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An English Course in Language and Speech Therapy and Audiology II

PREPARED BY

Büşra Uyanık
Embiye Altaç
Sinem Akkuş
Yıldız Tombak

CAPPADOCIA UNIVERSITY PRESS

AN ENGLISH COURSE IN LANGUAGE AND SPEECH THERAPY AND AUDIOLOGY II

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Büşra Uyanık
Embiye Altaç
Sinem Akkuş
Yıldız Tombak

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CAPPADOCIA UNIVERSITY
50420 Mustafapaşa, Ürgüp, Nevşehir
yayinevi@kapadokya.edu.tr
kapadokyayayinlari.kapadokya.edu.tr
(0384) 353 5009
www.kapadokya.edu.tr

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Table of Content

Unit 1	2
Unit 2	11
Unit 3	19
Unit 4	36
Unit 5	51
Unit 6	60
Unit 7	68
Unit 8	78
Unit 9	86
Unit 10	95
Unit 11	106
Unit 12	116
Unit 13	128
Unit 14	138

1

TARGET VOCABULARY

agrammatic, anomic aphasia, broca's aphasia, comprehension, conduction aphasia, expression, frontal gyrus, global aphasia, hemisphere, language disorder, lesion, repetition, stroke, wernicke's aphasia, white matter



IMAGE MADE WITH GOOGLE AI

Language Disorders: Aphasia (Part 1)

Aphasia

Aphasia is a language disorder following a stroke, tumor, or head injury that is caused by cell death within portions of the brain that are responsible for language. Most often aphasia follows from damage to the left hemisphere. Aphasia is relevant for the study of language because clusters of symptoms are associated with different lesion locations. Aphasias are classified according to relative deficits in expression or comprehension ability. The five major types of aphasia are Broca's aphasia, Wernicke's aphasia, conduction aphasia, global aphasia, and anomic aphasia.

2

Broca's Aphasia

Broca's aphasia is also called expressive aphasia. The site of lesion is typically the gray matter and white matter linked to function of Broca's area, a region of the left, posterior inferior frontal gyrus (although the location of this region varies across individuals). Individuals with Broca's aphasia have difficulty in expressing their thoughts, naming objects, reading aloud, repeating words, or writing. Often, they can produce short meaningful phrases, but typically with great effort and frequent pauses. Adjectives, adverbs, and articles (such as the) are often omitted, making the speech agrammatic. An extreme case is the patient whom Broca examined in 1861 who lost his ability to speak any word other than the syllable tan. Individuals with Broca's aphasia do not lose the ability to understand speech, but a certain level of impairment is often present. Patients are aware of their difficulties in speech and express frustration.

Wernicke's Aphasia

Wernicke's aphasia is also called receptive aphasia. The site of the lesion is often within the superior posterior temporal lobe. Patients are known to produce abundant fluent utterances, but in semantically meaningless sentences, essentially a string of intelligible words randomly strung together. Patients use unnecessary words or even create new words in sentences. They have difficulty comprehending speech, repeating words, and naming objects, along with reading and writing deficits. Typically, individuals with Wernicke's aphasia are not aware that their speech lacks meaning, at least in the acute stage.

ROUSSEAU, BERNARD. BRAINS! RYAN C., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THORNE PUBLISHERS, 2018, P. 146.

3

A. Answer multiple-choice questions.

1. What is the most common cause of aphasia?
   a. Brain tumor
   b. Head injury
   c. Stroke
   d. Dementia

2. Which type of aphasia is characterized by fluent but meaningless speech?
   a. Broca's aphasia
   b. Wernicke's aphasia
   c. Conduction aphasia
   d. Anomic aphasia

3. In which type of aphasia are patients typically aware of their speech difficulties and express frustration?
   a. Broca's aphasia
   b. Anomic aphasia
   c. Global aphasia
   d. Wernicke's aphasia

4. Which brain region is typically damaged in Broca's aphasia?
   a. Frontal lobe
   b. Temporal lobe
   c. Parietal lobe
   d. Occipital lobe

4

5. Which type of aphasia is characterized by severe impairment in both language expression and comprehension?
   a. Broca's aphasia
   b. Conduction aphasia
   c. Wernicke's aphasia
   d. Global aphasia

Context Exercises

A. Are the statements True (T) or False (F)?

1. ( ) Broca's aphasia is also known as receptive aphasia.
2. ( ) Individuals with Broca's aphasia typically produce fluent and meaningful speech.
3. ( ) Patients with Broca's aphasia typically produce fluent and meaningful speech.
4. ( ) Wernicki's aphasia is caused by damage to the left superior posterior temporal lobe.
5. ( ) Individuals with Wernicke's aphasia have intact comprehension of spoken and written language.
6. ( ) Wernicki's aphasia is characterized by fluent speech that lacks coherent meaning.
7. ( ) Patients with Wernicke's aphasia are usually aware of their speech deficits.
8. ( ) Both Broca's and Wernicki's areas are located in the right hemisphere of the brain.

5

B. Ask questions for the given answers.

1. Question: _____?

Answer: Aphasia is a language problem caused by brain damage. It makes it hard for people to understand and speak.

2. Question: _____?

Answer: People with Broca's aphasia struggle to speak fluently. They find it hard to form sentences and name things.

3. Question: _____?

Answer: Wernicke's aphasia is usually caused by damage in a part of the brain called the left posterior superior temporal gyrus.

4. Question: _____?

Answer: People with Broca's aphasia can usually understand but have trouble speaking. People with Wernicke's aphasia struggle to understand and repeat words.

5. Question: _____?

Answer: People with Broca's aphasia know they have trouble speaking and can get frustrated. People with Wernicke's aphasia may not realize their speech doesn't make sense.

6

C. Match the words with their meanings.

1. Aphasia	a) Smooth
2. Lesion	b) Language disorder
3. Comprehension	c) Communicative
4. Fluent	d) Understanding
5. Expressive	e) Injury

Language Study: Gerund or Infinitive?

Use gerunds (verb+ing) after certain verbs like enjoy, avoid, and infinitives (to + verb) after verbs like want, need. In the following sentences describing aphasia symptoms, you will see the examples of Gerund and Infinitive.

- Individuals with Broca's aphasia have difficulty in expressing their thoughts, naming objects, reading aloud, repeating words, or writing. (Gerund)
- Individuals with Broca's aphasia do not lose the ability to understand speech, but a certain level of impairment is often present. (Infinitive)

7

A. Complete the following sentences using the gerund or infinitive form of the verb in parentheses:

1. She enjoys _____ (read) novels in her spare time.
2. He promised _____ (help) his friend with the project.
3. _____ (run) is my favorite form of exercise.
4. We need _____ (find) a solution to this problem as soon as possible.
5. Wernicke's aphasia is associated with _____(create) new words.
6. Speech therapy aims _____ (improve) language skills.
7. He seems _____ (enjoy) cooking for his family.
8. _____ (walk)in the park is a relaxing activity.
9. Anomic aphasia makes it difficult _____ (find) the right word.
10. Global aphasia severely impairs _____ (understand) and _____ (express) language.

8

Use of English: Subject & Object Questions

Subject Question: Ask who/what does the action.
Object Question: Ask who/what receives the action.

1. Subject Questions
Model: Wernicke's Aphasia is a language disorder that affects both comprehending and expressing.
Response: What is Wernicke's Aphasia?

A. Write subject questions to the following statements.

1. Aphasia is a language disorder that occurs due to damage to parts of the brain responsible for language.

_____

2. Aphasia is often caused by strokes, tumors, or head injuries.

_____

3. Broca's aphasia is termed expressive aphasia because individuals have difficulty expressing themselves verbally.

_____

4. Common symptoms of Wernicke's aphasia include producing fluent but meaningless speech, difficulty understanding spoken language, and using inappropriate or invented words.

_____

9

2. Object Questions
Model: Broca's aphasia affects the ability to express thoughts verbally, name objects, read aloud, repeat words, and write.
Response: What does Broca's aphasia affect?

B. Write subject questions to the following statements.

1. Broca examined a patient who had lost his ability to speak any word other than the syllable "tan."

_____

2. Aphasias are classified according to the relative deficits in expression or comprehension ability associated with different lesion locations in the brain.

_____

3. Individuals with Broca's aphasia often struggle with expressing their thoughts verbally, naming objects, reading aloud, repeating words, and writing.

_____

4. Despite their difficulties, individuals with Broca's aphasia can produce short, meaningful phrases, albeit with effort and frequent pauses.

_____

10

TARGET VOCABULARY

approximate, auditory, blockage, convey, defining, dominant, fiber bundle, injury, junction, language ability, manifest, parietal lobe, recall, substitute, visual aid



IMAGE MADE WITH GOOGLE AI

Language Disorders: Aphasia (Part 2)

Conduction Aphasia

Conduction aphasia may be caused by damage to white matter tracts, primarily the arcuate fasciculus, or temporoparietal cortex within the left hemisphere. The arcuate fasciculus is the whitematter fiber bundle that includes direct connections between Broca's area and Wernicke's area. The junction of the temporal and parietal cortex in close proximity to Wernicke's area has also been identified as another vulnerable region. Conduction aphasia is characterized by a specific difficulty in repeating words, but there can be difficulties in naming objects and in reading aloud as well. Individuals with conduction aphasia display relative sparing of auditory comprehension and reading comprehension. **They (1)** are able to write, but certain words are sometimes skipped, repeated, or substituted. In some ways, **this (2)** aphasia can manifest as an intermediate syndrome between receptive and expressive aphasia. Compared to other forms of aphasia, conduction aphasia can be a milder disorder.

11

Global Aphasia

Global aphasia involves damage to the widespread language area in the dominant (left) hemisphere through blockage near the origin of the MCA. Individuals with global aphasia lose almost all receptive and expressive language abilities. **They (3)** have difficulty in understanding spoken and written language, writing, speaking, repeating words, and naming objects. Communication options for patients with global aphasia are limited. Individuals with global aphasia may use visual aids to convey and express thoughts.

Anomic Aphasia

Anomic aphasia, or nominal aphasia, is caused by injury to either the parietal lobe or the temporal lobe. **Its (4)** defining characteristic is difficulty in directly naming objects. For example, the individual with anomic aphasia may know that a chair can be used to sit on but cannot recall that the object is called chair. Other than anomia, the language ability of patients with anomic aphasia can be relatively spared. That is, fluency, comprehension, and repetition may approximate prelusory performance.

ROUSSEAU BERNARD- BRANSKI RYAN C., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THEME PUBLISHERS, 2016, P.144

A. Answer the following questions.

1. What is Conduction Aphasia and what causes it?
2. What causes Conduction Aphasia?
3. What are some symptoms of Global Aphasia?
4. How does Anomic Aphasia affect language abilities?

12

Context Exercises

A. What do these words in the passages refer to?

Reference Word: In English, we often use substitute or reference words to avoid repeating the same word or term. One of the most common types of reference words is pronouns. As it said, it is used reference words like this so it doesn't repeat the same words. In addition, it is also used to refer to different parts of a text. We often refer back to an earlier part of a text, but we can also refer forward in the text.

