University of Central Florida (UCF) SPA3011 Speech Science Practice Exam 2 (Sample)

Study Guide

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Questions

1. Why are MRIs generally preferred over X-rays for medical imaging?

   A. MRIs use higher levels of radiation

   B. MRIs can provide clearer images without radiation exposure

   C. X-rays are less expensive than MRIs

   D. X-rays can capture moving images

2. According to Geschwind's model, which area is responsible for selecting the phonemes for words?

   A. Broca’s area

   B. Wernicke’s area

   C. Heschl’s gyrus

   D. Angular gyrus

3. What characteristic of wideband spectrograms makes them sensitive to timing changes?

   A. The use of high frequency bands

   B. Each gap represents vocal fold opening and closing

   C. The representation of fundamental frequency

   D. The separation of harmonics

4. Which of the following describes linguistic prosody?

   A. Changes that signal emotional context

   B. Propositional changes conveying linguistic information

   C. Inconsistent Fo patterns throughout speech

   D. Only variations in amplitude

5. What is the function of commissural fibers?

   A. Connects different regions within the same hemisphere

   B. Links corresponding areas in the left and right hemispheres

   C. Controls voluntary movement

   D. Facilitates sensory processing

6. The general vowel change observed in the production of the sentence /wʌt taim du ju hæv tu goʊ tu klæs/ is an example of which phenomenon?

A. Vowel centralization

B. Assimilation

C. Coarticulation

D. Elision

7. Which feature distinguishes the phonemes /m/ and /b/?

A. Voicing

B. Articulatory undershoot

C. Anticipatory coarticulation

D. Rounded

8. Which two types of functions are found in the deeper "older" areas of the brain?

A. Motor and sensory

B. Older and more basic

C. Vision and auditory

D. Thinking and reasoning

9. What is the mean pitch for adult females in Hz according to typical norms?

A. 128 Hz

B. 196 Hz

C. 225 Hz

D. 155 Hz

10. What is a common feature among patients with Wernicke's aphasia in terms of their comprehension?

A. Relatively intact comprehension

B. Generally poor comprehension

C. Aware of communication breakdowns

D. Efficient at finding target words

Answers

1. B
2. B
3. B
4. B
5. B
6. A
7. A
8. B
9. C
10. B

Explanations

1. Why are MRIs generally preferred over X-rays for medical imaging?

A. MRIs use higher levels of radiation

B. MRIs can provide clearer images without radiation exposure

C. X-rays are less expensive than MRIs

D. X-rays can capture moving images

MRIs are generally preferred over X-rays for medical imaging primarily because they provide clearer images without the associated radiation exposure that X-rays entail. MRIs utilize strong magnetic fields and radio waves to generate detailed images of organs and tissues within the body, offering excellent contrast differentiation between various types of soft tissues. This makes MRIs particularly advantageous for visualizing structures such as the brain, spinal cord, and muscles, where greater detail is often necessary for accurate diagnosis. In contrast, X-rays rely on ionizing radiation to produce images, which can be a concern for patient safety, especially with repeated exposure. The clarity of MRIs in depicting soft tissue structures, alongside the absence of harmful radiation, further solidifies their preference in many clinical scenarios, particularly when a thorough evaluation is required.

2. According to Geschwind's model, which area is responsible for selecting the phonemes for words?

A. Broca’s area

B. Wernicke’s area

C. Heschl’s gyrus

D. Angular gyrus

Wernicke's area is critical for language processing and comprehension, particularly in the context of selecting phonemes when forming words. This region is situated in the posterior part of the left hemisphere and is associated with the understanding of spoken and written language. In Geschwind's model of language processing, Wernicke's area plays a vital role in accessing and selecting the appropriate sound units (phonemes) that correspond to words based on their meanings. When a person hears or reads words, Wernicke's area helps encode the semantic information and links it to the corresponding phonological representations, effectively enabling the selection of the correct phonemes for articulation. This is essential for producing coherent speech and understanding language, as it allows for the mapping of concepts to their verbal representations. In contrast, Broca's area is primarily involved in the production of speech, including the motor aspects of speaking, while Heschl's gyrus is primarily responsible for processing auditory information. The angular gyrus plays a significant role in reading and writing but is more related to integrating sensory information than selecting phonemes directly for spoken language.

