

# THE FUNCTIONAL LISTENING EVALUATION

## Purpose of the Functional Listening Evaluation (FLE)

The purpose of this evaluation is to determine how listening abilities are affected by noise, distance, and visual access in an individual's natural listening environment. The FLE can also be used as a validation tool to demonstrate the benefits of hearing assistance technology. It is designed to simulate listening ability in situations that are more representative of actual listening conditions than can often be replicated in sound booth assessment. Through observation of the administration of the evaluation, the student's teachers, parents, and others may gain appreciation of the affects of adverse listening conditions encountered by the student. When comparing performance without and then repeated with the addition of the hearing assistance technology, the evaluation results provide evidence of the benefits of the device in enhancing access to the desired input. The FLE format may also be useful in justifying other accommodations, such as sign language or oral interpreting, notetaking, captioning, special seating, and room acoustic modifications. This protocol is based on a listening paradigm suggested by Ying (1990), and by Ross, Bracken, and Maxon (1992).

## Materials Needed

Cassette Tape Recorder, CD player, or laptop computer  
Sound Level Meter - use A weighted scale  
Noise Tape, CD, or .wav computer file - classroom noise or multitalker is recommended  
Word/Phrase/Sentence Lists for test stimuli  
Tape measure  
Tripod or stand to hold sound level meter (optional)  
Masking tape or marker (optional)

## Environment for Testing

Use the student's classroom during a time when students are not present. If this is not possible, choose a room that most closely approximates the size, ambient noise level, and floor and wall surfaces of the student's classroom. While performance during actual class sessions would seem ideal, the test process itself may be disruptive to instruction for the rest of the class and therefore may not reflect the true listening conditions encountered by the student throughout the day.

## Physical Set-up of Test Environment

Due to room size and instructional style variations, the occupied classroom should be observed to determine maximum listening distances. The distance used should be recorded on the scoring form. These distances can be marked using masking tape on the floor. Be sure that the markers are from the student's ear to the examiner's mouth.

Close: Noise and examiner are 3 feet in front of the student (see Diagram A).

Distant: Noise remains 3 feet in front of the student; examiner moves back to the pre-determined distance [12 to 15 feet in this example] from the student (see Diagram B).



## Types of Evaluation Materials

In order to simulate classroom listening ability, the evaluation material utilized should approximate material that is encountered by the student in the classroom. Additionally the stimuli should have sufficient length to reflect reverberation characteristics of the room. Consideration should also be given to both familiar and new material that a student may encounter. Individuals will usually perform better with familiar material than with stimuli containing unfamiliar vocabulary. Individuals with unilateral and mild hearing losses tend to perform well under all conditions due to the audibility and inherent redundancy in phrase and sentence material utilizing familiar vocabulary. Nonsense phrases have been constructed to decrease these performance effects.

Age, limited language, and memory abilities of the individual should also be considered when determining the test stimuli. In selecting word, phrase or sentence materials, consider whether the vocabulary and syntax are appropriate for the student's language ability. For students with poor speech intelligibility, it may be necessary to use materials that permit picture-pointing responses. If closed-set materials are utilized, performance can be expected to be better than with open-set materials. Once the type of stimuli is determined, it must remain constant throughout the assessment so that the variables manipulated are noise, distance, and visual input. Report the material used on the scoring form.

Sentence Materials:	BLAIR Sentences SPIN Sentences(older students) PSI Sentences	WIPI Sentences BKB Sentences
Phrase Materials:	Common Children's Phrases	Children's Nonsense Phrases
Word Lists:	PB-K WIPI	NU-CHIPS

Note: All of the above phrase and sentence materials are available in the Educational Audiology Handbook (2<sup>nd</sup> ed.) (Johnson & Seaton, 2010); word lists are available through your local audiologist.

In many of the above materials there will not be enough lists for the entire protocol (8 lists are needed). If it is necessary to use a list twice, select the lists that were more difficult for the student in order to reduce familiarity with the material.