Here are some of the common types of reference words:

- it, they, them, his: personal pronouns
- this, that, those: demonstratives
- which, whose, where: relative pronouns
- some, other, another: determiners

1. they (1) refers to _____

2. this (2) refers to _____

3. they (3) refers to_____

4. its (4) refers to _____

13

B. Match the words with their opposites.

1. Difficulty — a) Impaired
2. Severe — b) Expressive
3. Preserved — c) General
4. Intact — d) Ease
5. Receptive — e) Abundant
6. Limited — f) Mild
7. Specific — g) Confusion
8. Understanding — h) Affected

14

C. Fill in the table below.

Noun	Verb	Adjective	Adverb
damage		damaged	damagingly
difficulty	X	difficult	X
communication	communicate	communicative	communicatively
	comprehend	comprehensible	comprehensibly
expression	express	expressive	
individual	X		individually

D. Fill in the blanks with the words from the table above.

1. Aphasia is accepted as a language disorder and may occur in different brain regions.
2. In global aphasia, _____ and _____ are severely impaired.
3. Individuals face many _____ due to the _____ effects of aphasia.
4. _____ is challenging for those with global aphasia.
5. Even if language skills are affected, _____ differences exist across types.

15

Language Study: Passive Voice

Passive voice is often used in scientific and academic writing to emphasize the action or the result of an action rather than the doer of the action. It is also used when the focus is on the affected person or object rather than the agent performing the action.

Here, you will see the examples of Simple Present Passive Voice:

- Communication options for patients with global aphasia **are limited.**
- Anomic aphasia, or nominal aphasia, **is caused** by injury to either the parietal lobe or the temporal lobe.

A. Fill in the blanks with the correct form of the verbs in passive voice.

1. The letters _____ by the secretary every morning. (type)
2. English _____ in many countries around the world. (speak)
3. Tickets _____ online for the concert. (sell)
4. The house _____ cleaned every week by a cleaning service. (clean)
5. Vegetables _____ by farmers in this region. (grow)
6. Fresh bread _____ in the bakery downstairs. (bake)
7. Important decisions _____ by the manager. (make)
8. The news _____ on television every evening. (broadcast)

16

Tense	Active Voice	Passive Voice
Present simple	They **sell** ice cream here. They **sell** books here.	Ice cream **is sold** here. Books **are sold** here.
Present continuous	Someone **is washing** my car at the moment. Someone **is washing** my cars at the moment.	My car **is being washed** at the moment. My cars **are being washed** at the moment.
Present perfect simple	They **have repaired** my bike. They **have repaired** all the bikes.	My bike **has been repaired.** All the bikes **have been repaired.**
Past simple	They **sold** a car yesterday. They **sold** three cars yesterday.	A car **was sold** yesterday. Three cars **were sold** yesterday.
Past continuous	He **was painting** my bedroom then. He **was painting** my bedroom and kitchen then.	My bedroom **was being painted** then. My bedroom and the kitchen **were being painted** then.
Past perfect simple	Somebody **had left** an envelope on the table.	An envelope **had been left** on the table.
Future simple	They **will send** an e-mail.	An e-mail **will be sent.**
Future going to	Somebody **is going to call** Peter. Somebody **is going to call** you soon.	Peter **is going to be called.** You **are going to be called** soon.

17

Use of English

B. Read the questions below and answer them with your own ideas.

Model: How **are** these books **printed**?

Response: These books **are printed** by a professional printing company.

1. Where are these shoes made?

_____

2. Who is this report prepared by?

_____

3. When are these documents submitted?

_____

4. Who is this song sung by?

_____

5. What are limited for patients with global aphasia?

_____

18

5

TARGET VOCABULARY

adduction, airway protection, articulation, cadaver, complement, distribution, entrainment, fatigue-resistant, intrinsic, laryngeal, maintain, muscle fiber, skeletal muscle, vocal power

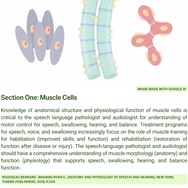


IMAGE MADE WITH GOOGLE AI

Section One: Muscle Cells

Knowledge of anatomical structure and physiological function of muscle cells is critical to the speech language pathologist and audiologist for understanding of the motor control for speech, swallowing, hearing, and balance. Treatment programs for speech, voice, and swallowing increasingly focus on the role of muscle training for habilitation (improved skills and function) and rehabilitation (restoration of function after disease or injury). The speech-language pathologist and audiologist should have a comprehensive understanding of muscle morphology (anatomy) and function (physiology) that supports speech, swallowing, hearing, and balance function.

ROUSSEAU, BERNARD. BRANDAU RYAN E., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THIEME PUBLISHERS, 2018, P.234

A. Read the text carefully, then answer the following questions.

1. Why is knowledge of muscle cells important for speech-language pathologists and audiologists?

51

2. What are the two main focuses of treatment programs mentioned in the passage?
3. What aspects of muscle cells should speech-language pathologists and audiologists understand?
4. How do muscle training programs contribute to speech and swallowing therapy, according to the passage?

Section Two: Muscle Fiber Types in the Human Larynx

The human larynx includes skeletal muscle fibers that in some respects are distinct from limb skeletal muscle. The muscle fiber complement of the intrinsic laryngeal skeletal muscles is well suited for the work required of these muscles for both the biologic role of airway protection and the nonbiologic role of communication. The lateral cricoarytenoid (LCA), interarytenoid (IA), and cricothyroid (CT) had a higher percentage of Type II muscle fibers in three cadavers investigated. **This** distribution makes functional sense given that these muscles are primarily responsible for rapid adduction of the vocal folds for airway protection and articulation. The thyroarytenoid (TA) had a more variable fiber type complement among the three cadavers. **These** differences may, in part, account for why there are individual differences in the ability to produce vocal power. However, production of vocal power is complex and encompasses far more than entrainment of the TA. The posterior cricoarytenoid (PCA) is distinct in that **it** clearly has a higher percentage of Type I fibers across the cadavers studied. Given that the PCA is primarily responsible for maintaining a patent (open) airway during most of our waking and sleeping time, it makes sense that this muscle would comprise more fatigue-resistant muscle fibers. Ultrafast muscle fibers, Type IIL (Tellis et al 2004), and slow tonic muscle fibers (Han et al 1999), which are precisely controlled and fatigue-resistant, have also been identified in the IA and TA, respectively.

ROUSSEAU, BERNARD. BRANDAU RYAN E., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THIEME PUBLISHERS, 2018, P.235

52

B. Read the text carefully, then answer the following questions.

1. What is the main purpose of the skeletal muscles in the human larynx?
2. Which muscle is responsible for rapid closure of the vocal folds?
3. Why does the posterior cricoarytenoid (PCA) muscle have a higher percentage of Type I fibers?
4. According to the passage, what may account for individual differences in vocal power production?
5. What types of muscle fibers are identified in the interarytenoid (IA) and thyroarytenoid (TA) muscles, respectively?

Context Exercises

A. Mark the statements True (T) or False (F). Correct the false ones.

1. ( ) The intrinsic laryngeal skeletal muscles primarily serve a nonbiologic role related to communication.
2. ( ) The lateral cricoarytenoid (LCA), interarytenoid (IA), and cricothyroid (CT) muscles have a higher percentage of Type II muscle fibers.
3. ( ) The thyroarytenoid (TA) muscle consistently exhibits a uniform fiber type composition across all individuals.
4. ( ) The posterior cricoarytenoid (PCA) muscle is responsible for closing the airway during sleep.
5. ( ) Ultrafast muscle fibers, Type IIL, are found in the thyroarytenoid (TA) muscle.

53

B. Ask questions for the given answers.

1. _____
_____

The muscles in the human larynx serve the purposes of airway protection and communication.

2. _____
_____

The lateral cricoarytenoid (LCA), interarytenoid (IA), and cricothyroid (CT) muscles are responsible for rapid closure of the vocal folds.

3. _____
_____

The PCA muscle is primarily responsible for keeping the airway open, requiring more fatigue-resistant muscle fibers (Type I fibers).

4. _____
_____

Differences in muscle fiber types, particularly in the thyroarytenoid (TA) muscle, may contribute to individual differences in vocal power production.

54

5. _____
_____

The IA muscle contains ultrafast muscle fibers (Type IIL), while the TA muscle contains slow tonic muscle fibers.

6. _____
_____

The muscle fiber complement of the intrinsic laryngeal skeletal muscles is well suited for both airway protection and communication.

7. _____
_____

The distribution of Type II muscle fibers in the LCA, IA, and CT muscles makes functional sense for their roles in vocal fold adduction and articulation.

C. What do these words in the passage refer to?

1. **this** refers to_____
2. **these** refers to_____
3. **it** refers to_____

55

Vocabulary Study

A. Match the words with their meanings.

1. Intrinsic	a) The action of bringing something closer to the midline of the body.
2. Adduction	b) Capable of withstanding tiredness or exhaustion.
3. Patent	c) A set of different elements that complete or enhance each other.
4. Fatigue-resistant	d) Internal or belonging naturally to a part of the body.
5. Entrainment	e) An established synchronization or coordination.
6. Complement	f) Open and unobstructed.
7. Variable	g) Likely to change or vary; not consistent.

56

B. Match the words to their correct opposites.

1. Intrinsic	a) Closed
2. Adduction	b) Extrinsic
3. Patent	c) Fixed
4. Fatigue-resistant	d) Slow
5. Rapid	e) Fatigable
6. Variable	f) Abduction
7. Open	g) Obstructed

57

Language Study: Relative Clause (who, which, that)

A. Fill in the blanks with the correct relative pronoun (who, which, or that).

1. The man _____ lives next door is very friendly.
2. This is the book _____ I borrowed from the library.
3. The dog _____ barks a lot belongs to my neighbor.
4. She is the teacher _____ taught me last year.
5. I have a friend _____ loves to play soccer.

B. Combine the sentences using a relative clause.

1. I met a girl. She can speak six languages.

I met a girl _____

2. The car was very expensive. He bought it yesterday.

The car _____

3. There is a park near my house. The park has a beautiful lake.

There is a park near my house _____

4. We visited a museum. It was very interesting.

We visited a museum _____

58

Use of English

A. Rewrite the following sentences without changing the meaning, using the given prompts.

1. The human larynx includes skeletal muscle fibers that in some respects are distinct from limb skeletal muscle.

_____

2. The muscle fiber complement of the intrinsic laryngeal skeletal muscles is well suited for the work required of these muscles for both the biologic role of airway protection and the nonbiologic role of communication.

_____

3. The lateral cricoarytenoid (LCA), interarytenoid (IA), and cricothyroid (CT) had a higher percentage of Type II muscle fibers in three cadavers investigated.

_____

4. The posterior cricoarytenoid (PCA) is distinct in that it clearly has a higher percentage of Type I fibers across the cadavers studied.

_____

59

6

TARGET VOCABULARY

myasthenia gravis, autoimmune disorder, antibody, neuromuscular junction, voluntary muscle, fatigue, breathing difficulty, chewing, hoarseness, breathy voice, vocal weakness, personal amplifier, aspiration, swallowing, assessment



IMAGE MADE WITH GOOGLE AI

Myasthenia Gravis

There is a growing interest in the use of muscle training programs for improvement of respiratory, voice, and swallowing function. In many cases that involve decline of muscle function, as with the elderly, increased muscle activity can improve functional ability. However, this adaptation is not the case with individuals who have communication or swallowing impairment secondary to MG. MG is an autoimmune disorder that produces antibodies that block, alter, or destroy neuromuscular junction postsynaptic acetylcholine receptors (ACRs) in voluntary muscle. This disease is distinct in that the affected muscles rapidly fatigue with use, contraindicating the use of exercise as a therapy modality.

