

Student's Guide to SPATS-ESL



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Student's Guide to SPATS-ESL

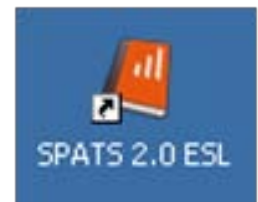
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Getting Started with SPATS-ESL

SPATS-ESL is a very flexible program that can be customized for specific testing, training, or research purposes, but to do so requires special training by Communication Disorders Technology, Inc., which is available in a one-day workshop. However, SPATS-ESL has a recommended Standard or Default Curriculum that has been found to be effective with ESL students with TOEFL (paper and pencil) scores near and well above 500. Use of this Default Curriculum can be started with almost no preliminary study of this manual. It is recommended, however, that even the most eager students should look over pages 2-4 of the Guide before starting SPATS-ESL. Later, as they become familiar with the program, they will find it useful to study the remainder of guide.

Quick Start

Students can begin as follows: Click on the SPATS-ESL icon on the desk top, which is shown on the left.



When the first screen appears, you must type in your assigned SPATS ID, provided by CDT or your program supervisor.



In the case shown, the client entered – sps137c7. This indicates that the client belonged to group 37 and was client 7 in that group.

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EXIT

SL

ENTER YOUR SPATS ID
spsl37c7

ENTER YOUR SPATS PASSWORD
7xP9a38

CDT Communication Disorders Technology, Inc.
SPATS - ESL v2.0
Speech Perception Assessment & Training System
- for students of English as a Second Language

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As shown on the left, on the next screen the student types in her/his password, which is also provided by CDT or their program supervisor. In this example, the client's SPATS ID is spsl37c7 and the associated password is 7xP9a38.

EXIT

LOG OUT

SL

INTRODUCTIONS

CALIBRATION

FILE DESIGNATION > SPATS_SL20_7

Click the options below that describe the NEW CLIENT.

Asian
 Western
 Other

Male
 Female

Under 5 years of English
 Over 5 years of English

CONTINUE

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Next, a new user clicks on options that describe her/his language background.

This screen only appears at the time of the first log in.

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When this screen appears, the student clicks on the “Calibration” button at the upper left to make sure that the sound is comfortably loud. The sound can be turned off by clicking the same button which now reads, “End Calibration.” If the sound is inaudible or too loud, turn off the calibration sound (even if it can’t be heard). Then from the computer’s control panel, reset the loudspeaker settings to default and try SPATS again (see Appendix 1 of the “User’s Guide.”) Once the

sound is comfortably loud, all the student needs to do is click on “Click here to Continue” and follow the on-screen written instructions.

The student needs to know that SPATS-ESL training begins with a sentence task that is introduced **WITHOUT SOUND**. After this introduction and a brief test **WITHOUT SOUND**, the program introduces sound and trains the students to improve their abilities to perceive naturally spoken English by a combination of sentence training in the presence of varying amounts of interfering background babble and by training on the individual sounds of English. The individual sounds are the “building blocks” of spoken English. Students should be warned that progress may seem slow, but that research has shown that students can approach near-native perception of naturally spoken English if they work with the program a few hours each week for 14-16 weeks. Two other points are worth mentioning: 1) Students should focus on listening, and should not try to pronounce or imitate the syllable or words that they hear until they can accurately identify them. 2) During syllable drills, be sure to use the “post-response rehearing option.” This allows them to compare the sound presented with the one mistakenly chosen. Use of this option promotes faster learning than can be achieved by only noting correct and incorrect responses.

Each student is also supplied with a User’s Guide and it will be helpful to become familiar with it as they progress through the SPATS-ESL curriculum.

SPATS-ESL User's Guide

Purpose of SPATS-ESL. Those who wish to become efficient in conversational English often find that they have trouble understanding sentences that are spoken rapidly by native speakers of that language. This is frequently true of non-native speakers of English with excellent reading and writing skills in English and even of those who are able to speak quite effectively in English. Non-native speakers often find themselves pretending to understand, when in fact they do not, or have only understood some part of what was said to them. This can be embarrassing, or worse, it can cause people to make serious mistakes in their studies, their job, or their everyday interactions with friends.

One reason for difficulty in understanding rapid English speech (second-language learners of English say that nearly all native speakers speak too rapidly) is that many of the basic elements of English, vowels and consonants, are perceptually different from those in the person's native language. Some vowels and consonants are pronounced similarly in, for example, Spanish and English, while others are not. Other speech sounds actually occur in English, but not in Spanish. Recent research has shown that guided, systematic, sound recognition drills, with right-wrong feedback, can greatly improve ESL students' abilities to understand spoken English. The SPATS-ESL program was developed for exactly this purpose. It alternates drills on the identification of speech elements, with the recognition of simple sentences that are spoken at normal conversational rates by a group of nine native speakers of English.

If you complete the series of drills in the SPATS-ESL training program it will make you better able to understand English at conversational rates, and to do so with less effort. Research has shown that, after about 15-35 hours of training, students of English as a second language are able to achieve scores on the SPATS-ESL recognition tasks that are nearly as high as those of native speakers.

Should you attempt SPATS-ESL? Research with SPATS-ESL has been limited to students that have basic knowledge of English. Typically SPATS-ESL user's have had TOEFL pbt scores (paper version) near or above 500. ESL learners and users with quite high TOEFL scores have reported significant benefit from practice with the SPATS software.

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How to begin SPATS-ESL. As previously stated, SPATS-ESL is designed to explain itself as you use the software. This guide is merely to help you get started and for your use as an occasional reference as you work with the program. You may wish to quickly read this User Guide and then refer to it from time to time as you progress through the program.

When to imitate the sounds you hear: When doing SPATS, keep your focus on listening! It is known that mispronunciation can interfere with your perception and interfere with the storage of the sound in short-term memory. Only after you can reliably identify a sound should you try to imitate it. **Remember; do not try to imitate a sound until you can accurately identify it! When your identification of a sound is nearly perfect, your pronunciation practice should then begin to produce significant benefits.**

Earphones: When identifying isolated speech sounds, good quality earphones are required. Examples are those found in most language laboratories. Earphones should be the equivalent of Sennheiser HD 212 or SONY MDR 7502 phones. Do not use speakers provided in laptop computers or inexpensive "ear buds" as you may be unable to hear many of the necessary distinctions required for learning English sounds.