## Presentation Levels

Speech to noise levels should be based upon the auditory environment encountered by the student in their classrooms. Sound level measurements of classroom discourse and activity may be necessary to determine these levels. For this example, the levels below will achieve values resulting in a +5 dB speech advantage in the close condition and a -5dB speech to noise level in the distant condition (12-15ft). Levels will vary slightly depending upon the acoustics of the room and consistency of the examiner's voicing of the stimuli. Record the classroom ambient noise level (unoccupied) and approximate teacher or speaker levels and noise levels on the scoring form.

- Speech: Calibrate the examiner's voice at a distance of 3 feet from the listener (close condition) by measuring the examiner's voice with the sound level meter so that speech averages 65dBA SPL at the listener's ear. Once that level is measured, it helps to determine the SPL level when the sound level meter is one foot from the examiner's mouth (being careful to keep the voice level the same) so that the examiner can hold the sound level meter to monitor his/her voice for all conditions to verify that the proper speech level is maintained. The level at 1 foot from the examiner will be approximately 6 dBA SPL greater than at listener's ear for close conditions).
- Noise: Using a sound level meter, adjust the volume of a cassette or CD player that is located approximately 3 feet from the student, so that the classroom/multitalker noise averages 60 dBA SPL at the student's ear. This yields a +5 speech-to-noise level.

## Presentation Protocol

The evaluation should be conducted in the student's typical hearing mode. If hearing aids are usually worn at school, they should also be worn during the evaluation. When this evaluation is used as a validation tool to demonstrate the improvement in listening ability with FM or other hearing assistance technology, the examiner may need to only repeat the noise and distant conditions to demonstrate the benefits of the device.

Eight phrase, sentence or word lists should be presented in the order indicated by the numbers on the scoring matrix. This order balances for difficulty across conditions so that the final task is the easiest of the distance conditions. The examiner may choose to alter the order for other reasons however.

The examiner should present the speech materials at a normal speaking rate. The listener repeats the test stimuli or points to the appropriate picture, as dictated by the material used.

Test administration takes approximately 30 minutes, including set up.

1. Auditory-Visual:	Close	Quiet	5. Auditory-Visual:	Distant	Noise
2. Auditory:	Close	Quiet	6. Auditory:	Distant	Noise
3. Auditory-Visual:	Close	Noise	7. Auditory:	Distant	Quiet
4. Auditory:	Close	Noise	8. Auditory-Visual:Distant		Quiet

Repeat noise and distant conditions to validate benefit of hearing assistance technology.

## Scoring

Scoring should be completed using the protocol established for the selected test materials. All scores should be reported in percent correct in the Scorebox. Hearing assistance technology scores can be entered in the lower part of the Scorebox for the conditions repeated.

## Variations in Protocol

This protocol is based on the listening situation of a typical classroom. For an individual student, it may be useful to modify this protocol to account for variations in the level and source of noise, classroom size, teacher's voice, typical listening distances for the student, or other factors. In order to accommodate these variations, the following modifications may be considered. Modifications other than distance and speech and noise levels should be noted on the test form.

Placement of noise/tape recorder	Order of presentation.
Distance of examiner from student for the distant condition	Level of noise.

## Interpretation Matrix

The Interpretation Matrix analyzes the effects of noise, distance, and visual input for the various conditions. It is completed by transferring the scores from the Scorebox to the interpretation matrix. Individual scores are averaged to determine the overall effect of each condition. Hearing assistance technology scores can be entered in the lower portion of the boxes. Although scores may be affected by different speakers, rate of speaking, attention of the listener, or status of amplification, as long as these variables are kept constant throughout the evaluation, comparisons are valid.

When validating hearing assistance technology, the target for desired performance is the score from Scorebox 1 (for auditory visual) or Scorebox 2 (auditory only). In other words, the effects of noise and distance can be considered eliminated when the performance with the device matches the individual's best performance in quiet or reduced if the performance is improved. This information can be used as evidence to justify technology and other accommodations that may be beneficial for the student. The findings should be discussed with the student, his/her parents, and teachers to help them understand the student's listening abilities and needs. A summary of the Interpretation Matrix and appropriate recommendations should be included on the scoring form.