The clinical presentation and severity of MG are variable. When severe, MG can result in difficulty smiling, talking, chewing, swallowing, or breathing. Typical symptoms for MG by subsystem and the clinical implications are as follows:

60

Speech Breathing

Breathing symptoms include shortness of breath or difficulty taking a deep breath or coughing. Since taking a deep breath is difficult, inhalation may be insufficient for typical speech phrasing and adequate vocal loudness. Insufficient subglottic pressure generation may make these individuals particularly vulnerable to airway protection. Use of respiratory muscle resistance training devices is not indicated with this population. Shorter phrasing and frequent breaks from talking are appropriate intervention strategies.

Articulation

When muscles of articulation rapidly fatigue with use, an AAC (Augmentative and Alternative Communication) system is helpful to assist with communication.

Voice and Resonance

Voice symptoms include hoarseness, breathy voice, vocal weakness, and sluggishness of vocal fold adduction. The primary voice symptom is breathiness. Insufficient loudness, particularly with ambient noise, may be a challenge. Use of an affordable, portable, lightweight personal amplifier may be the best recommendation.

Feeding and Swallowing

Involvement of oropharyngeal musculature is not uncommon. Timely consideration of myasthenia gravis in evaluating dysphagia is crucial to prevent complications and to improve the quality of life of these patients. The impact of MG on swallowing may occur gradually or suddenly. Swallowing muscles may become fatigued, particularly toward the end of a meal or when food requires a lot of chewing. Because airway protection may be compromised, these individuals are more likely to have silent aspiration. A clinical assessment of swallowing function may not be adequate to assess these individuals fully should they exhibit swallowing difficulty.

ROUSSEAU BERNARD, BRANDA RYAN E., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THEME PUBLISHERS, 2018, P. 253

61

A. Ask or answer the questions.

1. _____?

Answer: Shortness of breath or difficulty taking a deep breath.

2. What recommendations are given for improving voice clarity in MG patients?

Answer: _____.

3. _____?

Answer: Hoarseness, breathy voice, vocal weakness.

4. Why might individuals with Myasthenia Gravis benefit from using a personal amplifier?

Answer: _____

5. _____?

Answer: It causes rapid fatigue of articulation muscles, necessitating the use of AAC systems for communication.

B. Complete the following sentences.

1. Myasthenia Gravis is an autoimmune disorder that affects neuromuscular junctions, causing muscles to rapidly fatigue with use, particularly in individuals with _____.
2. Individuals with MG may experience difficulty in taking a deep breath or coughing due to _____.
3. To assist with communication, individuals with rapidly fatiguing articulation muscles may benefit from using _____.

62

4. For MG patients experiencing voice symptoms such as hoarseness or breathy voice, an effective recommendation is to use _____.
5. Swallowing difficulties in MG patients can lead to increased risk of silent aspiration, particularly when _____.

Vocabulary Study

A. Find words in the second part which mean the following.

1. Dysphagia — a) A device used to make the voice louder.
2. Aid — b) Making something open or unblocked.
3. Patent — c) To assist with
4. Amplifier — d) Difficulty in swallowing

B. Match each definition on the left with the correct word from the passage on the right.

1. Proteins on muscle cells that acetylcholine binds to — a) Autoimmune
2. Inhaling food, fluid, or other substances into the airways — b) Fatigue
3. Immune system attacks the body's own tissues — c) ACHRs
4. Rapid exhaustion or tiredness — d) Aspiration

63

C. Fill in the blanks with the correct words from the passage.

1. Myasthenia Gravis is an _____ disorder that affects the neuromuscular junction.
2. Individuals with MG may experience rapid _____ of muscles involved in speech and swallowing.
3. The primary voice symptom in MG is _____.
4. Timely consideration of MG in evaluating _____ is crucial to prevent complications.
5. Respiratory muscle resistance training devices are _____ indicated for individuals with MG.

64

Language Study: Should or Shouldn't

A. Fill in the blanks with the correct prepositions from the passage.

1. There is a growing interest _____ the use of muscle training programs for improvement _____ respiratory, voice, and swallowing function.
2. MG is an autoimmune disorder that produces antibodies that block, alter, or destroy neuromuscular junction postsynaptic acetylcholine receptors (ACHRs) _____ voluntary muscle.
3. In many cases that involve decline _____ muscle function, as _____ the elderly, increased muscle activity can improve functional ability.
4. The clinical presentation and severity _____ MG are variable.
5. Individuals _____ MG may experience rapid fatigue _____ muscles involved in speech and swallowing.
6. Timely consideration _____ MG _____ evaluating dysphagia is crucial to prevent complications.
7. Because airway protection may be compromised, these individuals are more likely to have silent aspiration _____ food, fluid, or other substances _____ the airways.

65

Giving Advice: Using Should

Question: **Should** I + verb ... ?

- (I want advice about something.)

Here are some advices:

- I think you **should** + verb ...
- I don't think you **should** + verb ...
- I think you **shouldn't** + verb ...
  - (We do not use shouldn't with I think.)

Question: **Should** I buy the red shirt or the blue shirt?

Answer: I think you **should** buy the red one.

- One can be used to avoid repetition of word "shirt".

Answer: I think you **should** buy the red shirt because it is nicer than the blue one.

- A comparative can be used to give a reason for your advice.

B. Complete the with "should" or "shouldn't".

1. People with voice disorders _____ see a specialist.
2. You _____ smoke if you have vocal cord issues.
3. Teachers _____ rest their voices regularly.
4. You _____ drink plenty of water to keep vocal cords healthy.
5. He _____ yell during recovery.

66

Use of English

A. Find the mistakes and correct them.

U. Stravgovsky
Syllens,
23445 Hungary

Wednesday 19th July, 2011.

Dear Mr. and Mrs. Bennett,

I am home now since two weeks, but when I arrived home I must start work immediately so this is my first opportunity to write to you. How are you all? Are you all busy? Does Andrew still work hard for his exams? I am miss you a lot and also all my friends from my English class.

Yesterday, I've received a letter from one of the Greece students I meet in England, Christina. She told about some of the other students. She said me that the Japanese girls Katsida and Yikuko will write me this summer. During I was in England, I made a lot of good friends and I enjoyed very much. I think I learned a lot of English but also knew people from so many different countries.

My family are fine. They had a good holliyday the last month. We are all very exciting because my brother gets married before Christmas. We like very much his girlfriend, who live in Budapest. They are looking for a flat in my town but it isn't easy and if they don't find one soon, they stay with us in my house.

I can't find my big red scarf that I bought in London. I think I left it in the cupboard in my bedroom. Can you to check for me?

Please write soon. I hope I can come back next year. Stay with you was a wonderful experience for me. I learned so much things.

Goodbye.

Kati

67

7

TARGET VOCABULARY

Lee Silverman Voice Treatment (LSVT), Parkinson's disease, speech intelligibility, vocal loudness, specificity, cortical, vestibular system, benign paroxysmal positional vertigo (BPPV), vertigo, dizziness, sensory receptors, otoconia, nystagmus, idiopathic



Section One: Lee Silverman Voice Treatment and Muscle Training Principles

The Lee Silverman Voice Treatment (LSVT), LSVT Global, Tucson, AZ) program is an intensive therapy program designed for the treatment of speech and voice disorders associated with Parkinson's disease (PD; Mahler et al 2015). Individuals with PD may have difficulty being understood because of a soft voice and poor speech intelligibility. When evaluating this therapy program from the perspective of muscle training principles, this approach uses the principles of specificity and overload effectively to realize significant improvement in vocal loudness and speech intelligibility. This program focuses on functional speech tasks, such as frequently used phrases, thus honoring the principle of specificity. With patients completing all the therapy tasks at a louder level than typically employed, the cortical and vestibular mechanisms are employed at a level beyond which they are used to working, honoring the overload principle.

By assigning regular positherapy practice and scheduling follow-up appointments, the LSVT program also helps avoid reversibility of muscle adaptations realized during treatment.

Section Two: Benign Paroxysmal Positional Vertigo (BPPV)

While not life threatening, disorders in our vestibular system make it difficult to maintain our balance and can have a dramatic impact on our quality of life. **Benign paroxysmal positional vertigo** (BPPV) is a vestibular disorder that can cause vertigo and dizziness when there is a change in the position of your head. For example, if you have a sudden head movement to see what is happening, you may experience vertigo. Vertigo is the sensation of spinning or dizziness. This occurs when the vestibular system mechanically activates sensory receptors that provide the brain with information regarding the position, rotation, and acceleration of our heads. For individuals with BPPV, the otoconia of the otolith organs can collect and clump together in one area of the system. When the head turns, the clump of otoconia moves erratically and stimulates receptors to send false sig nals to the brain regarding our position.

Aside from vertigo, individuals with BPPV may experience nystagmus (involuntary eye movements), imbalance, lightheadedness, and nausea with even the slightest movement of their heads. BPPV can occ cur after certain types of surgery or trauma, but most cases are idiopathic. BPPV can be treated by special ists who are trained in using specific head positions to move the otoconia out of the impacted areas of the vestibular system.

ROSSIGNOL BERNARD, BENIGN PERIPH.T., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THIEME PUBLISHERS, 2018, P. 345

Context Exercises: Section One

A. Read and choose the correct option.

1. What is the primary focus of the Lee Silverman Voice Treatment (LSVT) program?
   a. Physical fitness
   b. Speech and voice disorders related to Parkinson's disease
   c. Cognitive therapy
   d. Vision correction
2. Which principle is honored by having patients perform therapy tasks at a louder level than typically used?
   a. Principle of consistency
   b. Principle of specificity
   c. Principle of overload
   d. Principle of duration
3. What type of speech tasks does the LSVT program emphasize?
   a. Complex verbal instructions
   b. Frequently used phrases
   c. Monologues
   d. Formal presentations

4. How does the LSVT program help prevent the reversal of muscle adaptations?
   a. By reducing therapy sessions
   b. By increasing the frequency of therapy tasks and follow-up appointments
   c. By lowering the volume of therapy tasks
   d. By eliminating follow-up visits
5. What is the main goal of the LSVT program according to the text?
   a. To increase muscle mass
   b. To improve vocal loudness and speech intelligibility
   c. To enhance cognitive functions
   d. To reduce muscle tension

Context Exercises: Section Two

A. Read and choose the correct option.

1. What is a common symptom of Benign Paroxysmal Positional Vertigo (BPPV)?
   a. Headaches
   b. Vertigo with head movements
   c. Chronic fatigue
   d. Memory loss

2. What happens to the otoconia in individuals with BPPV?
   a. They dissolve in fluid
   b. They collect and clump together in one area
   c. They float freely in the fluid
   d. They get absorbed by the body
3. Which condition is NOT typically associated with BPPV?
   a. Nystagmus
   b. Nausea with head movement
   c. Hearing loss
   d. Imbalance
4. What can cause Benign Paroxysmal Positional Vertigo (BPPV) aside from idiopathic reasons?
   a. Exposure to loud noise
   b. Certain types of surgery or trauma
   c. Excessive physical exercise
   d. Poor nutrition
5. How is BPPV generally treated?
   a. With medication to control symptoms
   b. By using specific head positions to move the otoconia
   c. Through surgical removal of the otoconia
   d. By prescribing vestibular exercises only

B. Match the vocabularies with their given meanings.

1. LSVT	a) A therapy program for speech and voice disorders.
2. Parkinson's Disease	b) A neurodegenerative disorder affecting movement.
3. Specificity	c) A muscle training principle that involves practicing specific tasks.
4. Overload Principle	d) A principle where tasks are performed at a higher level than normal.
5. Vestibular System	e) The part of the inner ear involved in balance.
6. Otoconia	f) Small crystals in the inner ear that can cause dizziness.
7. Vertigo	g) A sensation of spinning or dizziness.
8. Nystagmus	h) Involuntary rhythmic eye movements.
9. Idiopathic	i) A term for a condition with no known cause.
10. Imbalance	j) Difficulty in maintaining balance.