Sound Level Adjustment. The first requirement is that you set the sound output of your computer to a level that will be comfortable for your drill sessions. This setting should be checked before each session. [see Appendix I]

Outline of Training and what to Expect

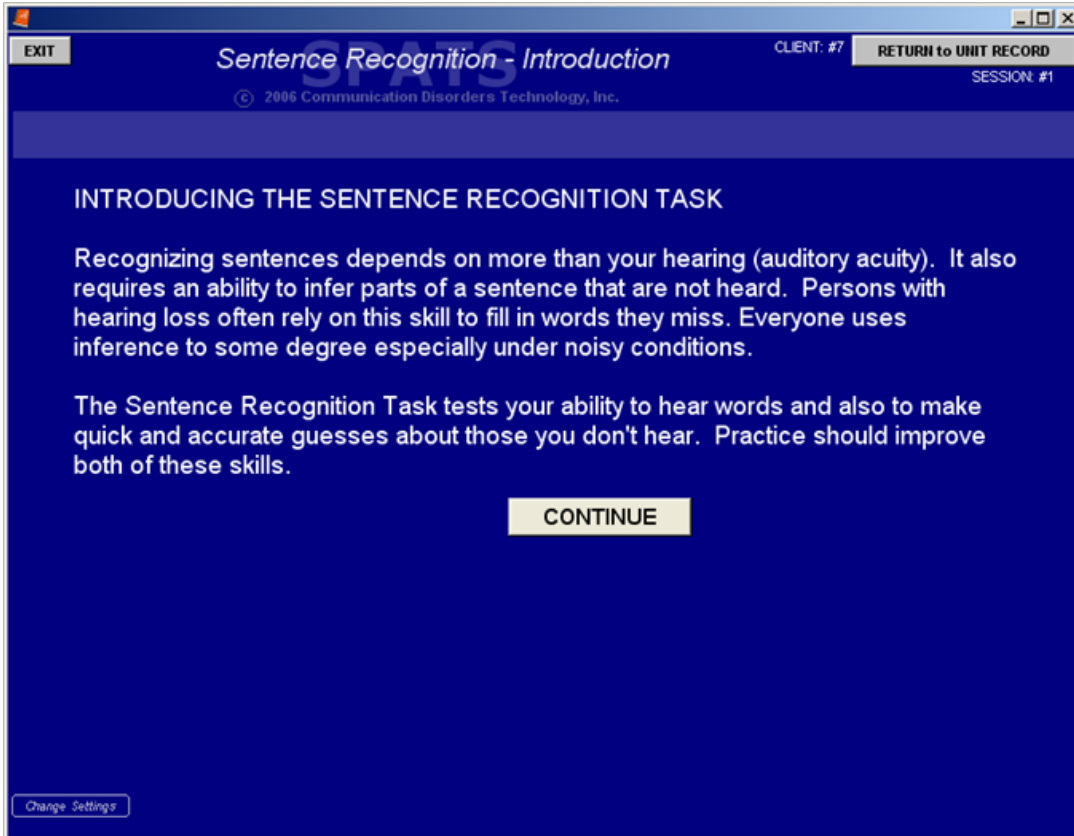
General: SPATS-ESL is designed to train you to accurately perceive naturally spoken English whether in quiet or in moderate amounts of interfering background babble.

Sentence Training.

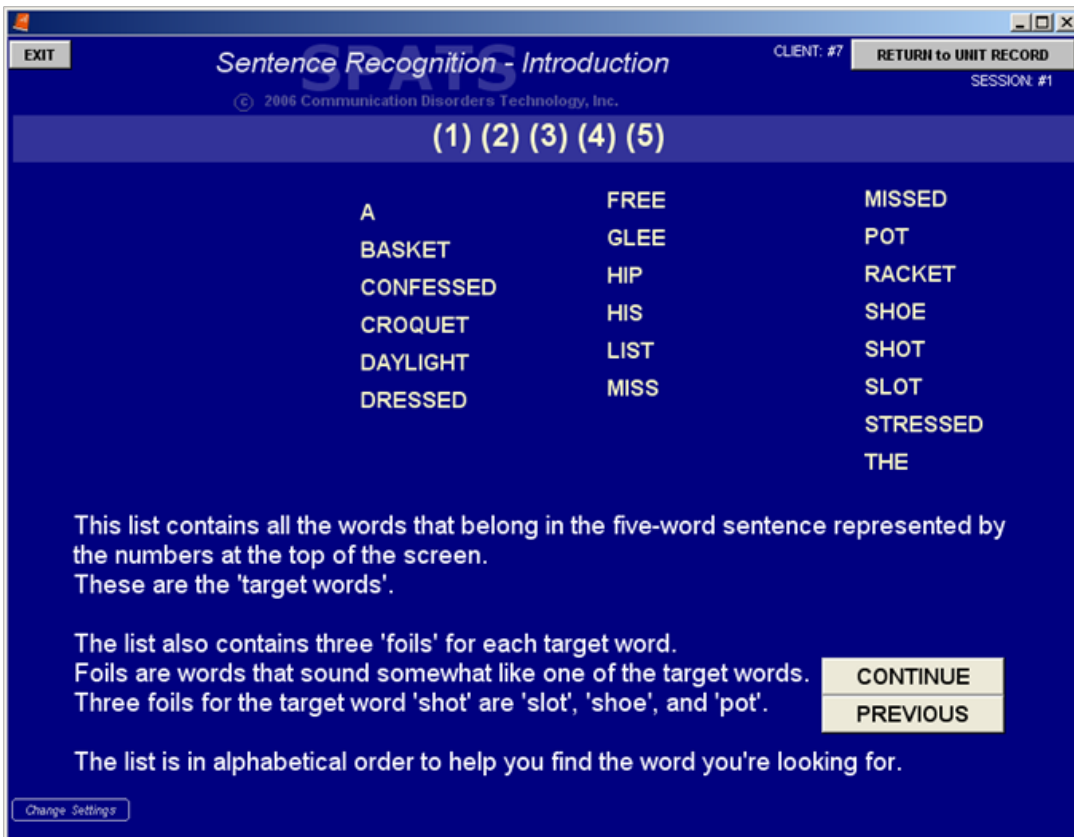
SPATS-ESL begins with sentence training. This training is introduced by several explanatory screens that describe the way you will be asked to identify the words in sentences, using examples. At first these examples **do not use any sound**. This should not bother you; there is a good reason for trying the sentence training without sound in order to help you understand how it works. You will learn to use the first few words that you identify as a guide to determining the other words. This is a normal part of speech recognition, often referred to as "top-down processing". All persons (both native and non-native speakers) recognize words in sentences partly by using the words they hear as a basis for "filling in" the words that they do not hear. The process of inferring missing or unheard words is not simply guessing and when you can anticipate the word that may be spoken, you actually become better able to hear that word.

