Chapter 1

Introduction to communication disorders

Human communication is a complex activity that draws on a diverse set of linguistic, cognitive and motoric skills. These skills are the basis upon which speakers (and writers) generate appropriate communicative intentions, encode and decode linguistic utterances and program and execute the motor movements that are needed to produce those utterances. An understanding of these skills and how they contribute to the formulation and comprehension of linguistic utterances is a prerequisite for the study of communication disorders.

The study of communication disorders also requires an understanding of a number of key clinical distinctions. A communication disorder may have its onset in the developmental period. Alternatively, normally acquired speech and language skills may be disrupted by illnesses and events in late childhood and adulthood. The distinction between a developmental and an acquired communication disorder has implications for all aspects of the management of a communication disorder. Similarly, clinicians recognize a distinction between speech disorders and language disorders and, within language disorders, a distinction between expressive and receptive language impairments. A client may exhibit all of these disorders, or just one.

Clinicians must draw on a range of linguistic and medical disciplines to understand the communication disorders they encounter in clients. Knowledge of phonetics, phonology, morphology, syntax, semantics, pragmatics and discourse is essential for the identification and characterization of all communication disorders (Cummings, 2013a). Similarly, clinicians must have a sound understanding of anatomy, physiology, neurology, psychiatry and ENT medicine (otorhinolaryngology) if they are to understand the medical aetiologies of communication disorders. Aside from linguistic and medical disciplines, clinicians must also be familiar with branches of psychology (e.g. developmental psychology and cognitive psychology) and education in order to assess and treat communication disorders. Each of these disciplines has a part to play in the study of communication disorders and in the clinical management of clients with these disorders.

Section A: Short-answer questions

1.1 Human communication and its disorders

(1) The starting point in the communication of a linguistic message is having a clear communicative _____ that the speaker wants to convey to the hearer.

(2) Which of the following occurs during language encoding?
   (a) Nervous impulses bring about the contraction of muscles that are used in articulation.

(b) The phonological, syntactic and semantic structures that form an utterance are selected.
(c) The auditory centres in the brain recognize nervous impulses as speech sounds.
(d) The speaker forms an idea that he or she wishes to communicate.
(e) A motor plan is constructed.

(3) *True* or *False*: During motor programming, articulators receive nervous impulses instructing them to perform particular movements.

(4) Which of the following occurs during the sensory processing stage of the human communication cycle?
(a) Sound waves are converted by the ear into nervous impulses which are then carried to the auditory centres in the brain.
(b) The brain recognizes certain nervous signals as speech and non-speech sounds.
(c) The articulatory movements that are required to produce an utterance are planned.
(d) A speaker's communicative intention in producing an utterance is established.
(e) The phonological, syntactic and semantic structures that form an utterance are selected.

(5) *True* or *False*: The speech disorders dysarthria and apraxia of speech involve an impairment of motor programming and motor execution, respectively.

(6) In which of the following communication disorders is there a deficit in language decoding?
(a) specific language impairment
(b) developmental verbal dyspraxia
(c) stuttering
(d) acquired dysarthria
(e) selective mutism

(7) In which of the following clinical populations is there difficulty in forming an appropriate communicative intention?
(a) children with cleft lip and palate
(b) adults with Parkinson's disease
(c) adults with schizophrenia
(d) children with developmental stuttering
(e) adults with aphasia

(8) Which of the following clients displays impaired language encoding?
(a) the teacher with vocal nodules
(b) the retired nurse with non-fluent aphasia
(c) the child with developmental verbal dyspraxia
(d) the teenager who stutters
(e) the adult with dysarthria

(9) *True* or *False*: Children and adults with autism spectrum disorders have difficulty in recovering a speaker's communicative intentions.

(10) In which of the following disorders is impaired recognition of spoken words – a condition known as verbal auditory agnosia – to be found?
(a) specific language impairment
(b) developmental phonological disorder
(c) acquired apraxia of speech

(d) Landau-Kleffner syndrome
(e) Prader-Willi syndrome

1.2 Significant distinctions in speech-language pathology

(1) Which of the following tasks is assessing a client's receptive syntax?
   (a) A child with Down's syndrome is asked to group pictures into the categories *fruit* and *furniture*.
   (b) An adult with aphasia is asked to name pictures of objects.
   (c) A child with specific language impairment is asked to point to the picture that corresponds to the utterance *The man, who is fat, is climbing the tree*.
   (d) An adult with Williams syndrome is asked to tell a story based on a series of pictures.
   (e) A child with foetal alcohol syndrome is asked to explain the rules of a game to a therapist.