C. Use the base words provided in parentheses to form a word that fits correctly in the blank spaces.

Section One: Lee Silverman Voice Treatment and Muscle Training Principles

1. The Lee Silverman Voice Treatment (LSVT, LSVT Global, Tucson, AZ) program is an intensive therapy program designed for the _____ (treat) of speech and voice disorders associated with Parkinson's disease (PD; Mahler et al 2015).
2. Individuals with PD may have difficulty being understood because of a soft voice and poor speech _____ (intelligible).
3. When _____ (evaluate) this therapy program from the perspective of muscle training principles, this approach uses the principles of specificity and overload effectively to realize significant _____ (improve) in vocal loudness and speech intelligibility.
4. This program focuses on _____ (function) speech tasks, such as frequently used phrases, thus honoring the principle of specificity.
5. With patients completing all the therapy tasks at a louder level than typically _____ (employ), the communication mechanisms are employed at a level beyond which they are used to working, honoring the overload principle.
6. By assigning regular positherapy practice and scheduling follow-up appointments, the LSVT program also helps avoid _____ (reverse) of muscle adaptations realized during treatment.

"Section Two: Benign Paroxysmal Positional Vertigo (BPPV)"

1. While not life threatening, disorders in our vestibular system make it difficult to maintain our balance and can have a dramatic _____ (impact) on our quality of life.
2. Benign paroxysmal positional vertigo (BPPV) is a vestibular disorder that can cause vertigo and sudden _____ (dizzy) when there is a change in the position of your head.
3. When we turn our heads, the fluid within the vestibular system mechanically _____ (activate) sensory receptors that provide the brain with information regarding the position, rotation, and _____ (accelerate) of our heads.
4. For individuals with BPPV, the otoconia of the otolith organs can collect and _____ (clump) together in one area of the system.
5. Aside from vertigo, individuals with BPPV may experience nystagmus (involuntary eye _____ (move)), imbalance, lightheadedness, and nausea with even the slightest _____ (move) of their heads.
6. BPPV can occur after certain types of surgery or trauma, but most cases are _____ (idiopathy).
7. BPPV can be treated by specialists who are trained in using specific head positions to move the otoconia out of the _____ (impact) areas of the vestibular system.

Language Study: Conjunctions

A. Combine the following pairs of sentences using the appropriate conjunctions. Choose from: because, although, while, for, nor, yet.

1. The Lee Silverman Voice Treatment (LSVT) program improves vocal loudness _____ it also enhances speech intelligibility.
2. BPPV can cause sudden dizziness _____ it is not life-threatening.
3. Patients with BPPV may experience vertigo _____ they may also experience nausea.
4. The LSVT program involves performing tasks at a louder level _____ the principle of overload is honored.
5. The vestibular system provides information about head position _____ it also helps in maintaining balance.
6. The otoconia can clump together in the inner ear _____ this can cause vertigo.
7. BPPV can occur after surgery _____ it can also occur due to trauma.
8. Regular practice is necessary for LSVT _____ follow-up appointments are scheduled.
9. Individuals with BPPV may feel lightheaded _____ they may feel nausea with head movements.

Use of English

A. Rewrite the following sentences using the words in parentheses to maintain the original meaning.

1. The LSVT program helps improve vocal loudness by applying specific therapy techniques.

_____

2. Individuals with BPPV might feel dizzy when changing their head position.

_____

3. The Lee Silverman Voice Treatment is based on muscle training principles that enhance speech clarity.

_____

4. Otoconia clumping in the vestibular system can lead to incorrect signals being sent to the brain.

_____

8

TARGET VOCABULARY

( ) atrophy, skeletal muscle, fast-twitch fibers, connective tissue, neuromuscular junction (NMJ), capillary density, muscle mass, hypertrophy, motor unit, nerve terminals, muscle adaptation, resistance exercise, swallowing pressures

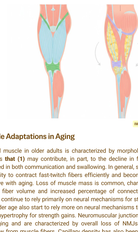


IMAGE MADE WITH GOOGLE AI

Muscle Adaptations in Aging

Skeletal muscle in older adults is characterized by morphologic and neurologic changes **that (1)** may contribute, in part, to the decline in function that can be observed in both communication and swallowing. In general, skeletal muscles lose the ability to contract fast-twitch fibers efficiently and become slower and more oxidative with aging. Loss of muscle mass is common, characterized by smaller muscle fiber volume and increased percentage of connective tissue. Although women continue to rely primarily on neural mechanisms for strength gains, men in their older age also start to rely more on neural mechanisms than on testosterone-driven hypertrophy for strength gains. Neuromuscular junction changes also occur with aging and are characterized by overall loss of NMJs as nerve terminals withdraw from muscle fibers. Capillary density has also been observed to decline with aging, **which (2)** may be secondary to a muscle fiber metabolic shift with aging.

78

Evidence suggests that exercise, even into the ninth decade of life, can improve muscle function. Specifically, muscle adaptations **that (3)** have been observed in the motor unit following exercise in old muscle include tightening up of the postsynaptic AChRs around motor end plates for more efficient propagation of the neural impulse into the muscle cell (Johnson et al 2013). In humans, significantly increased isometric and swallowing pressures have been found following an 8-week tongue resistance exercise program in older individuals **who (4)** are at greater risk of developing swallowing disorder.

SOURCES AND IMAGES: AMANDA RYAN C., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, THEME PUBLISHERS, 2018, P. 257

A. Read the text titled "Muscle Adaptations in Aging" carefully. After reading, answer the following questions in complete sentences. Use information from the text to help you answer.

1. What happens to muscle fibers as people get older?
2. How does losing muscle affect older people?
3. How do men and women get stronger as they age?
4. What changes happen to neuromuscular junctions (NMJs) with aging?
5. How can exercise help older people's muscles, especially for swallowing?

79

B. Read the text titled "Muscle Adaptations in Aging" carefully. After reading, decide whether the following statements are true or false. Write "True" if the statement is correct according to the text and write "False" if the statement is incorrect.

1. ( ) Older adults' muscles lose the ability to move fast.
2. ( ) Older people have bigger muscles than younger people.
3. ( ) Women use their nerves to get stronger all their lives.
4. ( ) Older men use testosterone more than their nerves to get stronger.
5. ( ) The number of capillaries in muscles does not change with aging.
6. ( ) Exercise can help muscles even in very old people.
7. ( ) Exercise does not change muscles in old people.
8. ( ) Older people had better swallowing after doing tongue exercises for 8 weeks.

C. What do the words in bold in the text "Muscle Adaptations in Aging" refer to?

1. **that (1)** refers to _____
2. **which (2)** refers to _____
3. **that (3)** refers to _____
4. **who (4)** refers to _____

80

D. Fill in the table below.

Noun	Verb	Adjective	Adverb
	strengthen		strongly
contribution			X
	characterize	characteristic	
		oxidative	oxidatively
muscle			X
	lose		X
efficiency		efficient	
	observe		X
adaptation	adapt		adaptively
		reliant	reliably
communication	communicate		communicatively

81

E. Use the words you filled in the blanks in the parts of speech table to complete the sentences above. Write the appropriate word form (noun, verb, adjective, or adverb) in each blank to ensure the sentence makes sense.

1. Her physical _____ surprised everyone, as she effortlessly lifted the heavy box.
2. Teachers _____ that regular practice improves students' learning outcomes.
3. The _____ changes in weather patterns are causing concern among farmers.
4. He was _____ shocked by the unexpected news of his promotion.
5. The _____ of her speech resonated deeply with the audience.
6. Scientists are studying how _____ changes affect wildlife habitats.
7. _____ understanding of complex concepts is essential for academic success.
8. The company's _____ strategies have led to increased market share.
9. Drivers are urged to _____ caution when approaching slippery roads.
10. The _____ transition to online learning posed challenges for both students and teachers.
11. The _____ use of technology has transformed communication in the modern era.
12. The CEO's _____ leadership style inspired confidence among employees.
13. Researchers are investigating how _____ changes in diet affect long-term health.

82

Language Study

A. Read the sentences below from the text "Muscle Adaptations in Aging." Then, rewrite each sentence in your own words with the same meaning. Try to use simpler language. Feel free to use the example provided to guide your own paraphrasing. You should keep the original meaning of the sentences.

Example:

- **Original Sentence**: Skeletal muscle in older adults is characterized by morphologic and neurologic changes that may contribute, in part, to the decline in function that can be observed in both communication and swallowing.
- **Rewritten Sentence**: In older people, changes in muscle shape and nerve function can cause problems with talking and swallowing.

Now You Try:

- **Original Sentence**: In general, skeletal muscles lose the ability to contract fast-twitch fibers efficiently and become slower and more oxidative with aging.
- **Your Sentence**: _____

- **Original Sentence**: Loss of muscle mass is common, characterized by smaller muscle fiber volume and increased percentage of connective tissue.
- **Your Sentence**: _____

83

- **Original Sentence**: Neuromuscular junction changes also occur with aging and are characterized by overall loss of NMJs as nerve terminals withdraw from muscle fibers.
- **Your Sentence**: _____

- **Original Sentence**: Evidence suggests that exercise, even into the ninth decade of life, can improve muscle function.
- **Your Sentence**: _____

Use of English

A. Read the following passive sentences from the text "Muscle Adaptations in Aging." Rewrite each sentence in the active voice. Make sure the meaning of each sentence remains the same. An example is given to you below.

- **Passive Sentence**: The cake was baked by the chef.
- **Active Sentence**: The chef baked the cake.

1. Skeletal muscle in older adults **is characterized** by morphologic and neurologic changes that may contribute, in part, to the decline in function that **can be observed** in both communication and swallowing.

_____

2. Loss of muscle mass is common, **characterized** by smaller muscle fiber volume and increased percentage of connective tissue.

_____

84

3. Neuromuscular junction changes also occur with aging and **are characterized** by overall loss of NMJs as nerve terminals withdraw from muscle fibers.

_____

4. Capillary density **has also been observed** to decline with aging, which may be secondary to a muscle fiber metabolic shift with aging.

_____

5. Specifically, muscle adaptations that **have been observed** in the motor unit following exercise in old muscle include tightening up of the postsynaptic AChRs around motor end plates for more efficient propagation of the neural impulse into the muscle cell.

_____

6. In humans, significantly increased isometric and swallowing pressures **have been found** following an 8-week tongue resistance exercise program in older individuals who are at greater risk of developing swallowing disorder.