The first screen that you will see is shown below.

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A series of screens (without sound) will lead you through the sentence task.



Another screen in this series is shown to the left. A succession of screens will teach you how to click on words listed to identify which ones form the 5-word sentence at the top of the screen. While this may seem tedious at first, you will quickly adjust to the task and by your second session will be enjoying identifying the words in naturally spoken English sentences.

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Identifying words in sentences without sound.

After the Introduction to sentence training, you will be asked to complete a set of 15 sentences without sound. Initially a few of the words in the sentence will be identified for you, and you will be asked to find the rest, simulating the real-life conditions in which you hear some but not all of the words in a sentence. The number of missing words and the number of “foils” or incorrect words are increased as you go through the 15 sentences.

Next, you will be asked to identify 15 short sentences that are spoken by different speakers (women and men, younger and older). The sentences are presented in multi-talker speech “babble,” representing the type of background sound that often occurs in classrooms and work places. The background sound is very soft for some sentences and will not cause you any problem in hearing the words, while other sentences will be presented in louder backgrounds and will be difficult to hear.

Sentence Training: How to monitor your progress. You will do sets of three sentences after each completion of a constituent testing or training run (explained below). When five sets of three (15 sentences) are completed you will receive a report of your performance on the SPATS screen. The report gives the total number of words identified, the errors (clicks on wrong words), the number of temporal penalties (5-second intervals without a click), and your effective percent correct which combines the number of words correctly identified, the number of errors and the number of temporal penalties in a single score. A report on 15 sentences might look like the lines shown below.

Number of Words	Number of Errors	Number of Temporal Penalties	Effective Percent Correct	Performance Category
84	20	20	68	“Needs Work”

As you complete more sets of 15, the series of reports might look like those shown below.

Sets of 15 Sentences	Number of Words	Number of Errors	Number of Temporal Penalties	Effective Percent Correct	Performance Category
1	84	20	20	68	Needs Work
2	85	16	12	75	Fair
3	82	10	8	82	Fair
4	87	5	8	87	Very Good
5	85	9	9	83	Good

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The relation between the **Effective Percent Correct** and the **Performance Category** is given in the Table below

Effective Percent Correct	Performance Category
Less than 70	Needs Work
70 to 77	Fair
78 to 85	Good
86 to 93	Very Good
94 to 100	Excellent

Your goals:

- 1) **Try to keep the number of errors and the number of temporal penalties about equal.** If you have many more errors than temporal penalties, it means that you are just guessing and not using both the sounds and the context (previous words identified) to help you identify the words in the sentence. If you have many more temporal penalties than errors, it means that you are spending too much time trying figure out the sentence from context and not using the sounds you hear as much as you should. Remember; try to keep the number of errors and number of temporal penalties about equal!!!!
- 2) **Try to reduce the sum of the number of errors and the number of temporal penalties to a small number.** The table below shows the relation between the total errors and temporal penalties and the effective percent correct. Unfortunately the groups of 15 sentences vary in difficulty, so your scores will vary from one set of 15 to another, even after considerable training. Do not be discouraged by this, on average your scores should improve and reach the “good” and “very good” categories. A few students may actually achieve the “Excellent” level, but that is very difficult because of the use of background noise in the sentence task.

Words	Errors (E)	Temporal Penalties (TP)	E + TP	Effective Percent Correct	Performance Category
84	>18	>18	>36	Less than 70	Needs Work
85	18	18	36	70	Fair
84	13	14	27	76	Fair
87	12	13	25	78	Good
84	9	9	18	82	Good
83	8	8	16	84	Very Good
84	4	4	8	91	Very Good
85	2	2	4	96	Excellent
84	0	0	0	100	Excellent

Syllable Constituent Training

General. After your first drill with sentences, you will be automatically introduced to Constituent Training. The constituents are the building blocks of English speech, and consist of ONSETS (speech sounds that occur at the beginning of syllables); NUCLEI (speech sounds, mainly vowels, that occur in the middle of syllables) and CODAS (speech sounds that occur at the end of syllables). As in the case of sentence training, you will be taken through a series of screens to familiarize you with the Constituent Training Task. Below is shown a response screen for drills on a set of 11 different onsets of English syllables.

The screenshot shows the SPATS-ESL interface for 'ONSETS: Beginnings of Words and Syllables Onset Benchmark - Level 1 in QUIET'. The screen is divided into several sections:

- Top Bar:** 'EXIT' button on the left, 'Client: 42' in the center, and 'RETURN to UNIT RECORD' on the right.
- Title:** 'ONSETS: Beginnings of Words and Syllables Onset Benchmark - Level 1 in QUIET' with a copyright notice for 2006 Communication Disorders Technology, Inc.
- Onset Grid:** A grid of onset buttons. The first row contains 'f-', 't-', 's-', 'k-', and 'h-'. The second row contains 'b-', 'd-', and 'r-'. The third row contains 'w-' and 'm-'. A 'Vowel-' button is located at the bottom left of the grid. The 'd-' button is highlighted in green.
- Classification:** The grid is organized into three vertical columns: 'Voiceless' (top row), 'Voiced' (middle row), and 'S Cluster' (bottom row).
- Buttons:** A 'HEAR NEXT' button is located at the bottom center.
- Performance:** At the bottom center, it says '- YES -' with a row of asterisks below it.
- Settings and Stats:** On the bottom right, there are buttons for 'SNR Adapt OFF' and 'SNR 40'. A box displays 'ITEM 16 of 44', '12 Correct - 4 Incorrect', and '75% correct so far.'

The learner heard a syllable that began with the d-sound (“dee,” “dah,” “doo,” or “der”) and correctly clicked on the “d” button. The screen below shows what happens on the screen after an error.

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EXIT Client: 42 RETURN to UNIT RECORD

ONSETS: *Beginnings of Words and Syllables*
Onset Benchmark - Level 1 in QUIET
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	f-		t-	s-			k-	h-	Voiceless
	b-		d-						Voiced
						r-			
	w-								
	m-								
									S Cluster
	Vowel-								

HEAR NEXT

- NO -
You chose *r* - *f* was played.

SNR Adapt OFF
SNR -40

ITEM 17 of 44
12 Correct - 5 Incorrect
71% correct so far.

The learner clicked on “HEAR NEXT” and heard a syllable beginning with the f-sound (“fee,” “fah,” “foo,” or “fer”). The learner misidentified the sound as beginning with the consonantal “r-sound.” The screen immediately indicated that the correct onset was “f” and that the misidentified sound was “r.” When this happens the learner has the opportunity for **“post-response rehearing.”** By clicking the “f-button” and the “r-button” the listener can compare the two sounds. You should use the “post response rehearing” option as often as you can as that will speed your learning.