(2) *True* or *False*: The child who says [tat] for *cat* has a problem with expressive phonology.

(3) *True* or *False*: The adult with cerebral palsy who has dysarthria has an acquired communication disorder.

(4) Which of the following clients has a developmental communication disorder?
   (a) an adult with fluent aphasia
   (b) a teenager with persistent stuttering
   (c) an adult with specific language impairment
   (d) a child with foetal alcohol syndrome and language impairment
   (e) an adult with semantic dementia

(5) Which of the following clients has a speech disorder?
   (a) an adult with stroke-induced dysarthria
   (b) a teenager with puberphonia or mutational falsetto
   (c) an adult with auditory agnosia
   (d) a child with developmental verbal dyspraxia
   (e) an adult with anomic aphasia

(6) Fill in the blank spaces in these paragraphs using the words in the box below:
Speech and language therapists who work with clients with communication disorders recognize a number of important clinical distinctions. Depending on when a communication disorder has its onset, it is described as either developmental or _____ in nature. The child who has language impairment in the presence of a genetic syndrome such as _____ X syndrome is described as having a _____ communication disorder. This is because the child's language impairment is related to neurodevelopmental events which have their onset during _____. Alternatively, an adult with previously intact communication skills may sustain a _____ brain injury which results in a speech disorder. The communication impairment in this case is acquired in nature, as the disorder has its onset in _____ when speech skills are fully developed.

Another significant clinical distinction concerns the difference between a speech disorder and a _____ disorder. Although the lay person is likely to call any communication problem a 'speech disorder', this label is only applied by speech and language therapists to a specific group of communication disorders. Where communication is impaired on account of breakdown in any aspect of the motor planning or _____ of speech, a speech disorder is typically diagnosed. So, the child or adult with hypernasal

speech related to _____ incompetence, regardless of the medical aetiology which underlies this incompetence (e.g. cleft _____ or cerebral _____), has a speech disorder. Alternatively, where communication is compromised on account of a failure to manipulate phonological, _____, semantic or pragmatic aspects of language, a language disorder is diagnosed. The child or adult who cannot comprehend sentences which contain a passive _____ construction has a language disorder. This deficit in receptive syntax may arise on account of stroke-induced _____ in the adult or _____ disability in the child with Down's syndrome. This example also demonstrates another important clinical distinction between a receptive and an _____ language disorder. In a _____ language disorder, the comprehension or decoding of an aspect of language is compromised. In an expressive language disorder, the production or _____ of language is impaired. The adult with aphasia who cannot decode a _____ voice construction may also be unable to encode such a construction.

palsy	execution	active	gestation	fragile
velopharyngeal	receptive	decoding	adulthood	
mental	traumatic	lip	voice	language
phonetic	developmental	aphasia	palate	acquired
intellectual	encoding	lexical	hemisphere	
syntactic	expressive	passive	apraxia of speech	

(7) Which of the following clients has an acquired communication disorder?
- (a) the teenager with dysarthria following a road traffic accident
- (b) the adult with frontotemporal dementia and a language impairment
- (c) the child with cleft palate and a phonological disorder
- (d) the teenager with persistent stuttering
- (e) the adult with a brain tumour and apraxia of speech

(8) Which of the following clients has a language disorder?
- (a) an adult with conversion aphonia
- (b) a child with developmental phonological disorder
- (c) a teenager with vocal nodules
- (d) a child with a posterior fossa tumour and word-finding difficulty
- (e) an adult with AIDS dementia complex and pragmatic disorder

(9) *True* or *False*: The adult with Down's syndrome who cannot comprehend sentences which contain relative clauses has an expressive language disorder.

(10) *True* or *False*: The child with paresis of the velum and hypernasality following a traumatic brain injury has a speech disorder.

1.3 Disciplines integral to speech-language pathology

(1) Which of the following medical specialists has primary responsibility for the diagnosis and treatment of vocal fold pathologies?
- (a) neurologist
- (b) otolaryngologist
- (c) psychiatrist
- (d) endocrinologist
- (e) paediatrician

(2) Which of the following linguistic disciplines must the speech and language therapist draw on to characterize problems with inflectional suffixes in children with specific language impairment?
   (a) semantics
   (b) phonology
   (c) morphology
   (d) prosody
   (e) pragmatics

(3) Which of the following medical disciplines is *not* involved in the management of the child with a cleft lip and palate?
   (a) orthodontics
   (b) gastroenterology
   (c) otolaryngology
   (d) neurology
   (e) psychiatry

(4) *True* or *False*: The speech and language therapist must have a sound knowledge of neurology to understand the pathological basis of conditions such as multiple sclerosis and Parkinson's disease.