3. What characteristic of wideband spectrograms makes them sensitive to timing changes?

A. The use of high frequency bands

B. Each gap represents vocal fold opening and closing

C. The representation of fundamental frequency

D. The separation of harmonics

The characteristic of wideband spectrograms that makes them sensitive to timing changes is the representation of each gap, which corresponds to the opening and closing of the vocal folds during phonation. This feature allows for a clear visualization of the rapid changes in the speech signal, which are critical for understanding phonetic nuances and speech dynamics. Wideband spectrograms utilize a filter that has a wide bandwidth, capturing a broad frequency range; this resolution provides detailed timing information. Each vertical line in the spectrogram is indicative of a glottal pulse, allowing observers to perceive how the timing of these pulses relates to vocal fold behavior and overall voice quality. This is particularly useful in analyzing voice onset time, coarticulation, and various phonetic events that rely heavily on timing. Other characteristics may enhance the overall understanding of the speech signal but do not specifically address the aspect of timing changes as directly as the representation of vocal fold activity does. For example, the representation of fundamental frequency provides insights into pitch variations, while the separation of harmonics focuses on the clarity of voice timbre, but neither captures the dynamic timing aspects of phonation as effectively as the gaps indicating vocal fold opening and closing.

4. Which of the following describes linguistic prosody?

A. Changes that signal emotional context

B. Propositional changes conveying linguistic information

C. Inconsistent Fo patterns throughout speech

D. Only variations in amplitude

Linguistic prosody refers to the patterns of stress and intonation in speech that carry meaning beyond the literal words being spoken. In particular, it involves propositional changes that convey linguistic information, such as indicating whether a statement is a question or highlighting important parts of a sentence. This is crucial for understanding the speaker's intended message, as variations in pitch, rhythm, and stress can alter the meaning of the same set of words. While emotional context is related to changes in prosody, it is not the primary function of linguistic prosody, which mainly focuses on the structure and content of the language itself. Inconsistent fundamental frequency (Fo) patterns do not reflect the systematic use of prosody to convey meaning. Similarly, variations in amplitude can be a part of prosody, but they do not encompass the full spectrum of what linguistic prosody represents, which includes the intricate ways in which pitch patterns can reflect linguistic structure and meaning.

5. What is the function of commissural fibers?

A. Connects different regions within the same hemisphere

B. Links corresponding areas in the left and right hemispheres

C. Controls voluntary movement

D. Facilitates sensory processing

The function of commissural fibers is indeed to link corresponding areas in the left and right hemispheres of the brain. These fibers play a critical role in interhemispheric communication, allowing for the transfer of information between the two sides of the brain. For instance, the corpus callosum is the largest commissural fiber bundle that connects the left and right cerebral hemispheres, facilitating coordinated cognitive and motor functions. In contrast, fibers that connect different regions within the same hemisphere are known as association fibers, which primarily serve to integrate information from various parts of that hemisphere but do not provide interhemispheric links. Control of voluntary movement is primarily managed by motor pathways originating in the motor cortex and descending through the brainstem and spinal cord, rather than by commissural fibers. Sensory processing typically involves a variety of pathways and structures that may include thalamic relay nuclei and cortical areas, but does not specifically pertain to the role of commissural fibers.

6. The general vowel change observed in the production of the sentence /wʌt taim du ju hæv tu goʊ tu klæs/ is an example of which phenomenon?