Nearly 20% of all English syllables do not begin with a consonant or consonant cluster, they begin with a vowel or the nucleus. So you need to be able to identify syllables that begin with a vowel sound as in the words “at,” “of,” “up,” “in,” or “early.” In SPATS-ESL when you hear the sounds “ee,” “aah,” “oo, or “er,” you will respond by clicking on the “Vowel-button”. It is very important for you to learn to distinguish syllables that begin with a consonant or consonant cluster from those that begin with a vowel.

Remember do not pronounce, imitate, or try pronouncing a sound (onset, nucleus, or coda) that you hear until you can identify it nearly perfectly. To imitate sounds before you can identify them accurately can result in reinforcing both perceptual errors and habitual pronunciation errors.

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Levels of Difficulty. As you progress through the constituent training drills you will find that the sizes of the sets of constituents that you are asked to identify is very small at first, but as you improve your ability to identify most of the constituents in each set, you will advance to the next larger set. There are four sizes of constituent sets. These are called Cumulative Levels 1, 2, 3, and 4. Level 1 is the smallest and consists of those 25% of the constituents (ONSETS, CODAS, or NUCLEI) that are most important in English. "Importance" is determined by the frequency with which the constituents occur in actual use of the language. Successively larger sets include the 50% that are most important (Level 2), the 75% most important (Level 3), and (almost) 100% of the English constituents (Level 4). When you are able to identify all constituents at the 100% level of difficulty, with an accuracy of close to 90% or better, you will have achieved accuracy in constituent recognition that is close to that of a native speaker. It is likely that even after extensive practice you will have a few remaining difficulties in identifying the constituents of spoken English. If these difficulties are few in number they will not interfere with your perception of naturally spoken English. Depending on local dialects native speakers of English have similar problems. Being able to accurately identify about 90% of the constituents of naturally spoken English will enable you understand naturally spoken English sentences and phrases with ease.

Training Rotations.

A Training Rotation includes both constituent and sentence training. After the introduction to sentence training and the first fifteen sentences with sound, you will automatically enter a Training Rotation. In each Training Rotation you will train on the following series. (Note that your "current cumulative level" is determined by your previous success. As you are more accurate you progress to higher numbers of sounds which increases the difficulty.)

ONE TRAINING ROTATION

ONSETS at your current cumulative level.

SENTENCE TRAINING (2 sets of three sentences)

NUCLEI at your current cumulative level.

SENTENCE TRAINING (2 sets of three sentences)

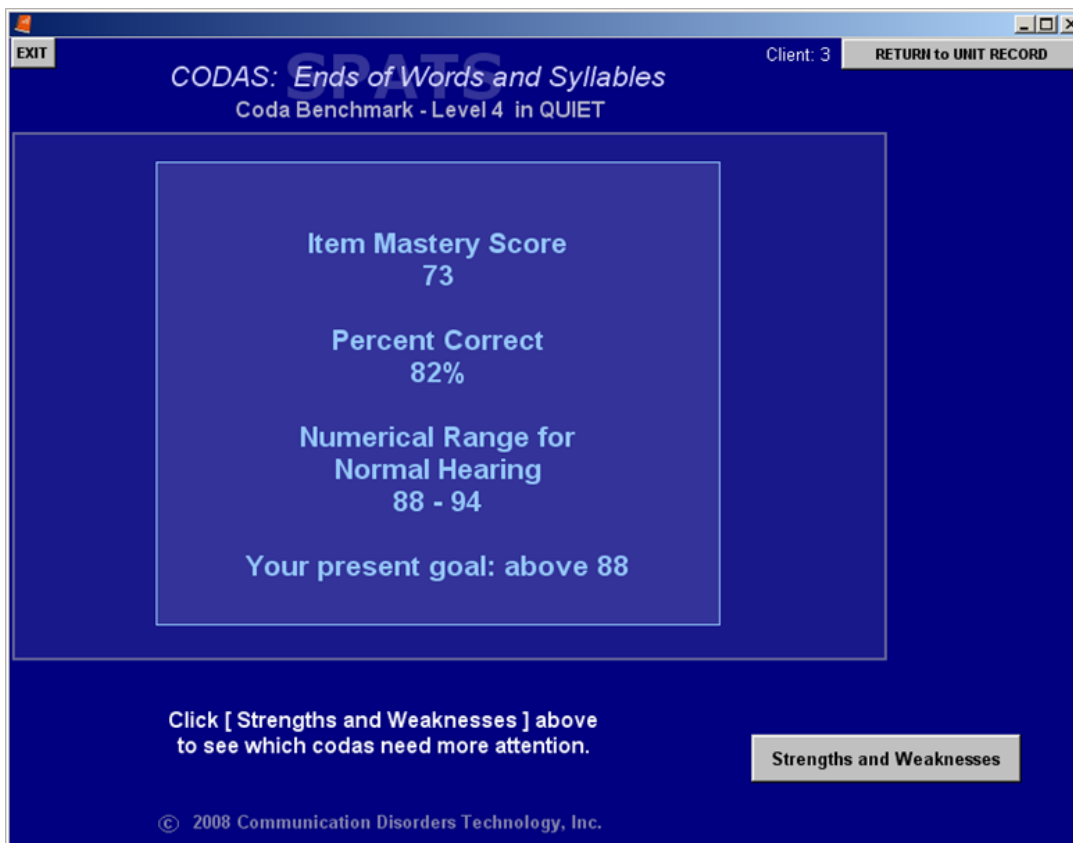
CODAS at your current cumulative level.

SENTENCE TRAINING (1 set of three sentences)

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Benchmark and Training Runs:

In syllable constituent training there are two kinds of runs (series of trials). A Benchmark Run is a test and the most significant score is the Percent Correct (PC) shown to you at the end of the run. In contrast, a Training Run is designed to efficiently train you to learn all of the items in a set. The most significant score for a Training Run is the Item Mastery Score (IMS) shown to you at the end of a run. A high IMS on a training run combined with a lower Percent Correct indicates that you are on the verge of mastery of all the items. When both the IMS and the PC are consistently very high it means that you have mastered the task and can perceive the sounds of English about as well as native speakers.



The figure to the left shows an end-of-run screen for a Benchmark Run for Codas at Cumulative Level 4. The Percent Correct of 82% is just below range expected for native speakers with normal hearing. For a Benchmark Run the Percent Correct is the most relevant measure of performance.

