ = runs code on imputed files

e. Optional codes to identify errors in frequency analysis
   - +d6 = Breakdown of replaced forms, errors, partial omissions, and full forms
   - -s*** = Exclude all words produced in error
   - +r5 = Exclude any text replacements
   - +r6 = Exclude repetitions and revisions

2. Click “file in” and add all appropriate files to the window on the right by highlighting files and clicking “add”/”add files” or double clicking on desired files
3. Click “done”
4. Click “run”
5. Save output file