## References

- Auditec of St. Louis, Multitalker Noise Tape. 2515 S. Big Bend Blvd., St. Louis, MO 63143-2105; 800-669-9065, [www.auditec.com](http://www.auditec.com)
- Johnson, C.D. & VonAlmen, P.(1993). The Functional Listening Evaluation. In *Educational audiology handbook*, (pp 336-339). Johnson, Benson, & Seaton (1997). San Diego: Singular Publishing Group, Inc.
- Johnson, C.D. Benson, P.V., & Seaton, J.(1997). *Educational audiology handbook*, Sentence and Phrase Lists, Appendix Section 15 (pp 477-489). San Diego: Singular Publishing Group, Inc.
- Ross, M., Brackett, D. & Maxon, A. (1991). Communication Assessment. In *Assessment and management of mainstreamed hearing-impaired children* (pp 113–127). Austin, Tx: Pro-Ed.
- Ying, E. (1990). Speech and Language Assessment: Communication Evaluation. In M. Ross (Ed.), *Hearing-impaired children in the mainstream* (pp 45–60). Parkton, MD: York Press.

# THE FUNCTIONAL LISTENING EVALUATION

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Examiner: \_\_\_\_\_ Age/DOB: \_\_\_\_\_

## AUDIOMETRIC RESULTS

Hearing Sensitivity: Pure Tone Ave: Right Ear \_\_\_dB Left Ear \_\_\_dB  
 PTA used:  500, 1K, 2K  1K, 2K, 4K  
 Word Recognition: Right Ear \_\_\_% @ \_\_\_dBHL Left Ear \_\_\_% @ \_\_\_dBHL  
 Sound Field:  Aided  Unaided  
 Quiet \_\_\_% @ \_\_\_dBHL  
 Noise \_\_\_% @ \_\_\_dBHL @ \_\_\_ S/N

## FUNCTIONAL LISTENING EVALUATION CONDITIONS

Amplification:  None  Hearing Aids  Cochlear Implant  Baha  
 Hearing Assistance Technology:  FM  Classroom Other \_\_\_\_\_  
 Classroom Noise Level: Unoccupied \_\_\_dBA SPL; Occupied \_\_\_dBA SPL  
 Assessment Material: \_\_\_\_\_  
 Distance (distant condition): \_\_\_ft  
 Noise Stimulus:  Multitalker  Classroom  Other \_\_\_\_\_  
 Speech level @ listener's ear: \_\_\_dBA SPL; @ 1ft from examiner: \_\_\_dBA SPL  
 Noise level @ listener's ear: \_\_\_dBA SPL  
 Approximate speech to noise levels: close + \_\_\_dB distant - \_\_\_dB  
 Modifications in protocol:

## INTERPRETATION MATRIX

		Noise		Distance		Visual Input	
		quiet	noise	close	distant	aud-vis	aud
close-	aud	2	4	2	7	1	2
	quiet	1	3	1	8	3	4
close-	aud/vis	7	6	4	6	5	6
	noise-	8	5	3	5	8	7
distant-	aud						
	aud/vis						

Average of above scores: quiet \_\_\_% noise \_\_\_% close \_\_\_% distant \_\_\_% aud/vis \_\_\_% aud \_\_\_%

### With Hearing Assistance Technology :

Average of above scores: quiet \_\_\_% noise \_\_\_% close \_\_\_% distant \_\_\_% aud/vis \_\_\_% aud \_\_\_%

## FUNCTIONAL LISTENING SCOREBOX

	close/quiet	close/noise	distant/quiet	distant/noise
auditory-visual	1	3	8	5
auditory	2	4	7	6

## INTERPRETATION AND RECOMMENDATIONS

## COMMON CHILDREN'S PHRASES<sup>1</sup>

### LIST 1

1. He fell down.
2. Clean this up.
3. It's not for you.
4. Can you see me?
5. Can I play now?
6. Look over there.
7. It's lunch time.
8. Can you help me?
9. Close your eyes.
10. Let me have it.
11. Clean up the mess.
12. Hold this toy.
13. Bring it here.
14. Who is missing?
15. Take my hand.
16. Ring the bell.
17. Let me have it.
18. You can't make me.
19. Can I have some?
20. Go right now.