_____

85

TARGET VOCABULARY

perception, speech production, speech perception, phoneme, coordination, central nervous system (CNS), sensory environment, sensory feedback, acoustic feedback, visual feedback, tactile feedback, intervention, intelligibility



IMAGE MADE WITH GOOGLE AI

The Critical Value of Sensation

Sensation is at the heart of learning to produce and maintain the constituent behaviors underlying speech production and perception. The ability to appreciate our sensory environment is critically important for recognizing everything from the nuances of producing speech sounds to understanding an inspiring speaker or actors in a play. To produce just one independent phoneme, our entire system from respiration to voice to resonance and articulation must work in a rapid, precisely coordinated manner. This level of coordination requires that the central nervous system possess reliable, accurate, and detailed information regarding the real-time state of the system during a behavior. If you could no longer feel where your tongue was or how it contacted your teeth to produce a specific sound, do you think you would be as accurate at making an /s/? High-fidelity sensory systems allow us to adaptively self-correct and maintain our speech production and perception skills to a high degree of competency.

86

A frequently used approach used in speech therapy is to shape accurate speech production skills by focusing on salient feedback to inform production attempts. Typically, patients are provided with sensory feedback through acoustic, visual, and tactile channels ("Dat that sound right?" or "Put your tongue here" or "Watch my lips"). The central role of the clinician is to increase the sensory saliency of therapeutic activities by crafting intervention opportunities to increase patient access to quality sensory feedback. In turn, the quality of incoming sensory feedback and patient ability to process and use that information are paramount for adaptive and intelligible speech production.

RUGGERO BERNARD, BRENNAN RYAN C., ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK, TWENTY-FIRE RAINING, 2018, 21,288

Context Exercises

A. Read the text "The Critical Value of Sensation" carefully and answer the following questions. Write your answers in complete sentences.

1. Why is sensation important for speech production and perception?
2. What must the central nervous system possess to ensure coordinated speech production?
3. How would your ability to produce the sound /s/ be affected if you couldn't feel where your tongue was?
4. What role do high-fidelity sensory systems play in speech production and
5. How is sensory feedback used in speech therapy to improve speech production skills?
6. What are some examples of sensory feedback channels mentioned in the text?
7. What is the main goal of the clinician in speech therapy according to the text?

87

B. Read the text titled "Muscle Adaptations in Aging" carefully. Write "True" if the statement is correct according to the text and write "False" if the statement is incorrect.

1. ( ) Sensation plays a central role in learning to produce and maintain speech production and perception behaviours.
2. ( ) Understanding our sensory environment is crucial for recognizing nuances in speech sounds and understanding speakers or actors.
3. ( ) Producing a single phoneme requires coordinated efforts from respiration to articulation.
4. ( ) The central nervous system does not need detailed real-time information for coordinated behaviour.
5. ( ) Losing the ability to feel tongue position and contact with teeth would not affect accuracy in producing the sound /s/.
6. ( ) High-fidelity sensory systems enable adaptive self-correction in speech production and perception.
7. ( ) Speech therapists primarily use auditory feedback to shape speech production skills.

88

C. Match each word from the left column with its correct definition from the right column. Write the corresponding letter of the definition next to each word.

1. sensation — a) the smallest unit of sound that distinguishes one word from another in a language.
2. speech production — b) the ability to integrate and synchronize movements or actions effectively.
3. perception — c) relating to the sense of touch.
4. phoneme — d) the ability to perceive and understand sensory information.
5. coordination — e) action taken to improve a situation or condition.
6. feedback — f) the interpretation and understanding of sensory information.
7. acoustic — g) the process of creating speech sounds using the vocal tract and other systems.
8. tactile — h) information received to evaluate or modify performance.
9. visual — i) relating to sight or the sense of vision.
10. intervention — j) the process of creating speech sounds using the vocal tract and other systems.

89

D. Challenge yourself! Match each word from the list with the definition of its opposite. Think carefully and write down the word that corresponds to each definition. This may help you match the pairs easily!

1. increase — a) decrease or reduce
2. independent — b) lacking in detail; general
3. accurate — c) slow or sluggish
4. rapid — d) minor or insignificant
5. detailed — e) lacking precision or exactness
6. reliable — f) untrustworthy or unsteady
7. critical — g) dependent on others

90

Language Study: Noun Clauses

A noun clause is a dependent clause that contains a subject and a verb. It works as a noun in a sentence. It can be the subject of a sentence, an object, or a complement.

1. Noun Clauses as Subjects

- **That** she did not pass the exam is obvious at this point.
- **What** you have said makes her sad.
- **Whichever** you buy, there is a six-month guarantee.
- **Whoever** made this cake is a real artist.
- **Whether** we can stay in this situation is debatable.

2. Noun Clauses as Objects

- He had miscalculated **how** long the trip would take.
- I can do **whatever** I want.
- He cannot understand **why** she's constantly carping at him.
- My parents are really satisfied with **what** I have done.
- I'm not looking for **what** he likes.

3. Noun Clauses as Compliments

- Harry's problem was **that** he couldn't make a decision.
- He knows **that** I am a dentist.
- The uncertainty is **whether** he will attend or not.
- Linda said **that** her boyfriend betrays her.
- Jennifer seemed angry **that** he refused to help her.

91

A. Read each sentence carefully. Write down the complete noun clause for each sentence in the space provided. Three examples from the text are given to you below. Related phrases are highlighted for you.

1. **To produce just one independent phoneme,** our entire system from respiration to voice to resonance and articulation must work in a rapid, precisely coordinated manner.
2. **If you could no longer feel where your tongue was or how it contacted your teeth to produce a specific sound,** do you think you would be as accurate at making an /s/?
3. **To shape accurate speech production skills by focusing on salient feedback** is a frequently used approach in speech therapy.

Now complete the following:

1. **Sentence:** If you could no longer feel where your tongue was or how it contacted your teeth to produce a specific sound, do you think you would be as accurate at making an /s/?
   Clause: _____.
2. **Sentence:** The central role of the clinician is to increase the sensory saliency of therapeutic activities by crafting intervention opportunities to increase patient access to quality sensory feedback.
   Clause: _____.

92

3. **Sentence:** To shape accurate speech production skills by focusing on salient feedback is a frequently used approach in speech therapy.
   Clause: _____.
4. **Sentence:** High-fidelity sensory systems allow us to adaptively self-correct and maintain our speech production and perception skills to a high degree of competency.
   Clause: _____.
5. **Sentence:** To improve speech production skills, speech therapists often use focused feedback techniques.
   Clause: _____.

Use of English

A. Read the two sentences below from the text.

This level of coordination requires **that** the central nervous system possess reliable, accurate, and detailed information regarding the real-time state of the system during a behavior.

If you could no longer feel **where** your tongue was or how it contacted your teeth to produce a specific sound, do you think you would be as accurate at making an /s/?

That and where provide additional information about the noun they modify, helping to create more detailed and informative text. We use "that" to give essential information about a noun, specifying which person, thing, or group you mean. We use "where" to give more information about a place, specifying the location or setting of an action or event.

93

A. Combine the sentences below as in the examples.

1. The seminar was insightful. He attended it last week.
2. The library is a peaceful place. She studies there every evening.
3. The neighborhood is very quiet. They moved there recently.
4. The documentary was very informative. We watched it in class.
5. The proposal was innovative. The team presented it at the meeting.
6. The laboratory has state-of-the-art equipment. They conduct their research there.
7. The mountain is a popular hiking destination. We climbed it last summer.
8. The manuscript was well-written. She submitted it for publication.
9. The restaurant has a wonderful ambiance. They celebrated their anniversary there.
10. The report was comprehensive. He completed it before the deadline.

94

CONCEPT VOCABULARY
synesthesia, neural pathways, neurologist, activate, involuntary stimulus, sensation, associate, pragmatic, neural connectivity trait, process, research



IMAGE MADE WITH GOOGLE AI

Anatomical Variants and Synesthesia

Can you see the words people speak? Do you associate sounds with specific colors? Synesthesia, or the union of the senses, refers to a neurologic state in which activation of one sensory pathway involuntarily triggers activation in a second sensory pathway. There are two major forms of synesthesia: associative and projective. In associative synesthesia, individuals with the trait may associate numbers, letters or shapes when a sensation pathway is stimulated, rather than just seeing it in their mind's eye. On the other hand, **those** with associative synesthesia may perceive a strong, involuntary connection between a stimulus and a sensation; having a sense that two stimuli must belong together. One commonly reported associative synesthesia form is the experience of numbers or letters which having an assigned color, referred to as graphemic synesthesia. People with graphemic synesthesia may also report remembering a telephone number or someone's name by **its** color representation.

95

Synesthesia was a popular research topic in the late nineteenth and early twentieth centuries and is experiencing a resurgence of interest these days. Although researchers have not yet reached a consensus, many scientists contend that synesthesia research is not just the result of an overactive imagination but has a structural basis in neural connectivity. Individuals experiencing synesthesia may have increased neural activation or additional neural connectivity within and between sensory cortical areas compared to others. Further research in the area of synesthesia may help gain insight into brain connectivity and how sensory information is normally processed (Hupé and Dojat 2015).

RUGGIERO, BARBARA F., IMAGINE FIRST: ... ANATOMY AND PHYSIOLOGY OF OPTICS AND HEARING, NEW YORK, TOWNE PUBLISHING, 2008, P. 271.

A. Read the text and answer the following questions.

1. What are the two major forms of synesthesia mentioned in the passage?
2. How do individuals with projecting synesthesia experience sensory stimuli differently from those with associative synesthesia?
3. What happens to the people with graphemic synesthesia?
4. Why do some scientists believe synesthesia has a neural basis?
5. What potential insights could further research on synesthesia provide to scientists?

96

Context Exercises

A. Mark the statements True (T) or False (F). Correct the false ones.

1. ( ) Synesthesia involves the involuntary triggering of a second sensory pathway when one sensory pathway is activated.
2. ( ) There are three major forms of synesthesia: associative, projecting, and projective.
3. ( ) Individuals with projecting synesthesia actually see colors, numbers, letters, or shapes when a sensation pathway is stimulated.
4. ( ) Associative synesthesia involves a voluntary connection between a stimulus and a sensation.
5. ( ) Graphemic synesthesia is a form of associative synesthesia where numbers and/or letters are associated with specific colors.

97

B. Ask questions for the given answers.

1. What kind of _____ ?

Those with associative synesthesia report a strong, involuntary connection between a stimulus and a sensation.

2. How _____ ?

People with graphemic synesthesia may describe remembering a telephone number or someone's name by its color representation.

3. When _____ ?

Synesthesia was a popular research topic in the late nineteenth and early twentieth centuries.

4. What _____ ?

Further research in the area of synesthesia may provide scientists with key insight into brain connectivity and how sensory information is normally processed.

98

Vocabulary Study

A. Find words in the text which mean the following.

1. Neurologic state where activation of one sensory pathway triggers another.
2. A form of synesthesia where individuals report seeing colors, numbers, letters, or shapes.
3. A form of synesthesia where there is a strong, involuntary connection between a stimulus and a sensation.
4. The experience of numbers and/or letters having an assigned color.
5. Increased neural activation or additional neural connectivity.
6. Refers to how sensory information is processed.
7. The combination or union of the senses.

99

B. Match the words with their meanings.

1. Synesthesia	a) The revival of interest or activity
2. Associative Synesthesia	b) The experience of numbers and/or letters having an assigned color.
3. Projecting Synesthesia	c) The state where activation of one sensory pathway involuntarily triggers another sensory pathway.
4. Graphemic Synesthesia	d) A form of synesthesia where individuals report actually seeing colors, numbers, letters, or shapes when a sensory pathway is stimulated.
5. Neural Connectivity	e) A form of synesthesia where there is a strong, involuntary connection between a stimulus and a sensation.
6. Resurgence	f) Agreement among scientists or researchers.
7. Consensus	g) The connection between neurons in the brain.
8. Stimulus	h) Something that causes a response in a sensory pathway.