On the next page, two examples of end-of-run screens are shown for Training Runs. In the first case, the student has a very high IMS and a slightly lower Percent Correct. This pattern is predictive of success to follow. The second example shows a case where both the IMS and the Percent Correct are in or above the ranges expected for a native speaker of English.

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EXIT Client: 3 RETURN to UNIT RECORD

CODAS: Ends of Words and Syllables
Coda Training - Level 4 in QUIET

Item Mastery Score
99

Percent Correct
84%

Numerical Range for
Normal Hearing
88 - 94

Your present goal: above 88

Click [Strengths and Weaknesses] above
to see which codas need more attention.

Strengths and Weaknesses

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The screen to the left represents the case where a student has almost mastered Codas at Cumulative Level 4. Since this is a Training Run the average Item Mastery Score at the end of the run is the best indicator of progress. In this case it is 99, close to the maximum of 100. However, the Percent Correct, which based on the entire run, is 84%. This score is just below the range for native speakers with normal hearing. Once

again, the high IMS of 99 indicates that the student is on the verge native performance.

EXIT Client: 3 RETURN to UNIT RECORD

CODAS: Ends of Words and Syllables
Coda Training - Level 4 in QUIET

Item Mastery Score
100

Percent Correct
91%

Numerical Range for
Normal Hearing
88 - 94

Your present goal: above 88

Click [Strengths and Weaknesses] above
to see which codas need more attention.

Strengths and Weaknesses

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The screen to the left summarizes performance on a training run that demonstrates identification of Codas equal to that of native speakers. The average Item mastery Score at the end of the run is 100 and the Percent Correct of 91% is in the expected range for native speakers.

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Keys to Successful Speech Perception Training.

Spaced vs. Massed Drills. A well established rule that applies to many sorts of learning is that time in practice is more efficient if it is spent in sessions that are not so long that you become tired. There is also evidence that learning may actually be more effective when a drill session is followed by at least one night's sleep. Thus, it is not recommended that you participate in more than one SPATS drill session per day. But there may also be some loss from session to session if you allow more than 2-3 days to elapse between one session and the next. An ideal training schedule might include 2-3 sessions per week. Previous experience also suggests that an optimal duration of a single session is between 45 and 60 minutes and should never be less than 20 minutes or longer 90 minutes.

Total training required to achieve excellent perception of conversational English. Evidence collected during the development of SPATS-ESL showed a very strong relationship between total amount of practice and the level of performance achieved. As noted in the introductory comments, data collected using this system suggest that the average student of English as a second language can achieve near-native accuracy in identification of syllable constituents, after approximately 15-35 hours of SPATS-ESL drills. There are, of course, individual differences in language learning skills, but experience with SPATS-ESL suggests that the question is not whether you can learn excellent perception of English, but rather whether you can do so very rapidly, or after a somewhat larger number of drill sessions. Just as all children learn to understand their native language easily, sufficient effort in SPATS-ESL drills can be expected to result in similarly excellent recognition of English.

Tests, Training, and Certificates

As you work with the SPATS-ESL program you will encounter test runs (here termed Benchmark Runs) and training runs. The scores on Benchmark and Training Runs are not easy to compare. The best comparison is the Percent Correct on a Benchmark Run with the Item Mastery Score (IMS) shown at the end of a Training Run. However, IMS score tends to be optimistic as it can be influenced by short-term improvements in your perception that have not yet been converted to stable, long-term improvements in your recognition ability. . For certification of your ability to perceive English speech sounds you will need to arrange for proctored tests to be administered by your program. A safe rule is to take a test at one level below your current training level. For example, if you are working on Onsets at Level 4, Nuclei at Level 3, and Codas at Level 2, you may wish to sign up for Tests at Onsets-Level 3, Nuclei –Level 2, and Codas-Level 1. After more training you may wish to return and take tests at higher levels. Your program will certify your progress and levels. SPATS-ESL also will provide Sentence Tests. As there are a limited number of forms for the sentence test, it is best if you take a sentence test near the end of your SPATS-ESL program.

Appendix I. Checking the Sound System in WindowsXP

Sometimes the sound playback from a computer does not work.

Here are two common problems:

- 1) Another user has turned the sound off or raised or lowered the loudness of the sound system.
- 2) Sometimes the headset is not properly plugged in.

After SPATS is started check the sound:

- 1) Click “*Calibration,*” and you should hear a sound in the headphones.
- 2) To stop the sound, click the same button which now reads “*End Calibration.*”

The calibration sound is a noise and it should sound moderately loud as the SPATS speech sounds will be a little softer than the “calibration noise.”

If the calibration sound is absent, too soft, or too loud:

- 1) Look to see that the headset is properly plugged in.
- 2) Check the internal settings of the computer's sound system by following these steps:

(my computer → control panel → sounds, speech, and audio devices → change the speaker settings → speaker volume → restore defaults → apply → OK → OK.)

Note if the Default settings are too loud, use the volume control to find a comfortable listening level.

Appendix II SPATS-ESL Sound Guide

Introduction

This sound guide is will be useful for ESL students who have been introduced to English spelling and the International Phonetic Alphabet (IPA). Separate tables are presented that specify the syllables used in SPATS-ESL drills for the perception of the constituents of English syllables. The drills and syllables used represent an important sample of the syllables of English and their mastery will generalize to almost all of the syllables of spoken English. The learner may find the tables presented in this guide a helpful supplement to SPATS-ESL training and also for their classes in English pronunciation and spelling. As the program is self explanatory, it is advised that these tables only be consulted after the learner has spent several hours working the SPATS-ESL program. After that, these tables may help the learner become a more “sophisticated” user of the program.

Descriptions of the structure of each of the tables.