(5) *True* or *False*: The speech and language therapist must have a sound knowledge of semantics to understand compensatory articulations in the child with a cleft palate.

(6) Which of the following linguistic disciplines are most important to an understanding of the communication problems of the adult with schizophrenia?
   (a) phonetics
   (b) discourse
   (c) pragmatics
   (d) phonology
   (e) sociolinguistics

(7) The speech and language therapist may need to seek the professional opinion of an _____ when hormonal factors are believed to play a role in a client's voice disorder.

(8) The speech and language therapist may work alongside a _____ or counsellor in the treatment of clients who stutter.

(9) In the management of the transsexual client, the speech and language therapist is part of a multidisciplinary clinical team which includes social workers and psychologists alongside medical professionals such as _____.

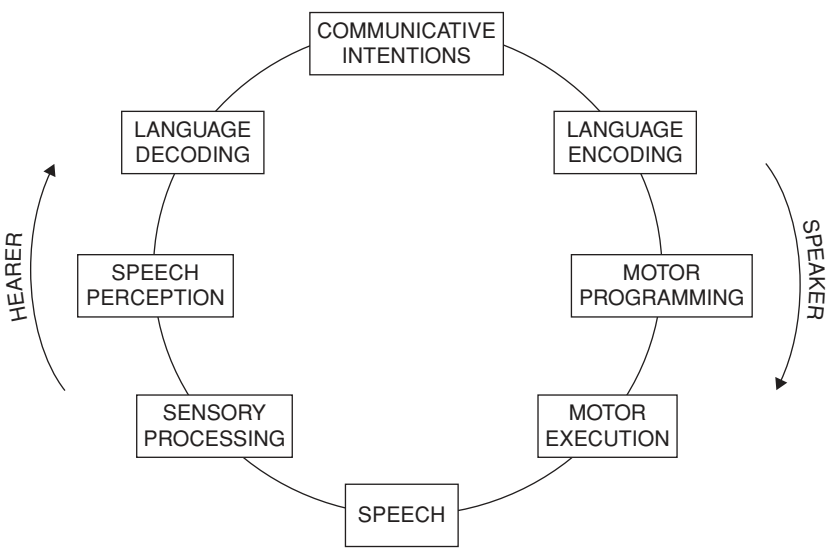
(10) The linguistic discipline which sheds most light on the communication impairments of children with autism spectrum disorders is phonology/syntax/pragmatics (indicate one).

Section B: Clinical scenarios

1.4 Human communication breakdown

The human communication cycle is shown below. It portrays communication as a complex process involving eight stages. Read each of the scenarios presented below. Then decide

which of the eight stages in the communication cycle is impaired in the client described. Your answer may include one stage or more than one stage.



(1) Sally is a sociable 5-year-old who attends primary school. The school's speech and language therapist has assessed Sally's communication skills and has found that her use of phonology is more typical of a 3-year-old child. In all other respects her communication skills are normal.

(2) Bill is 49 years old and has been diagnosed with a brain tumour in his left cerebral hemisphere. Formal assessment of his language skills reveals that his comprehension and production of syntax is disrupted. His speech is also somewhat slurred and mildly unintelligible.

(3) Frank is 65 years old and has been diagnosed with Alzheimer's disease. His participation in conversation has steadily diminished as he has found it increasingly difficult to make relevant contributions to verbal exchanges with others. An assessment of his communication skills reveals relatively intact structural language skills but marked difficulty in generating appropriate messages for communication.

(4) Felicity is 6 years old. She was born with Möbius syndrome which has affected a number of the cranial nerves used in speech production. She is attending regular speech and language therapy where the focus of therapy is on improving the intelligibility of her speech.

(5) Toby is 7 years old and is in recovery following severe bacterial meningitis. The infection has caused bilateral damage to the cochlea in his inner ear. Audiological assessment has revealed significant sensorineural hearing loss. His language skills are age appropriate.