Score (@ 5% each) \_\_\_\_\_

### LIST 2

1. Can I go play?
2. Who is that?
3. Can we go?
4. Have a nice day.
5. What's the matter?
6. What's going on?
7. How are you?
8. Can you play?
9. I don't want to.
10. It's snowing outside.
11. That is neat.
12. No way man.
13. Leave me alone.
14. Do I have to?
15. Where's the crayons?
16. Why can't I go?
17. I want that.
18. That's cool.
19. When can I?
20. No way.

Score (@ 5% each) \_\_\_\_\_

### LIST 3

1. See you later.
2. Got to go now.
3. Let me have it.
4. I'm tired.
5. That's awesome.
6. Way to go.
7. That's tough.
8. Turn the light off.
9. Stop that now.
10. Guess what?
11. Do you want to play?
12. Give it over.
13. Can we be friends?
14. She did it.
15. Do you know what?
16. You can't do that.
17. Watch this.
18. Tie my shoe.
19. What's up?
20. I can't find it.

Score (@ 5% each) \_\_\_\_\_

### LIST 4

1. Can I watch TV?
2. Where is it?
3. Let's go play.
4. I don't feel good.
5. Can we draw?
6. I want to.
7. Like my picture?
8. Can I go too?
9. Can we play that?
10. I want that toy.
11. Where are we going?
12. Where's my shoe?
13. Leave me alone.
14. Can we stop?
15. I want some.
16. That one is mine.
17. I get the front.
18. It was my turn.
19. Did you see mine?
20. Let's stop there.

Score (@ 5% each) \_\_\_\_\_

NOTE: Exact repetition of each phrase is required to be correct.

<sup>1</sup> Phrase lists have been matched for length and for comprehension difficulty using the Flesch Reading Ease Index; they had not yet been field tested.

LIST 5

1. Why can't I?
2. Do we have to?
3. Soccer is cool.
4. Can I open it?
5. Pick a team.
6. Where's my shoe?
7. How come?
8. I get to go.
9. Stop it now.
10. School was fun.
11. We played outside.
12. I know a song.
13. Can you do that?
14. Come in my house.
15. I don't know.
16. It's time for art.
17. Make my day.
18. I am hungry.
19. Go for it.
20. Why not?

Score (@ 5% each) \_\_\_\_\_

LIST 6

1. Know what Mom?
2. I'm sick.
3. Where's my present?
4. Give me that.
5. I didn't do it.
6. Put your shoes on.
7. That's so cool.
8. Who is it?
9. He threw it.
10. What time is it?
11. He tripped me.
12. Lets play Nintendo.
13. It's time for lunch.
14. Want to ride bikes?
15. This is dumb.
16. It's my turn.
17. I wrecked my bike.
18. Watch out.
19. My tooth is loose.
20. I want money.

Score (@ 5% each) \_\_\_\_\_

LIST 7

1. I broke my arm.
2. My lunch is gone.
3. Is it recess?
4. Do I have to?
5. Stay off the hill.
6. Don't worry.
7. That's my sweater.
8. My dog is gone.
9. I want an A.
10. Buy me that book.
11. I hate spinach.
12. I don't feel good.
13. You can't make me.
14. That's my phone.
15. Get that off.
16. Change the channel.
17. What a ride.
18. It's mine now.
19. Finders keepers.
20. Get off my bed.

Score (@ 5% each) \_\_\_\_\_

LIST 8

1. I bit the dust.
2. He kept it.
3. That song is sad.
4. He poked by eye.
5. I like candy.
6. Get the ball.
7. He kicked me.
8. Why can't I?
9. No thank you.
10. Where's the ball?
11. I don't know.
12. You know what?
13. My homework is late.
14. I hate that.
15. I don't get it.
16. Don't mess with me.
17. Keep your hands off.
18. That's my steak.
19. Let's get pizza.
20. I skinned my knee.

Score (@ 5% each) \_\_\_\_\_

NOTE: Exact repetition of each phrase is required to be correct.

## CHILDREN'S NONSENSE PHRASES

### LIST 1

21. Down fell he boat.
22. Up this clean floor.
23. You table not.
24. Me you see can.
25. Now play I go.
26. There over look.
27. Lunch not time do.
28. Help you can me.
29. Eyes yours on blue
30. Have me let ball.
31. Mess up the clean.
32. Toy hold this now.
33. It here bring me.
34. Missing who done.
35. Hand my take go.
36. The ring bell not.
37. Have it let me.
38. Can make me you.
39. Now go right house.
40. Have some can I.