- 1) **The syllable onset guide.** This table lists, in order, the 45 syllable onsets presented for identification in SPATS-ESL. The left-hand column gives the Item Number. Numbers 1-11 are included in SPATS Level 1, Numbers 1-23 in SPATS Level 2, Numbers 1-24 in SPATS Level 3, and Numbers 1-45 in SPATS Level 4. The next column gives the English spelling shown on the SPATS virtual buttons for each of the onsets. The third column from the left gives the IPA transcription of the onset sound. The next four columns give the IPA transcription of the four syllables used to exemplify each onset in the SPATS-ESL drills. Next come four English words that exemplify the syllables as used in actual words. The last two columns give words that use the onset in English with other vowels. (One common confusion is the use of the “w-” button for the syllable “who,” when the correct button is the “h-” button. Another common error is to use the “g-” button for the syllable “gee,” when the correct button is the “j-” button.)
- 2) **The syllable nucleus guide.** This table lists, in order, the 28 syllable nuclei presented for identification in SPATS-ESL. The left-hand column gives the Item Number. Numbers 1-7 are included in SPATS Level 1, Numbers 1-14 in SPATS Level 2, Numbers 1-21 in SPATS Level 3, and Numbers 1-28 in SPATS Level 4. The next column gives the English spelling shown on the SPATS virtual buttons for each of the onsets. The third column from the left gives the IPA transcription of the nucleus sound. Under the heading “Key Words” examples of English words with each nucleus are listed. Each nucleus is represented by only one syllable in SPATS-ESL. These are listed with the English spellings used on the SPATS-ESL buttons and by their IPA transcriptions. Unlike many other sources, SPATS-ESL treats the dark-el that follows a vowel as part of a unique syllable nucleus. While some linguists may not agree with this classification, the drills so conducted are both difficult and useful for many ESL-learners.
- 3) **The syllable coda guide.** This table lists, in order, the 36 syllable codas presented for identification in SPATS-ESL. The left-hand column gives the Item Number. Numbers 1-9 are included in SPATS Level 1, Numbers 1-18 in SPATS Level 2, Numbers 1-27 in SPATS Level 3, and Numbers 1-36 in SPATS Level 4. The next column gives the English spelling shown on the SPATS virtual buttons for each of the onsets. The third column from

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the left gives the IPA transcription of the coda sound. The next five columns give the IPA transcription of the five syllables used to exemplify each onset in the SPATS-ESL drills. English has a very large number of syllable codas. In SPATS-ESL they are organized in way to minimize the number of codas while training the necessary skills for their recognition. Each coda is attached to five “stems” or vowel-like sounds. These stems are “ee,” “ah,” “oo,” “er,” and “el.” (When a stem is presented in isolation, the user must respond on the “Vwl” button I for sounds “ee,” “ah,” or “oo” are presented, The “er” button when “er” is presented. And, the “el” button when “el” is presented. When a consonant or consonant cluster is attached to any of these five stems, the learner must click on the button with the correct consonant or consonant cluster. For example, if “er” is presented, the learner must click on the “er” button, but if “erz” is presented, the learner must click on the “-z” button. Otherwise, the structure of the syllable coda guide is similar to that of the syllable onset guide.

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Sound Guide for Syllable Onsets

Item	SPATS Buttons	IPA	SPATS Syllables in IPA				Key Words with /i/, /a/, /u/, & /ə/ or /ʌ/.				Key Words with other vowels	
1	Vwl	/#-/	/#i/	/#a/	/#u/	/#ə/	<u>eat</u>	<u>on</u>	<u>oops</u>	<u>earth</u>	<u>off</u>	<u>at</u>
2	s-	/s-/	/si/	/sa/	/su/	/sə/	<u>seat</u>	<u>sot</u>	<u>suit</u>	<u>sir</u>	<u>sad</u>	<u>cent</u>
3	r-	/r-/	/ri/	/ra/	/ru/	/rʌ/	<u>read</u>	<u>rot</u>	<u>roost</u>	<u>rut</u>	<u>rat</u>	<u>raise</u>
4	k-	/k-/	/ki/	/ka/	/ku/	/kə/	<u>keep</u>	<u>cop</u>	<u>coop</u>	<u>cur</u>	<u>kin</u>	
5	b-	/b-/	/bi/	/ba/	/bu/	/bə/	<u>beet</u>	<u>robot</u>	<u>boot</u>	<u>bird</u>	<u>boat</u>	<u>buy</u>
6	m-	/m-/	/mi/	/ma/	/mu/	/mə/	<u>me</u>	<u>mop</u>	<u>moon</u>	<u>mirth</u>	<u>much</u>	<u>may</u>
7	h-	/h-/	/hi/	/ha/	/hu/	/hə/	<u>he</u>	<u>hod</u>	<u>who</u>	<u>heard</u>	<u>had</u>	<u>hip</u>
8	d-	/d-/	/di/	/da/	/du/	/də/	<u>deep</u>	<u>dot</u>	<u>dude</u>	<u>dirt</u>	<u>done</u>	<u>dad</u>
9	t-	/t-/	/ti/	/ta/	/tu/	/tə/	<u>tea</u>	<u>top</u>	<u>tooth</u>	<u>term</u>	<u>tip</u>	<u>toe</u>
10	w-	/w-/	/wi/	/wa/	/wu/	/wə/	<u>weed</u>	<u>want</u>	<u>woo</u>	<u>were</u>	<u>wait</u>	<u>white</u>
11	f-	/f-/	/fi/	/fa/	/fu/	/fə/	<u>feed</u>	<u>fop</u>	<u>fool</u>	<u>first</u>		
12	p-	/p-/	/pi/	/pa/	/pu/	/pə/	<u>peat</u>	<u>pot</u>	<u>pool</u>	<u>purr</u>	<u>past</u>	
13	l-	/l-/	/li/	/la/	/lu/	/lə/	<u>lean</u>	<u>lot</u>	<u>loose</u>	<u>learn</u>	<u>late</u>	<u>last</u>
14	n-	/n-/	/ni/	/na/	/nu/	/nə/	<u>knees</u>	<u>cot</u>	<u>new</u>	<u>nerd</u>	<u>knit</u>	<u>nice</u>
15	pr-	/pr-/	/pri/	/pra/	/pru/	/prʌ/	<u>preen</u>	<u>prod</u>	<u>proof</u>		<u>pride</u>	<u>print</u>
16	g-	/g-/	/gi/	/ga/	/gu/	/gə/	<u>gear</u>	<u>god</u>	<u>goon</u>	<u>girl</u>	<u>get</u>	<u>go</u>
17	v-	/v-/	/vi/	/va/	/vu/	/və/	<u>veer</u>	<u>volunteer</u>	<u>voom</u>	<u>verse</u>	<u>vast</u>	<u>very</u>
18	st-	/st-/	/sti/	/sta/	/stu/	/stə/	<u>steer</u>	<u>stop</u>	<u>stew</u>	<u>stir</u>	<u>staff</u>	
19	sh-	/ʃ-/	/ʃi/	/ʃa/	/ʃu/	/ʃə/	<u>sheet</u>	<u>shop</u>	<u>shoe</u>	<u>sure</u>	<u>show</u>	<u>ship</u>
20	fr-	/fr-/	/fri/	/fra/	/fru/	/frʌ/	<u>freak</u>	<u>free</u>	<u>fruit</u>	<u>frustrate</u>	<u>France</u>	<u>frail</u>
21	j-	/dʒ-/	/dʒi/	/dʒa/	/dʒu/	/dʒə/	<u>gee</u>	<u>jot</u>	<u>juice</u>	<u>germ</u>	<u>gym</u>	<u>jury</u>
22	tr-	/tr-/	/tri/	/tra/	/tru/	/trʌ/	<u>treat</u>	<u>trot</u>	<u>true</u>	<u>trust</u>	<u>trip</u>	<u>trap</u>
23	ch-	/tʃ-/	/tʃi/	/tʃa/	/tʃu/	/tʃə/	<u>chief</u>	<u>chop</u>	<u>chew</u>	<u>church</u>	<u>chin</u>	<u>charge</u>