(6) Rose is 50 years old and is two years post-onset a traumatic brain injury that was sustained in a road traffic accident. Her expressive and receptive language skills are relatively intact. However, she has marked difficulty in sequencing the articulatory movements that are needed to produce speech and her vowels are severely distorted. The speech and language therapist diagnoses acquired verbal dyspraxia.

1.5 Clinical distinctions

This exercise is intended to get you thinking about three important distinctions in the study of communication disorders: (1) receptive vs. expressive communication disorders, (2) developmental vs. acquired communication disorders and (3) speech vs. language disorders. Each of the scenarios below examines one of these three distinctions. You need to state which distinction within your answer.

(1) Landau-Kleffner syndrome (LKS) is a rare disorder in children that has a peak incidence between four and seven years of age (Temple, 1997). It leads to sudden or gradual loss of language skills in the presence of a seizure disorder (the children who develop LKS experience seizures as they sleep). Another term for LKS is '*acquired* epileptic aphasia'. Why is the term 'acquired' used of this disorder when it is exclusively children who develop the condition?

(2) Patrick is 59 years old. He is aphasic following a cerebrovascular accident (CVA) some six months earlier. His communication skills have been assessed by a speech and language therapist using the Boston Diagnostic Aphasia Examination (Goodglass et al., 2001), amongst other assessments. This has revealed that Patrick struggles to understand certain syntactic constructions (e.g. relative clauses and passive voice) and that he produces semantic paraphasic errors when asked to name pictures (i.e. his errors are semantically related to the target word, e.g. he says 'eye' for ear). Are Patrick's difficulties with syntax and semantics expressive or receptive in nature?

(3) Penelope is 8 years old and she has a severe communication disorder. Her problems with communication are so severe that she is unable to attend mainstream school and must attend a special school that has a team of speech and language therapists. Penelope's therapist has extensively assessed her communication skills and has noted the following: significant distortion of consonants and vowels, reports of unintelligibility from caregivers and teachers, age-appropriate performance on the Clinical Evaluation of Language Fundamentals (Semel et al., 2003). Does Penelope have a speech disorder, a language disorder or both?

(4) John is 27 years old and has schizophrenia. His communication skills are bizarre which has led to withdrawal and social isolation from everyone other than close family members. Informal observation by a speech and language therapist reveals marked impairment in the pragmatics of language. Specifically, John fails to understand humour and irony used by others and he interprets many utterances literally (e.g. he responds 'yes' to indirect speech acts such as 'Can you tell me the time?'). Also, he contributes many irrelevant utterances in conversation and produces utterances that are poorly related to each other. Are John's problems with pragmatics receptive or expressive in nature?

(5) Frank is 45 years old. He is currently under the supervision of a speech and language therapist who is treating him for a speech disorder (dysarthria) that he developed as a result of a head injury sustained in a motorbike accident. This is not Frank's first contact with speech and language therapy. When he was 5 years old he was diagnosed with grammatical delay by a therapist at the primary school he attended. Frank has experienced two communication disorders to date. Are these disorders developmental or acquired in nature?

(6) Paul is a lively 6-year-old who has a number of cognitive and communication problems caused by his mother's excessive consumption of alcohol during pregnancy (he has been diagnosed as having foetal alcohol syndrome by a paediatrician). His expressive syntax is severely delayed – he is still only at the two-word stage of language production. An analysis of his expressive phonology reveals a number of immature phonological processes. However, his articulation skills are intact. Does Paul have a speech disorder, a language disorder or both?

1.6 Foundational disciplines

The study of communication disorders draws on a diverse knowledge base. Clinicians and researchers must have a sound understanding of a number of linguistic disciplines. However, they must also understand how a range of medical disciplines impact upon this field of work. The statements in (A) below describe linguistic features and errors in a range of child and adult clients. For each statement, name the branch of linguistics (e.g. phonology, syntax) that is used to characterize the feature in question. The statements in (B) below describe different aspects of the medical knowledge that clinicians and researchers draw upon in their work on communication disorders. Name the branch of medicine (e.g. neurology, psychiatry) to which each of these statements relates.

Part A: Linguistics

(1) An aphasic adult is asked by a therapist to describe a picture in which an elderly man is walking a dog. The patient struggles to say 'Man . . . walk . . . dog'.

(2) A 5-year-old child says to his mother 'Can we go in the [tar]?' when he wants to be taken for a drive in the car.

(3) A child with an autism spectrum disorder starts to talk about his friends when he is asked what school he attends.

(4) An adult with Down's syndrome cannot categorize pictures of objects according to the fields *fruit*, *clothing* and *furniture*.