Score (@ 5% each) \_\_\_\_\_

### LIST 2

1. Play go can I.
2. That is who stop.
3. Go we can draw.
4. Day nice have down.
5. Matter the what.
6. Going on what.
7. Snowing you are.
8. Play you here can.
9. I do want not to.
10. Outside it is.
11. Neat that ahead.
12. Man no become.
13. Alone me leave.
14. Do have I to
15. Crayons the where.
16. Can go why I.
17. Want I come book.
18. Cool that on hope.
19. I when can here.
20. Way no ball count.

Score (@ 5% each) \_\_\_\_\_

### LIST 3

21. You later see.
22. Now to go got.
23. It have me let.
24. Tired am I.
25. Awesome that is.
26. Go way to here.
27. Tough is that now.
28. Off light the turn.
29. Now that stop from.
30. What guess you home.
31. Play to want you do.
32. Over it give.
33. Friends be we can.
34. It did she go.
35. What know you do.
36. That do can you.
37. Watch no this go.
38. Shoe my fix now
39. Up what is tie.
40. It find cannot.

Score (@ 5% each) \_\_\_\_\_

### LIST 4

21. TV watch can.
22. Book is it where.
23. Play to let go.
24. Good feel not do.
25. Draw we can here.
26. Food to want dog.
27. Picture my like.
28. To go I can.
29. That play we hope.
30. Toy that want I.
31. Going we are.
32. Shoe my is where.
33. Alone me leave.
34. Stop we can now.
35. Some want I tell.
36. Mine is one that.
37. Front the get back.
38. Turn my was now.
39. Mine see you did.
40. There stop let is.

Score (@ 5% each) \_\_\_\_\_

NOTE: Exact repetition of each phrase is required to be correct.

## CHILDREN'S NONSENSE PHRASES

### LIST 5

21. I not can why.
22. To have we do.
23. Cool is soccer.
24. It open I can.
25. Team a pick you.
26. Shoe my is where.
27. Come how to here.
28. Go to get it.
29. Now it stop pen.
30. Day fun was school.
31. Outside play we.
32. Song to know I.
33. That do you can.
34. House my in come.
35. Know I do not.
36. Art for time is.
37. Day my make go.
38. Hungry am I here.
39. It for go home.
40. Not is why eat.

Score (@ 5% each) \_\_\_\_\_

### LIST 6

21. Mom what know me.
22. Sick am I here.
23. Present my where.
24. That me give book.
25. Paper It do.
26. On shoe you put.
27. Cool so that is.
28. It is who gone.
29. Threw he become.
30. It is time what.
31. Me tripped he.
32. Game play us for.
33. Lunch for time is.
34. Bike ride to want.
35. Dumb is this for.
36. Turn my come is.
37. Bike my wreck here.
38. Out is watch go.
39. Loose is my gum.
40. Money want I.

Score (@ 5% each) \_\_\_\_\_

### LIST 7

21. Arm my broke I.
22. Gone is lunch my.
23. Recess it is.
24. To have I do.
25. Hill the off stay.
26. Worry not do.
27. Sweater that is.
28. Gone is dog my.
29. Boat want go now.
30. Book that me buy.
31. Spinach like me.
32. Good feel not do.
33. Me make not can.
34. Phone my is that.
35. Off that get here.
36. Channel the eat.
37. Ride a what to.
38. Now mine is it.
39. Keep the find key.
40. Bed my off get.

Score (@ 5% each) \_\_\_\_\_

### LIST 8

21. Dust the bit I.
22. It kept he gone.
23. Sad is song that.
24. Eye by poke here.
25. Candy like I done.
26. Ball the get gone.
27. Me kicked he for.
28. I not can why.
29. You thank no see.
30. Ball that where on.
31. Know not do lunch.
32. What know you for?
33. Late is work home
34. That hate to do.
35. It get not done.
36. Me with mess not.
37. Off hands your keep.
38. Steak my is that.
39. Pizza get let.
40. Knee my hurt now.

Score (@ 5% each) \_\_\_\_\_

NOTE: Exact repetition of each phrase is required to be correct