Student's Guide to SPATS-ESL

Sound Guide for Syllable Onsets (Continued)

Item	SPATS Buttons	IPA	SPATS Syllables in IPA				Key Words with /i/, /a/, /u/, & /ə/ or /ʌ/.				Key Words with other vowels	
24	th(v)-	/ð-/	/ði/	/ðɑ/	/ðu/	/ðə/	these			ra- ther	th en	th ere
25	br-	/br-/	/bri/	/bra/	/bru/	/brʌ/	brief	bra	brute	brunt	br east	br it-tle
26	gr	/gr-/	/gri/	/gra/	/gru/	/grʌ/	greet	Mardi Gras	group	grunt	gr ape	gr in
27	kr-	/kr-/	/kri/	/kra/	/kru/	/krʌ/	creep	crop	crew	crud		
28	sp-	/sp-/	/spi/	/spa/	/spu/	/spə/	speak	spot	spoon	spur		
29	pl-	/pl-/	/pli/	/pla/	/plu/	/plə/	please	plot	plume	plur -al	pl an	pl us
30	th-	/θ-/	/θ i/	/θ a/	/θ u/	/θ ə/	thief		en- th use	th ird	th eme	th is-tle
31	y-	/y-/	/yi/	/ya/	/yu/	/yə/	yield	yacht	you	law- y er	y ear	y es
32	sk-	/sk-/	/ski/	/ska/	/sku/	/skə/	ski	ska	school	skirt	sk y	sk it
33	bl-	/bl-/	/bli/	/bla/	/blu/	/blə/	bleed	blot	blue	blurt	bl ame	
34	str-	/str-/	/stri/	/stra/	/stru/	/strʌ/	street	strop	strew	strut	str ap	str aight
35	dr-	/dr-/	/dri/	/dra/	/dru/	/drʌ/	dream	drop	drew	drub	dr ive	dr ab
36	kw-	/kw-/	/kwi/	/kwa/	/kwu/	/kwə/	queer	quad		quirk	qu ack	qu ick
37	fl-	/fl-/	/fli/	/fla/	/flu/	/flə/	flee	flop	flew	flur -ry	fl at	
38	sl-	/sl-/	/sli/	/sla/	/slu/	/slə/	sleep	slop	sloop	slur	sl ap	
39	kl-	/kl-/	/kli/	/kla/	/klu/	/klə/	clear	clock	clue		kl een-ex	cl ass
40	sw-	/sw-/	/swi/	/swa/	/swu/	/swə/	sweet	swat	swoon	swerve	sw im	
41	sm-	/sm-/	/smi/	/sma/	/smu/	/smə/			smooth	smile	sm ack	
42	gl-	/gl-/	/gli/	/gla/	/glu/	/glə/	glean	glop	gloom	bu- g ler	gl ass	
43	sn-	/sn-/	/sni/	/sna/	/snu/	/snə/	sneak		snoop		sn ip	sn ake

Student's Guide to SPATS-ESL

44	skr-	/skr-/	/skri/	/skra/	/skru/	/skrʌ/	<u>scream</u>	<u>scar</u>	<u>screw</u>	<u>scrub</u>	<u>scrap</u>	
45	z-	/z-/	/zi/	/zɑ/	/zu/	/zø/	<u>zee</u>		<u>zoo</u>	ra- <u>zor</u>	<u>zero</u>	

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Sound Guide for Syllable Nuclei

Item	SPATS Buttons	IPA	Key Words			
1	heed	/hid/	<u>fee</u> d	w <u>ee</u> d	<u>ea</u> t	
2	heard	/hɜrd/	<u>fu</u> r	<u>bi</u> rd	ham <u>me</u> r	<u>ea</u> th
3	had	/hæd/	<u>h</u> at	<u>ba</u> d	<u>pa</u> st	
4	hod	/had/	<u>o</u> dd	<u>ho</u> t	<u>fa</u> ther	
5	hide	/hard/	<u>ti</u> de	<u>si</u> de	<u>tie</u>	<u>my</u>
6	who'd	/hud/	<u>bo</u> ot	th <u>re</u> w	<u>rou</u> ge	<u>two</u>
7	held	/hɛld/	<u>te</u> ll	<u>fe</u> ll	<u>be</u> lt	<u>el</u> k
8	hayed	/herd/	<u>a</u> te	<u>pa</u> y	<u>mai</u> d	<u>pa</u> ge
9	hulled	/hʌld/	<u>du</u> ll	<u>gu</u> ll		
10	hoed	/houd/	<u>lo</u> ad	<u>ro</u> ad	<u>ob</u> ey	<u>ow</u> n
11	hewed	/hrud/	<u>fe</u> w	<u>vi</u> ew	<u>hu</u> ge	<u>fu</u> se
12	hard	/hɑrd/	<u>ca</u> r	<u>ba</u> r	<u>sm</u> art	ch <u>ar</u> ge
13	hilled	/hɪld/	<u>fi</u> ll	<u>wi</u> ll	<u>si</u> lly	<u>fr</u> ill
14	hoid	/hoird/	<u>vo</u> id	<u>bo</u> y	<u>co</u> in	
15	hid	/hɪd/	<u>si</u> t	<u>ki</u> d	<u>pi</u> n	<u>my</u> th
16	hud	/hʌd/	<u>hu</u> g	<u>cu</u> t	<u>bu</u> d	<u>co</u> me
17	hoard	/hoərd/	<u>bo</u> re	<u>sh</u> ore	<u>fo</u> rt	<u>bo</u> ard
18	haired	/heərd/	<u>ca</u> re	<u>sh</u> are	<u>ai</u> r	<u>er</u> r
19	hood	/hud/	st <u>oo</u> d	<u>pu</u> t	<u>co</u> uld	<u>bo</u> ok
20	hired	/haɪrd/	<u>fi</u> re	<u>ti</u> re	<u>li</u> ar	
21	heeled	/hiɪld/	<u>de</u> al	<u>fe</u> el	<u>re</u> al	<u>ste</u> el
22	head	/hed/	<u>re</u> d	<u>be</u> d	<u>le</u> ft	
23	hawed	/hɔd/	<u>ca</u> ught	<u>ra</u> w	<u>ou</u> ght	
24	how'd	/haud/	<u>lo</u> ud	<u>co</u> w	<u>ou</u> t	
25	Hal'd	/hæɪld/	<u>ga</u> l	<u>pa</u> l	<u>sa</u> lad	
26	hold	/hɔld/	<u>po</u> le	<u>go</u> al		
27	hauled	/hɔld/	<u>ca</u> ll	<u>ba</u> ll	<u>Fa</u> ll	
28	hailed	/heɪld/	<u>sa</u> il	<u>ba</u> il	<u>na</u> il	