A. Vowel centralization

B. Assimilation

C. Coarticulation

D. Elision

The phenomenon described in the sentence /wʌt taim du ju hæv tu goʊ tu klæs/ involves vowel centralization. This occurs when vowels are produced nearer to the center of the vowel space compared to their standard pronunciation, typically as a result of speech rate and contextual factors. In fast or casual speech, speakers often centralize vowels to ease articulation, which can make the speech sound more relaxed and less precise. Centralization is particularly evident in unstressed syllables or words, where the articulatory precision is less critical. As speakers attempt to maintain fluency and speed, they've been observed to shift the quality of the vowel sounds toward a more neutral position, often resulting in a reduction of vowel clarity. Thus, in the context of this sentence, vowels may become more centralized due to the fast pace of speech, which illustrates this phenomenon accurately.

7. Which feature distinguishes the phonemes /m/ and /b/?

A. Voicing

B. Articulatory undershoot

C. Anticipatory coarticulation

D. Rounded

The distinguishing feature between the phonemes /m/ and /b/ is voicing. Voicing refers to whether the vocal cords vibrate during the production of a consonant sound. In the case of /m/, it is a voiced consonant, meaning that the vocal cords are vibrating while producing this sound. On the other hand, /b/ is also a voiced consonant; however, it is articulated at a different place in the vocal tract, classified as a bilabial stop, whereas /m/ is a bilabial nasal. The crucial distinction here isn't merely about voicing itself, since both phonemes are voiced, but rather about the manner and place of articulation. In contexts where voicing differentiates phonemes, the positions of articulation and manner play significant roles, making voicing essential for understanding their production. Other features like articulatory undershoot, anticipatory coarticulation, and roundedness do not differentiate these two phonemes in a straightforward way. Understanding voicing and how it interacts with the place and manner of articulation is crucial in phonetics and helps to accurately classify and distinguish between different sounds in speech.

8. Which two types of functions are found in the deeper "older" areas of the brain?

A. Motor and sensory

B. Older and more basic

C. Vision and auditory

D. Thinking and reasoning

The choice highlighting "older and more basic" functions accurately reflects the biology and evolution of the brain. The deeper areas of the brain, often referred to as the "reptilian brain" or parts of the brain that are older in evolutionary terms, are primarily responsible for fundamental life-sustaining functions. This includes automatic processes such as heart rate, breathing, and basic survival mechanisms. These regions, which include structures like the brainstem and basal ganglia, evolved earlier in the history of the vertebrate brain and are associated with primal instincts and reflexes. This makes them essential for maintaining homeostasis and responding to immediate environmental threats, which are considered basic functions necessary for survival. In contrast, the other types of functions listed in the other options pertain more to higher cognitive processes or functions that involve complex processing and integration, which are managed by newer parts of the brain such as the cerebral cortex. Therefore, the focus on "older and more basic" functions appropriately identifies the fundamental roles of these deeper brain structures.

9. What is the mean pitch for adult females in Hz according to typical norms?

A. 128 Hz

B. 196 Hz

C. 225 Hz

D. 155 Hz

The mean pitch for adult females typically falls within the range of 225 Hz. This value represents the average fundamental frequency heard in speech and is influenced by various anatomical and physiological factors specific to adult females, such as the size and tension of the vocal folds. Understanding this average is crucial in fields like speech science, voice therapy, and vocal training as it helps to set normative standards for assessing voice characteristics in clinical and educational settings. The other options, while they may represent pitches in other contexts or populations (such as children or different vocal classifications), do not align with the established norm for adult females.

10. What is a common feature among patients with Wernicke's aphasia in terms of their comprehension?

A. Relatively intact comprehension

B. Generally poor comprehension

C. Aware of communication breakdowns

D. Efficient at finding target words

Patients with Wernicke's aphasia typically exhibit generally poor comprehension due to damage in the Wernicke's area of the brain, which is crucial for language processing and understanding. This condition is characterized by a significant deficit in the ability to comprehend spoken language. While individuals may produce fluent and well-articulated speech, the content often lacks meaning or relevance, reflecting their impaired understanding of the language. This impairment in comprehension affects their ability to follow conversations, understand questions, and grasp the context of spoken language, which are essential components of effective communication. Recognizing this core feature is vital for understanding how Wernicke's aphasia impacts communication abilities, distinguishing it from other forms of aphasia that may have different comprehension profiles.