100

C. Match the meaning with their opposites.

1. Activation	a) Rare
2. Involuntary	b) Dormancy
3. Increased	c) Reduction
4. Resurgence	d) Isolation
5. Popular	e) Disagreement
6. Structural	f) Voluntary
7. Connectivity	g) Non-structural
8. Consensus	h) Deactivation

D. Fill in the table below.

Noun	Adjective	Verb	Adverb
		associate	X
	specific		
activation			
		X	involuntarily

101

E. Fill in the blanks with the words from the table above.

1. The [1] _____ of neurons in the brain is crucial for cognitive functions such as memory and learning.
2. During the experiment, the researchers [2] _____ the exact conditions needed for the chemical reaction.
3. When discussing her research, she emphasized the importance of [3] _____ in her methods.
4. The company's success can be attributed to its strong [4] _____ with international partners.
5. He couldn't control his [5] _____ movements, which were a symptom of his condition.
6. To join the club, you must first become an [6] _____ member.
7. The teacher asked the students to [7] _____ which topics they found most difficult.
8. The immune response involves the [8] _____ of various cells to fight off infections.
9. The software needs to be [9] _____ before it can be used for data analysis.
10. She participated [10] _____ in the community service project, helping out every weekend.
11. The child's [11] _____ is blinking was a sign of a neurological disorder.

102

12. The scientist measured the [12] _____ of the enzyme to understand its role in metabolism.
13. The brain's [13] _____ networks are involved in processes such as pattern recognition.
14. He is an [14] _____ professor at the university, teaching part-time in the evenings.

Language Study

Subject Questions

Model: Atypical neural connections causes synesthesia.
Response: What causes synesthesia?

A. Write subject questions to the following statements as in the example above.

1. _____ ?

Synesthesia refers to this neurologic state.

2. _____ ?

Graphemic synesthesia is commonly reported as an associative form.

3. _____ ?

People with graphemic synesthesia may describe remembering such information by its color representation.

103

4. _____ ?

Synesthesia was a popular research topic in the late nineteenth and early twentieth centuries and is experiencing a resurgence of interest these days.

5. _____ ?

Individuals experiencing synesthesia may have increased neural activation or additional neural connectivity within and between sensory cortical areas compared to others.

Use of English

A. Rewrite the following sentences without a change in the meaning, using the given prompts.

1. Synesthesia, or the union of the senses, refers to a neurologic state where stimulation of one sensory pathway involuntarily triggers activation in a second sensory pathway.
Synesthesia, which _____
_____

2. In projecting synesthesia, individuals actually see colors, numbers, letters, or shapes when a sensation pathway is stimulated, rather than imagining it.
_____ perceive actual _____
_____

104

3. Many scientists argue that synesthesia is not merely a result of an overactive imagination but is rooted in neural connectivity.
According to _____
_____

4. Graphemic synesthesia occurs when numbers and/or letters are associated with specific colors.
_____ individuals associate _____
_____

TARGET VOCABULARY
agnosia, dry mouth, saliva, recognize, perception, movement, neglect, stimulus, sensation, radiation therapy, medication, dentures, hygiene, moisture, side effect

IMAGE MADE WITH GOOGLE AI

Agnosia

Neurons project from sensory cortex to higher-order areas to give humans a multimodal and integrated appreciation of our bodies in time and space. When these higher-order areas are damaged by causes such as traumatic brain injury or stroke, the deficits that arise are more than just simple sensory loss in one modality. **Agnosia** is a complex type of deficit known as agnosia, literally meaning "absence of knowledge." There are multiple types of agnosia, including **theses (1)** that prevent individuals from recognizing faces, specific sounds, smells, or even common objects. For example, *akinetopsia* is the inability to perceive visual movement, and individuals with *astereognosia* can recognize objects but are unable to describe them. But are unable to recognize **it (2)**. For example, an individual may accurately describe a dog to you but may call it **(2)** a "cat." In auditory forms of agnosia, an individual may have difficulty discriminating between environmental sounds, nonverbal auditory cues, and speech, even though hearing is completely normal.

106

A final and most peculiar type of agnosia is asteriognosia, more commonly referred to as the *left neglect* syndrome or neglect syndrome. Individuals with neglect syndrome have difficulty with the left-hand side of the left side of their body. They may wash and dress only the right side of their body, eat food from only one side of their plate, and acknowledge only people and stimuli on their right side. If a neglect patient is asked to draw a clock, they will draw all of the numbers on their left, with all of it moves into their right visual field. For patients with left neglect, the left side of their perceptual world simply does not exist (Squire etal 2013).

Xerostomia

Xerostomia is the perceived sensation of dry mouth and may range from a mild decrease in saliva, **which (4)** an individual finds annoying, to the complete loss of salivary production, harming health and quality of life. Xerostomia is a common side effect of radiation therapy but may also be associated with aging, Parkinson's disease, trauma to the oral cavity, Sjögren's syndrome, exposure to tobacco, or methamphetamine use or as a side effect to certain over-the-counter and prescription medications. Patients experiencing xerostomia find **it (5)** difficult to produce the amount of saliva necessary to chew, swallow, and properly digest food. Lack of saliva may even have an impact on the clarity of speech. Most importantly, dry mouth can lead to an increased risk of poor oral health, mouth sores, bad breath, and difficulty wearing dentures.

Some individuals may find relief by increasing water intake, chewing sugarless gum, maintaining oral hygiene and alcohol, and using over-the-counter dry mouth moisturizing fluid. Consistent and high-quality oral care is also imperative to maintain good oral hygiene and prevent oral disease (Parmenis et al 2014).

ROSSOMANDO, EDWARD F. ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING. NEW YORK: THIEME MEDICAL PUBLISHERS, 2018. PRINT.

107

A. Read the text and answer the following questions.

Agnosia

1. Why do neurons project from sensory cortex to higher-order areas?
2. What are some causes of damage to higher-order areas in the brain that can lead to agnosia?
3. How does associative visual agnosia differ from other types of visual agnosia?
4. What areas can auditory agnosia impact an individual's ability to process sounds?
5. What problem do individuals with neglect syndrome have?

Xerostomia

1. What is xerostomia?
2. How does xerostomia affect eating and speaking?
3. What can dry mouth cause?
4. Why is oral hygiene especially important for people with xerostomia?

108

Context Exercises

A. Mark the statements True (T) or False (F). Correct the false ones.

Agnosia

1. ( ) Neurons project from sensory cortex to higher-order areas to provide humans with a multimodal and integrated appreciation of our bodies in time and space.
2. ( ) Agnosia refers to a simple sensory loss in one modality due to damage to higher-order areas.
3. ( ) Akinetopsia is the inability to perceive visual movement.
4. ( ) Individuals with associative visual agnosia can recognize objects but are unable to describe them.
5. ( ) Astereognosis is also known as left neglect, left inattention, or neglect syndrome.

Xerostomia

1. ( ) Xerostomia is the perceived sensation of dry mouth and may range from mild to complete loss of salivary production.
2. ( ) Xerostomia is exclusively a side effect of radiation therapy.
3. ( ) Xerostomia makes it easier to chew, swallow, and digest food.
4. ( ) Lack of saliva due to xerostomia can impact the clarity of speech.
5. ( ) Dry mouth can lead to an increased risk of poor oral health, mouth sores, bad breath, and difficulty wearing dentures.

109

B. What do these words in the passage refer to?

1. those (1) refers to _____
2. it (2) refers to _____
3. it (2) refers to _____
4. which (4) refers to _____
5. it (5) refers to _____

Vocabulary Study

A. Find words in the text which mean the following.

Agnosia

1. Lack of knowledge.
2. Damage to the brain caused by external force.
3. The loss or reduction of the ability to perceive motion.
4. The ability to identify and understand stimuli through more than one sense.
5. An inability to recognize objects despite being able to describe them.

Xerostomia

1. A feeling or awareness of something.
2. A side effect of treatment with high-energy radiation.
3. A condition marked by dry mouth due to lack of saliva.
4. Disease that causes dry mouth and eyes.
5. Bad breath.

110

B. Match the meaning with their opposites.

1. Integrated	a) Presence
2. Damage	b) Easy
3. Absence	c) Increase
4. Normal	d) Ability
5. Peculiar	e) Typical
6. Inability	f) Excellent
7. Difficulty	g) Separated
8. Decrease	h) Repair
9. Poor	i) Common
10. Avoid	j) Engage

111

C. Fill in the table below.

Noun	Adjective	Verb	Adverb
appreciation			
		X	accurately
sensation		X	X
	X	maintain	X

D. Fill in the blanks with the words from the table above.

1. The artist's work received widespread _____ for its beauty and depth.
2. To _____ the equipment in good condition, regular servicing is required.
3. The _____ of the temperature readings is crucial for the experiment's success.
4. Oscar described the event as _____ due to its extraordinary impact.
5. My sister smiled _____ when she received the unexpected gift.

112

Language Study

1. First Conditional

- When the result of a certain condition is **likely to happen at present or in the near future**, and when both the result and the condition are real, we use the first conditional (Type 1).
- As the result is not **certain but probable**, use "**will**" or "**modals**" in the result/ main clause, and "**the simple present tense**" in the conditional/if clause.

Read this sentence from the passage:

"It is not uncommon for patients with left neglect to be literally surprisingly their own left arm if it moves into their right visual field."

A. Choose the correct form of the verb in brackets to complete each first conditional sentence.

1. If it (*will be*) _____ sunny, we (*go/will go*) _____ for a walk on Sunday.
2. Tony (*will be*) _____ very happy if he (*gets/will get*) _____ the job at university.
3. If they (*don't/doesn't*) _____ hurry, they (*miss/will miss*) _____ the train.
4. You (*are/will be*) _____ hungry later, if you (*don't/doesn't*) _____ eat breakfast in the morning.
5. If we (*take/will take*) _____ the car, we (*arrive/will arrive*) _____ faster there.

113

2. Adjective + to + verb infinitive

Read this sentence from the passage:

- "Patients experiencing xerostomia find it difficult to produce the amount of saliva necessary to chew, swallow, and properly digest food."

Model: (tired, work)
Response: I'm too tired to work more. I think I'll go to bed.

B. Create sentences using the given adjectives and verb infinitives according to the example.

1. (anxious, start) _____
2. (glad, help) _____
3. (willing, participate) _____
4. (afraid, admit) _____
5. (proud, achieve) _____

114

Use of English

A. Rewrite the sentences using the correct verb infinitive form.

1. It is impossible for him to finish the project on time.
He is impossible _____ the project on time.
2. She is not willing to accept the offer.
She is unwilling _____ the offer.
3. They are able to solve the problem quickly.
They are capable _____ the problem quickly.
4. He is eager to start his new job.
He is enthusiastic _____ his new job.
5. It is essential to follow the safety guidelines.
It is necessary _____ the safety guidelines.