Student's Guide to SPATS-ESL

Sound Guide for Syllable Codas

Item	SPATS Buttons	IPA	SPATS Syllables in IPA					Key Words with /i/, /a/, /u/, /ə/, & /e/ or /ɛ/.					Other Key Words	
			/i/	/a/	/u/	/ə/	/e/	tee	la	new	butter	bell		
1	Vwl	/-#/	/i/	/a/	/u/	/ə/	/e/	tee	la	new	butter	bell		
2	-z	/-z/	/iz/	/az/	/uz/	/əz/	/etz/	bees	Boz	choose	blurs	bells		
3	-n	/-n/	/in/	/an/	/un/	/ən/	/ɛn/	clean	swan	toon	burn			
4	-d	/-d/	/id/	/ad/	/ud/	/əd/	/ɛd/	need	odd	nude	bird	held		
5	-t	/-t/	/it/	/at/	/ut/	/ət/	/ɛt/	eat	pot	boot	hurt	belt		
6	-L	/-l/	/il/	/al/	/ul/	X	X	peel	doll	duel			real	fool
7	-ng	/-ŋ/	/iŋ/	/aŋ/	/uŋ/	/əŋ/	/ɛŋ/	bring	song			penquin	clang	sprung
8	-s	/-s/	/is/	/as/	/us/	/əs/	/ɛs/	peace	Bos-nia	loose	burse	else		
9	-nd	/-nd/	/ind/	/and/	/und/	/ənd/	/ɛnd/	leaned	pond	tuned	burned	lend		
10	-m	/-m/	/im/	/am/	/um/	/əm/	/ɛm/	dream	calm	loom	term	elm		
11	-nt	/-nt/	/int/	/ant/	/unt/	/ənt/	/ɛnt/		want		burnt	bent	hint	blunt
12	-v	/-v/	/iv/	/av/	/uv/	/əv/	/ɛv/	sleeve	Slav	move	swerve	delve		
13	-k	/-k/	/ik/	/ak/	/uk/	/ək/	/ɛk/	leak	lock	fluke	lurk	elk		
14	-nz	/-nz/	/inz/	/anz/	/unz/	/ənz/	/ɛnz/	means	cleans	tunes	earns	lens		
15	-ts	/-ts/	/its/	/ats/	/uts/	/əts/	/ɛts/	treats	pots	shoots	hurts	belts		
16	-R	/-ə/	/iə/	/aə/	/uə/	X	X	steer	car	poor			core	butter
17	-st	/-st/	/ist/	/ast/	/ust/	/əst/	/ɛst/	east		boost	first		last	placed
18	-ns	/-ns/	/ins/	/ans/	/uns/	/əns/	/ɛns/	teens		spoons			once	dance
19	-bz	/-bz/	/ibz/	/abz/	/ubz/	/əbz/	/ɛbz/	bees	sobs	rubes	herbs			
20	-ks	/-ks/	/iks/	/aks/	/uks/	/əks/	/ɛks/	leaks	socks	nuke	perks			
21	-p	/-p/	/ip/	/ap/	/up/	/əp/	/ɛp/	leap	top	soup	perp	help		
22	-dz	/-dz/	/idz/	/adz/	/udz/	/ədz/	/ɛdz/	beads	needs	nods	moods	birds		
23	-mz	/-mz/	/imz/	/amz/	/umz/	/əmz/	/ɛmz/	dreams	alms	rooms	worms	elms		

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Sound Guide for Syllable Codas (Continued)

Item	SPATS Buttons	IPA	SPATS Syllables in IPA					Key Words with /i/, /a/, /u/, /ə/, & /ɛ/ or /e/.					Other Key Words	
			/if/	/af/	/uf/	/əf/	/ɛf/	leaf	off	proof	surf	self		
24	-f	/-f/	/if/	/af/	/uf/	/əf/	/ɛf/	leaf	off	proof	surf	self		
25	-kt	/-kt/	/ikt/	/akt/	/ukt/	/əkt/	/ɛkt/	peeked	locked	juked	irked		milked	sulked
26	-th	/-θ/	/iθ/	/aθ/	/uθ/	/əθ/	/ɛθ/	teeth	moth	truth	myrth	health		
27	-j	/-dʒ/	/idʒ/	/adʒ/	/udʒ/	/ədʒ/	/ɛdʒ/	siege	lodge	stooge	urge			
28	-ch	/-tʃ/	/itʃ/	/atʃ/	/utʃ/	/ətʃ/	/ɛtʃ/	teach	notch	pooch	perch	belch		
29	-sts	/-sts/	/ists/	/asts/	/usts/	/əsts/	/ɛsts/	feasts	costs	boosts	bursts			
30	-pt	/-pt/	/ipt/	/apt/	/upt/	/əpt/	/ɛpt/	heaped	hopped	looped		helped		
31	-ngz	/-ŋz/	/iŋz/	/aŋz/	/uŋz/	/əŋz/	/ɛŋz/						sings	lungs
32	-vz	/-vz/	/ivz/	/avz/	/uvz/	/əvz/	/ɛvz/	heaves		proves	swerves	elves		
33	-ps	/-ps/	/ips/	/aps/	/ups/	/əps/	/ɛps/	keeps	cops	droops	perps	kelps		
34	-sh	/-ʃ/	/iʃ/	/aʃ/	/uʃ/	/əʃ/	/ɛʃ/	leash	wash	swoosh			crash	dish
35	-g	/-g/	/ig/	/ag/	/ug/	/əg/	/ɛg/	league	dog		berg		lug	rag
36	-b	/-b/	/ib/	/ab/	/ub/	/əb/	/ɛb/	plebe	boob	tube	herb			