(5) A child with specific language impairment (SLI) says to his teacher 'Bobby make a mess'.

(6) During an articulation test, a child with a cleft palate says [ʔa] for 'cat'.

(7) An analysis of the verbal output of a patient with traumatic brain injury (TBI) reveals a lack of cohesion and extensive repetitiveness.

(8) An adult with aphasia is describing a picture in which a young girl is building a snowman. He says 'She builds a stowcan'.

(9) An adult with autism is asked by a social worker 'Can you close the door?' He responds 'Yes' but does not get up to close the door.

(10) A child with language delay is asked by a therapist to point to a picture in which a girl is being hit by a boy. The child points to a picture showing a girl hitting a boy.

Part B: Medicine

(1) An undersized mandible (micrognathia) is a feature of both Treacher Collins syndrome and Pierre Robin syndrome.

(2) A vocal polyp is detected on the left vocal fold during laryngoscopy.

(3) Following surgical repair of a cleft in the palate, the velum may be insufficiently mobile to achieve the elevation that is needed to make contact with the posterior pharyngeal wall.

(4) If fusion of the maxillary processes does not occur, a child will be born with a cleft in the upper lip.

(5) Aphasia is associated with a lesion in the inferior frontal gyrus (Broca's area) of the left cerebral hemisphere.

(6) Oro-nasal fistulae can appear in the palate after surgical repair of a cleft. Some fistulae can compromise speech production.

(7) A diagnosis of schizophrenia is based on the identification of positive symptoms (e.g. thought disorder) and negative symptoms (e.g. social withdrawal).

(8) In families who have children with SLI, two regions on chromosomes 16 and 19 have been linked to language-related measures.

(9) The facial nerve (cranial nerve VII) innervates the orbicularis oris, the sphincter muscle that encircles the lips.

(10) A patient with hyponasal speech is referred by his general practitioner to the regional hospital for further investigation. Examination of his nasal cavities reveals a well-developed nasal polyp.

SUGGESTIONS FOR FURTHER READING

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Chapter 2

Developmental speech disorders

For a significant number of children, the acquisition of speech in the developmental period does not occur along normal lines. During embryonic development, a range of craniofacial malformations may occur, leading to structural defects of the anatomical structures which are necessary for speech production. For example, the tissues of the palate and upper lip may fail to fuse during the first trimester of pregnancy, resulting in a cleft of the lip and hard and soft palates. This craniofacial anomaly may occur in isolation or alongside a number of other defects as part of a syndrome (e.g. Pierre Robin syndrome). Other syndromes in which there is abnormal development of the organs of articulation include a small mandible (micrognathia) in Treacher Collins syndrome and abnormal palatal morphology in Down's syndrome. In all these cases, speech acquisition is likely to be compromised to a greater or lesser degree.

Aside from structural defects, the development of speech can also be compromised on account of a neurological impairment. A speech disorder known as dysarthria results when there is damage of the motor centres in the brain and/or any of the pathways which transmit nervous impulses to the muscles of the articulators. The most common cause of developmental dysarthria is cerebral palsy. The child with congenital cerebral palsy has brain damage, often of unknown origin. In cases where the cause of this damage is known, aetiologies can include infections (e.g. maternal rubella), birth anoxia, prenatal exposure to alcohol and cocaine, and traumatic brain injury. Other, less common causes of developmental dysarthria include Duchenne's muscular dystrophy and genetic syndromes (e.g. Down's syndrome). The severity of the speech disorder in dysarthria can range from mild to severe. In the former case, there may be a negligible impact on the intelligibility of speech. In the latter case, speech may be so unintelligible that an alternative means of communication must be found for the client. The child with developmental dysarthria may also have swallowing problems (dysphagia). These problems are also assessed and treated by speech and language therapists.

Another speech disorder which has its onset in the developmental period is developmental verbal dyspraxia (DVD). There is a presumed neurological aetiology of DVD, although a specific brain lesion is rarely identifiable. DVD can be distinguished from developmental dysarthria in a number of ways. In developmental dysarthria, there is neuromuscular weakness which is not present in DVD. Speech errors are also consistent in developmental dysarthria, whereas this is not the case in DVD. The speaker with DVD finds automatic speech production easier than volitional speech production. No such automatic–volitional distinction is evident in the speaker with developmental dysarthria. However, like developmental dysarthria, the speaker with DVD can be highly unintelligible to all but the most familiar hearers.