115

TOPIC 7 VOCABULARY
deafness, high-frequency hearing loss, high-frequency sensorineural, hypersensitivity, ringing, background noise, exposure, risk, sensitivity, protect, preserve, exercise, tinnitus



IMAGE MADE WITH KOSOVA AI

Hearing and Aging: Presbycusis

Damage to the round-transducing cochlear hair cells can be caused by exposure to intense sounds, such as loud music during a concert, jet engines, gunfire, or even listening to music through headphones at excessively loud volumes. However, hair cells can also be damaged through repeated exposure to less intense sounds over long periods of time. This is called presbycusis. Presbycusis, or the presbycusis, consists of a loss of hair cell sensitivity beginning near the oval window. The hair cells nearest the oval window are responsible for encoding high-frequency sounds. Therefore, the first symptom of presbycusis is presbycusis. Presbycusis is the most common type of sensorineural hearing loss. It occurs bilaterally, meaning both ears are usually affected. Presbycusis can begin as early as 40 years of age. Individuals with presbycusis often complain of difficulty understanding speech over the phone, when the speaker is using a microphone in a large lecture hall, or when there is extensive background noise.

TAP

However, individuals may have no difficulty in one-on-one conversations in quiet environments. The best way to prevent presbycusis is to protect your ears by using noise-canceling headphones or earplugs when exposed to loud sounds. Although not terribly fashionable in some cases, wearing ear protection during your lifetime is vital for preserving the integrity of your auditory system. Protect those hair cells! Presbycusis is the most common type of sensorineural hearing loss. It occurs bilaterally, meaning both ears are usually affected. Presbycusis can begin as early as 40 years of age. Individuals with presbycusis often complain of difficulty understanding speech over the phone, when the speaker is using a microphone in a large lecture hall, or when there is extensive background noise. PROTECT THOSE HAIR CELLS!

TAP

Context Exercises

A. Answer the questions given below.

1. What are some sources of intense sounds that can damage cochlear hair cells?

2. Describe how presbycusis affects an individual's ability to hear high-frequency sounds.

3. Explain the difference between hearing loss caused by intense sounds and hearing loss caused by repeated exposure to less intense sounds.

117

4. Why is it important to protect your ears from loud sounds throughout your lifetime?

5. How does age-related hearing loss, or presbycusis, begin and where does it primarily affect the cochlea?

6. What are the common challenges that individuals with presbycusis face in everyday situations?

7. What measures can individuals take to prevent or minimize the risk of presbycusis?

8. Discuss the role of high-frequency sounds in understanding speech and how their loss can impact communication.

9. How do noise-canceling headphones or earplugs contribute to ear protection?

10. In what ways can background noise affect speech comprehension for someone with presbycusis?

118

B. Answer the following questions.

1. What can cause damage to cochlear hair cells?

2. What kind of hearing loss begins around the age of 40?

3. Which type of sounds are the cochlear hair cells near the oval window responsible for encoding?

4. What is the most common type of sensorineural hearing loss?

5. Where does presbycusis typically start affecting the cochlear hair cells?

6. When can damage to hair cells occur?

7. In which environments do people with presbycusis often have difficulty understanding speech?

119

8. What is one way to protect your ears from damage?

9. How does presbycusis affect understanding speech over the phone?

10. Why might ear protection be considered important despite its fashion?

C. Mark the statements True (T) or False (F). Correct the false ones.

1. ( ) Presbycusis is a type of hearing loss that begins around the age of 30.
2. ( ) Hair cells near the oval window encode high-frequency sounds.
3. ( ) Repeated exposure to loud sounds over a lifetime can cause damage to hair cells.
4. ( ) People with presbycusis often have difficulty understanding speech in quiet environments.
5. ( ) Presbycusis affects hearing bilaterally, meaning both ears are usually affected.
6. ( ) Presbycusis is the most common type of conductive hearing loss.
7. ( ) Using earplugs during loud events can help prevent damage to hair cells.
8. ( ) High-frequency sound loss is critical for understanding consonants.
9. ( ) Damage to hair cells only occurs from exposure to very loud sounds.
10. ( ) Presbycusis typically begins with a loss of low-frequency hearing.

120

Language Study

A. Find words in the first part which mean the following:

1. To lessen carefully to something (Verb)

2. Sounds that are very loud (Adjective)

3. The ability to hear (Noun)

4. A type of hearing loss that occurs with age (Noun)

5. A small part or section of something (Noun)

6. Protective devices worn to reduce noise exposure (Noun)

121

7. The gradual process of getting older (Noun)

8. To keep something safe from harm (Verb)

9. Sound that is not very strong or powerful (Adjective)

10. The occurrence of something happening repeatedly (Adjective)

122

B. Fill in the blanks with words from the list.

presbycusis	cochlear	high-frequency	sensorineural	exposure	
damage	intense	protect	understanding	noise	

1. _____ is a type of hearing loss that typically begins around the age of 40.
2. Repeated _____ to loud sounds can cause harm to the hearing system.
3. The _____ hair cells are crucial for encoding high-frequency sounds.
4. People with _____ hearing loss often have difficulty in noisy environments.
5. Prolonged _____ to less intense sounds can also lead to hearing issues.
6. _____ can result from exposure to loud music, jet engines, or gunfire.
7. Using earplugs or noise-canceling headphones helps to _____ your ears.
8. High-frequency sound information is vital for _____ speech clearly.
9. _____ sounds can damage the delicate structures of the ear.
10. The _____ of hearing loss due to aging starts near the oval window.

123

C. Complete the following sentences with conjunctions given below.

because	when	although	such as	if	
or	but	and	because of	however	

1. Damage to the cochlear hair cells can be caused by exposure to intense sounds, _____ loud music during a concert, jet engines, gunfire, _____ listening to music through headphones at excessively loud volumes.
2. Age-related hearing loss, or presbycusis, consists of a loss of hair cell sensitivity beginning near the oval window _____ the hair cells nearest the oval window are responsible for encoding high-frequency sounds.
3. Presbycusis is the most common type of sensorineural hearing loss, _____, it occurs bilaterally, _____ it begins around 40 years of age.
4. Individuals with presbycusis often complain of difficulty understanding speech over the phone, _____ the speaker is using a microphone in a large lecture hall, _____ when there is extensive background noise.
5. The best way to prevent presbycusis is to protect your ears by using noise-canceling headphones or earplugs _____ exposure to loud sounds.
6. Although not terribly fashionable in some cases, _____ wearing ear protection during your lifetime is vital for preserving the integrity of your auditory system.

124

7. People with presbycusis often complain of difficulty understanding speech in noisy environments, _____ they may have no difficulty in one-on-one conversations in quiet environments.
8. Damage to cochlear hair cells can be caused by exposure to intense sounds, _____ repeated exposure to less intense sounds over long periods of time can also cause damage.
9. Presbycusis begins around the age of 40, _____ the loss of high-frequency information can make it challenging to understand speech.
10. Using noise-canceling headphones or earplugs helps to protect your ears, _____ these measures are crucial for preventing hearing loss.

125

Use of English

A. Rewrite the following sentences without changing their meaning.

1. Presbycusis is a common hearing problem. It usually starts around age 40.

2. Loud sounds can damage hearing. Examples include concerts and gunfire.

3. The hair cells near the oval window help us hear high sounds. These are important for understanding speech.

4. People with presbycusis have trouble hearing in noisy places. They can still hear well in quiet places.

5. Using earplugs can protect your ears. This helps prevent hearing loss.

126

6. Hearing loss from loud sounds happens quickly. Hearing loss from quiet sounds happens slowly.

7. Presbycusis affects the cells near the oval window. These cells help us hear high sounds.

8. Noise-canceling headphones reduce outside noise. They protect your hearing.

9. High-frequency sounds are important for understanding speech. Losing these sounds makes speech harder to understand.

10. Protecting your ears is important for hearing health. You can use earplugs or noise-canceling headphones.

127

13

TARGET VOCABULARY

amplify, basilar membrane, cochlear amplifier, conformational change, cytoskeleton, efferent, excitability, inner hair cell (IHC), kanamycin, otoacoustic emissions, outer hair cell (OHC), sensitivity, tune

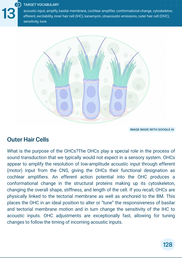


IMAGE MADE WITH GOOGLE AI

Outer Hair Cells

What is the purpose of the OHCs?The OHCs play a special role in the process of sound transduction that we typically would not expect in a sensory system. OHCs appear to amplify the resolution of low-amplitude acoustic input through efferent (motor) input from the ENS, giving the OHCs their functional designation as *cochlear amplifiers*. An efferent action potential into the OHC produces a *conformational change* in the structural proteins making up its cytoskeleton, changing the overall shape, stiffness, and length of the cell. If you recall, OHCs are physically linked to the tectorial membrane as well as anchored to the BM. This places the OHC in an ideal position. Any change in the relationship between the tectorial membrane and basilar membrane motion and in turn change the sensitivity of the IHC to acoustic inputs. OHC adjustments are exceptionally fast, allowing for tuning changes to follow the timing of incoming acoustic inputs.

128

The discovery of this tuning system was based on clinical research that demonstrated reduced IHC sensitivity when individuals were administered a powerful antibiotic known as kanamycin, an ototoxic agent that damages OHCs but not IHCs. IHC sensitivity changes could therefore be said to be due to the OHCs and a role in adjusting the sensitivity of the BM. A second line of evidence for the tuning role of OHCs is that spontaneous emissions of faint tones, otoacoustic emissions, or spontaneous otoacoustic emissions in an extremely sensitive microphone is placed withinthe ear canal, in roughly 50 to 70% of individuals. It is possible to record the spontaneous production of faint tones. The mechanism behind the OHCs' tuning function appears to be related to excitability changes to the internal potential of the cell through efferent inputs. It does not appear that processes using cellular metabolic products such as ATP are involved in this activity.

RUDOLPH BUTTIGLIERI, BEGINNING PHYSIC I, ANATOMY AND PHYSIOLOGY OF SPEECH AND HEARING, NEW YORK: THEME PUBLISHERS, 2018, P. 291

Context Exercises

A. Answer the questions given below.

1. What do OHCs help with in hearing?

_____

2. How do OHCs make quiet sounds louder?

_____

3. What happens to OHCs when they receive an efferent action potential?

_____

4. What are OHCs connected to in the ear?

_____

129

5. How do OHCs affect IHCs?

_____

6. What did the research show about IHCs and Kanamycin?

_____

7. What is spontaneous otoacoustic emission?

_____

8. How can a sensitive microphone help study OHCs?

_____

9. What does the tuning of OHCs involve?

_____

10. Is ATP used in the OHCs' tuning function?

_____

B. Ask questions for the given answers.

1. _____ ?

Answer: OHCs help us hear quiet sounds better.

2. _____ ?

Answer: OHCs are called cochlear amplifiers.

130

3. _____ ?

Answer: Kanamycin harms OHCs.

4. _____ ?

Answer: A special microphone can record faint sounds.

5. _____ ?

Answer: OHCs change their shape, stiffness, and length.

C. Mark the statements True (T) or False (F). Correct the false ones.

1. ( ) OHCs help us hear quiet sounds better.
2. ( ) OHCs make loud sounds quieter.
3. ( ) Kanamycin harms IHCs.
4. ( ) OHCs change their shape when they get an efferent action potential.
5. ( ) A sensitive microphone can record loud sounds from the ear canal.
6. ( ) OHCs are connected to the tectorial membrane and the basilar membrane.
7. ( ) ATP is involved in the OHCs' tuning function.
8. ( ) Spontaneous otoacoustic emissions are faint sounds that can be recorded.
9. ( ) OHCs are not important for hearing sensitivity.
10. ( ) The tuning of OHCs helps adjust how we hear different sounds.

