



Chapter 3

The Language Processing Model

In Chapter 1, a basic sketch of the processing continuum was introduced. Information presented in Chapter 2 expanded the central auditory processing model so the continuum can be further refined to represent the material covered so far (see Figure 3.1).

Hearing acuity, or adequate peripheral hearing ability, is prerequisite to processing auditory stimuli. The processing continuum begins where the peripheral auditory system stops and the central auditory nervous system (CANS) begins (the eighth auditory nerve). Central auditory processing follows the neurological pathway of the auditory signal to where it enters the cortex at Heschl's gyrus, the first cortical area that processes speech and language information from the auditory signal.

Auditory information comes into the system and is processed within 400 milliseconds. Some rudimentary processing has been completed at the brain stem level to determine if the auditory stimulus is important and should proceed to the cortex for decoding. At Heschl's gyrus, auditory features of the signal are determined using language knowledge. Very functionally defined types of auditory processing skills occur at this overlap site, such as auditory discrimination, auditory figure-ground, and auditory closure. These terms are defined later.

This is the point at which the processing model picks up in this chapter. Once speech we hear enters the temporal lobe, particularly the left temporal lobe through Heschl's gyrus, we begin to switch from an auditory processing mode to a language processing mode.

Once again, bear with a neurology review. The pieces of the puzzle have to be generated before they can all fit together and form an identifiable picture, just like the black and white splotches from Chapter 1.

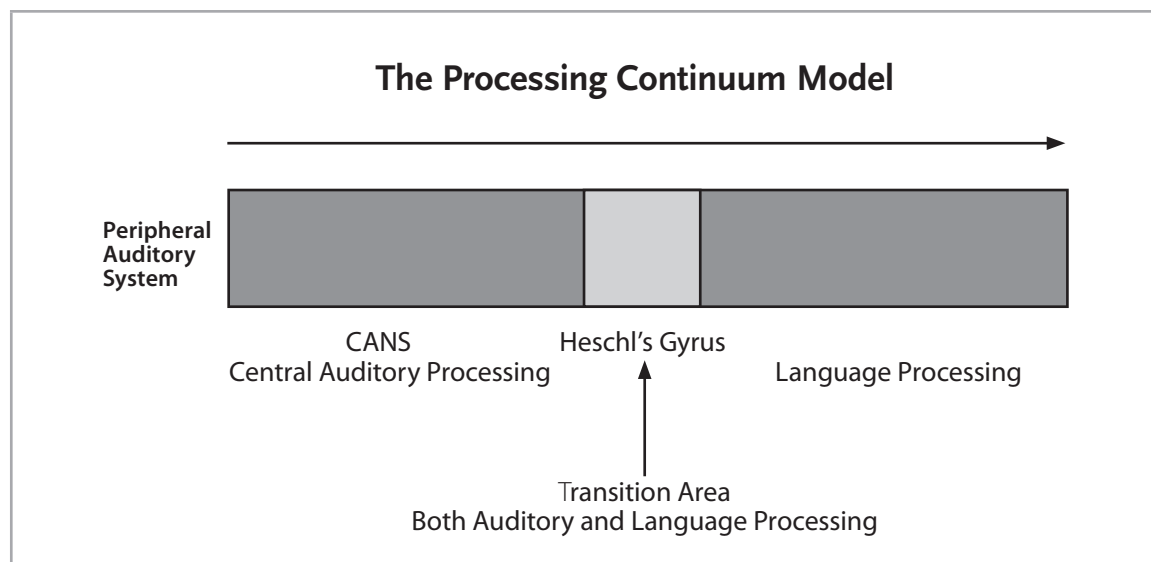


FIGURE 3.1. The processing continuum model.

The second (Table C.2) is a summary of the processing continuum levels, with examples of the major responsibility mediated at each level and example assessment and intervention tasks. I hope the visual summaries will help clarify the major components of the model to build your confidence in addressing processing disorders.

Table C.1
Neurological Continuum of Processing

Differential levels of processing	Anatomic structure or site	Type of processing
Peripheral auditory system	External, middle, inner ear	Auditory acuity; signal reception
Central auditory processing	Central auditory nervous system; auditory nerve through brain stem	Neurological transfer of signal; discrimination of signal's acoustic characteristics
Phonemic processing	Temporal lobe; Heschl's gyrus	Discrimination of signal's phonemic characteristics
Language processing	Temporal lobe; Wernicke's area and angular gyrus	Discrimination of signal's linguistic characteristics; attach meaning using language code
Executive functions	Prefrontal and frontal lobe; motor strip	Planning and executing response

Table C.2
Summary Continuum in Processing Disorders

Differential levels of processing	Behavioral objective or goal	Example assessment tasks	Example intervention tasks
Acoustic (audiologist)	Receiving the signal: intact transmission	Word repetition Tone discrimination (high and low sequences) Pattern repetition (clapping patterns)	FM system Preferential seating Lipreading Figure-ground Recording
Phonetic, phonemic (audiologist & and speech-language pathologist)	Analyzing the signal: discrimination of acoustic segments	Word segmentation Rhyming Phoneme discrimination	Sound blending Word analysis (first, middle, last sound) Grapheme-phoneme correspondence
Linguistic (speech-language pathologist)	Understanding the signal: attaching meaning	Identifying concepts Semantic relationships (synonyms, antonyms, homonyms) Multiple meanings	Concept development Word-object association <i>Wh-</i> questions Compare and contrast Word analogies
Executive functions (speech-language pathologist)	Managing and organizing a response to the signal	Pragmatic language Problem solving Reasoning Prosodic interpretation	Decisions and judgment Role-play pragmatic situations Impulse control Flexibility Organization