131

Language Study

A. Find words in the first part which mean the following.

1. A special job

_____

2. To make something louder or stronger

_____

3. The way something is made

_____

4. A soft layer in the ear

_____

5. How well something reacts

_____

6. A medicine to fight germs

_____

7. A quiet sound that can be recorded

_____

132

8. To change or adjust something

_____

9. A small change in shape

_____

10. A part that sends signals in the body

_____

B. Fill in the blanks with words from the list.

amplify	sensitivity	role	structure	membrane	efferent
antibiotic	emission	tune	conformational		

1. OHCs have a special _____ in the hearing process.
2. The _____ of the ear's soft layer helps in hearing.
3. OHCs _____ low amplitude sounds to make them louder.
4. The _____ of the OHCs helps them to adjust their shape.
5. _____ changes in the OHCs help them to respond quickly.
6. Kanamycin is a type of _____ that can damage OHCs.
7. A _____ is a quiet sound that can be recorded in the ear.
8. OHCs' _____ to improve hearing and respond to different sounds.
9. The _____ of the OHCs is important for their function.
10. The _____ pathway helps carry signals from the brain to the ear.

133

C. Read the sentences below from the passage and determine if they are in passive voice. Write "Yes" if it is passive voice, and "No" if it is not.

1. ( ) OHCs are physically linked to the tectorial membrane as well as anchored to the BM.
2. ( ) Kanamycin is a powerful antibiotic known as ototoxic agent.
3. ( ) OHCs play a special role in the process of sound transduction.
4. ( ) IHC sensitivity changes could therefore be altered only if the OHC had a role in adjusting the sensitivity of the BM.
5. ( ) The mechanism behind the OHCs' tuning function appears to be related to excitability changes.
6. ( ) A sensitive microphone can record the spontaneous production of faint tones.
7. ( ) The tuning of OHCs helps adjust how we hear different sounds.
8. ( ) OHC adjustments are exceptionally fast, allowing for tuning changes to follow the timing of incoming acoustic inputs.
9. ( ) An efferent action potential into the OHC produces a conformational change in the structural proteins making up its cytoskeleton.
10. ( ) Processes using cellular metabolic products such as ATP are involved in this activity.

134

Use of English

Example:

Original: The space around the magnets is called a magnetic field. Their effects are felt there.

Response: The space around the magnets, where their effects are felt, is called a magnetic field.

Sentences:

1. The OHCs play a special role in the process of sound transduction. We typically would not expect this in a sensory system.

_____

2. OHCs amplify the resolution of low-amplitude acoustic input. This happens through efferent (motor) input from the CNS.

_____

3. An efferent action potential into the OHC produces a conformational change in the structural proteins. These proteins make up its cytoskeleton.

_____

135

4. The OHC is physically linked to the tectorial membrane and anchored to the BM. This places the OHC in an ideal position.

_____

5. The OHC can alter the responsiveness of basilar and tectorial membrane motion. This changes the sensitivity of the IHC to acoustic inputs.

_____

6. Kanamycin is a powerful antibiotic known as an ototoxic agent. It damages OHCs but not IHCs.

_____

7. It is possible to record the spontaneous production of faint tones. This happens if an extremely sensitive microphone is placed within the ear canal.

_____

8. The tuning role of OHCs appears to be related to excitability changes. These changes affect the internal potential of the cell through efferent inputs.

_____

136

9. OHC adjustments are exceptionally fast. They allow for tuning changes to follow the timing of incoming acoustic inputs.

_____

10. Spontaneous otoacoustic emissions can be recorded in roughly 50 to 70% of individuals. These emissions are faint tones.

_____

137

TARGET VOCABULARY
cochlear implant, cochlear, electrical impulse, environmental sounds, external component, frequency, implant, internal component, microphone, neurophysiologist, receiver, sensorineural hearing loss, signal processor, transducer



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Cochlear Implants

Cochlear implants (CIs) have been a successful neuroprosthetic means of restoring partial hearing to children and adults with profound or complete sensorineural hearing loss. Cochlear implants have two main components, one that sits externally on the ear and a second internal component that is surgically placed under the skin and threaded into the cochlea of the implanted ear. The external component of the implant usually consists of a microphone that receives sound, a signal processor that filters and boosts the strength of the signal, and a transmitter and receiver system for conveying the processed sound to a their electrode array. At the electrode array, electrical impulses operate to stimulate auditory nerve afferent terminals, thus creating neural transduction centrally. The electrode arrays are constructed so that they span the entire length of the basilar membrane, providing electrical stimulation across a wide range of frequencies.

It is important to remember that CIs do not restore normal hearing. The process of normal sound transduction involves the coordinated activity of literally thousands of hair cells. The best a CI can do is replace a tiny fraction of those hair cell inputs. Therefore, even though CIs can help to achieve good speech recognition and comprehension in person or on the telephone, as well as improve their ability to detect environmental sounds, CIs do not restore normal hearing completely. CIs do go through a period of training to learn how to discriminate these new inputs into meaningful sounds. Individuals with CIs may achieve good speech recognition

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Context Exercises

A. Answer the questions given below.

1. What are cochlear implants (CIs) used for?

2. How many main components do cochlear implants have?

3. Where is the internal component of a cochlear implant placed?

4. What does the microphone in a cochlear implant do?

5. What is the role of the signal processor in a cochlear implant?

6. How do the electrical impulses in a cochlear implant operate?

7. Do cochlear implants restore normal hearing completely?

8. What must individuals with CIs do after the surgical procedure?

9. Can individuals with CIs achieve good speech recognition on the telephone?

10. How is the electrode array in cochlear implants designed?

B. Ask questions for the given answers.

1. _____ ?
Answer: Cochlear implants (CIs) are used for restoring partial hearing to children and adults with profound or complete sensorineural hearing loss.

2. _____ ?
Answer: Cochlear implants have two main components.

3. _____ ?
Answer: The internal component of a cochlear implant is surgically placed under the skin and threaded into the cochlea of the implanted ear.

4. _____ ?
Answer: The microphone in a cochlear implant records sound.

5. _____ ?
Answer: The signal processor in a cochlear implant filters and boosts the strength of the signal.

6. _____ ?
Answer: The electrical impulses in a cochlear implant operate to stimulate auditory nerve afferent terminals, thus initiating sound transmission centrally.

7. _____ ?
Answer: No, cochlear implants do not restore normal hearing completely.

8. _____ ?
Answer: After the surgical procedure, individuals with CIs must go through a period of training to learn how to discriminate these new inputs into meaningful sounds.

9. _____ ?
Answer: Yes, individuals with CIs may be able to achieve good speech recognition on the telephone.

10. _____ ?
Answer: The electrode array in cochlear implants is designed to span the entire length of the basilar membrane, providing electrical stimulation across a wide range of frequencies.

Language Study

A. Mark the statements True (T) or False (F). Correct the false ones.

1. ( ) Cochlear implants are used for restoring partial hearing.
2. ( ) Cochlear implants have two main components.
3. ( ) The microphone in a cochlear implant is placed outside the ear.
4. ( ) The microphone in a cochlear implant records sound.
5. ( ) The signal processor in a cochlear implant makes the sound stronger.
6. ( ) Electrical impulses in a cochlear implant help to send sound to the brain.
7. ( ) Cochlear implants give normal hearing.
8. ( ) People with cochlear implants need training after surgery.
9. ( ) The electrode array in cochlear implants covers the whole basilar membrane.
10. ( ) Cochlear implants can help people understand speech on the phone.

B. Find words in the first part which mean the following.

1. Very great or intense

2. A small device put into the body to help a medical condition

3. A device that picks up sound

4. To increase the strength or amount of something

5. To send something across space

6. The internal part of the ear shaped like a snail

7. Extremely small

8. The small structures in the ear that detect sound

9. Related to nerves that send information to the brain

10. The ability to understand speech

C. Fill in the blanks with words from the list.

microphone	signal processor	electrode array	cochlea
frequencies	partial	training	surgery	boost	hair cells

1. Cochlear implants have a _____ that records sound.
2. The _____ filters and boosts the strength of the signal.
3. The internal component is placed under the skin and threaded into the _____.
4. The _____ spans the entire length of the basilar membrane.
5. Electrical impulses provide stimulation across a wide range of _____.
6. Cochlear implants help in restoring _____ hearing.
7. Individuals with CIs must go through a period of _____ after surgery.
8. CIs involve a surgical procedure known as _____.
9. Cochlear implants _____ the strength of the signal.
10. The process of normal sound transduction involves many _____.

D. Complete the sentences using relative clauses from the text. Use the information provided to form sentences similar to the examples below.

Example:
Original: The microphone records sound.
With Relative Clause: The microphone **that** records sound is an important part of the cochlear implant.

1. The internal component is placed under the skin and threaded into the cochlea.

2. Cochlear implants have two main components.

3. The signal processor filters and boosts the strength of the signal.

4. Electrical impulses operate to stimulate auditory nerve afferent terminals.

5. The electrode arrays span the entire length of the basilar membrane.

6. Individuals with CIs must go through a period of training.

7. The cochlea is a part of the ear that is threaded into.

8. The microphone records sound.

9. The procedure involves surgery.

10. The process of normal sound transduction involves the activity of many hair cells.

E. Rewrite the following sentences according to the example.

Example:
Original Sentence: The space around the magnets is called a magnetic field. Their effects are felt there.
Response: The space around the magnets, where their effects are felt, is called a magnetic field.

1. Cochlear implants have two main components. One is the microphone.

2. The internal component is placed under the skin. It is threaded into the cochlea.

3. The signal processor filters and boosts the strength of the signal. It is an important part of the cochlear implant.

4. Electrical impulses operate to stimulate auditory nerve terminals. They initiate sound transmission centrally.

5. The electrode array spans the entire length of the basilar membrane. It provides stimulation across a wide range of frequencies.

6. Individuals with CIs must go through a period of training. They learn to discriminate new inputs into meaningful sounds.

7. Cochlear implants do not restore normal hearing. They only replace a tiny fraction of hair cell inputs.

8. The cochlea is threaded into by the internal component. It is an important part of the ear.

9. The procedure is known as surgery. It is necessary for placing the cochlear implant.

10. The process of normal sound transduction involves many hair cells. This process is different from what cochlear implants can achieve.

The Content-Based Language Teaching Approach—one of the effective methods frequently used in English for Specific Purposes (ESP) courses—and, in particular, the Topic-Based Teaching Model, aim to develop students' language skills in professional and academic contexts by focusing on situations they will encounter in the real world. This approach assumes that language teaching must be tailored to the specific language and communication needs of individual students and that particular attention must be paid to the context in which they use English.

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CAPPADOCIA UNIVERSITY

Nevşehir Campuses:

Mustafapaşa - Uçhisar - Ürgüp

Tel: 0384 353 5009 (pbx) Fax: 0384 353 5125

Sabiha Gökçen Campus:

Şeyhli, Bol Ahenk Sk. No:2, 34912 Pendik

Tel: 0216 588 0010 (pbx) Fax: 0216 588 0012

info@kapadokya.edu.tr

9 786255 463098