College overzicht per onderwerp

Lecture 2:
- Overview speech / language
- SLI
- DLD

Lecture 3:
- Organization of lexical-semantic knowledge
- Storage hypothesis vs. retrieval hypothesis
- Word learning (verbs)

Lecture 4:
- Morphological development
- Finite morphology

Lecture 5:
- Narratives
- Strokes (blood vessels)

Lecture 6:
- Social interaction
- Autism spectrum disorders
- Functions of communication / grice's maxims
- Social pragmatic communication disorder
- PLI

Lecture 7:
- SSD
- Articulatory errors
- Phonological processes
- Psycholinguistic framework

Lecture 8:
- Fluency
- Disfluency
- Stuttering
- Normal disfluency
- Borderline stuttering
- Beginning stuttering
- Cluttering

Lecture 9:
- Pediatric posterior fossa tumor patients
- DELPHI

Disorders in Language Development II

Lecture 2 – Speech and language disorders in children, an overview

Communication: any exchange of information between people using a common code, or symbol system, understood by those involved

Communication Disorders: interferes with the exchange of meaningful information
Communication Differences: communication abilities that differ form the mainstream culture

Communication Disorder: an impairment in the ability to receive, send, process and comprehend concepts or verbal, nonverbal and graphic symbol systems (ASHA, 1993)
An inability to understand/use speech and language to relate to others in society.
Can be divided into four areas:
- Language: involves listening, speaking, reading and writing
- Speech articulation: the production of sounds and words
- Voice: the sound produced by vibration of the vocal cords
- Fluency: a disruption in the normal flow or rhythm of speech

This is indeed a very important distinction to learn. The reason why we look into these aspects separately is because they can be independently impaired, that is, people may have selective difficulties with one thing, while doing well with the other aspects.
Let´s start with speech. All aspects of speech (articulation, voice, fluency) are related to motor execution.

- Articulation: Someone who had to remove part of their tongue because of a tumor, as a consequence, cannot execute certain articulatory movements, and therefore as a speech problem (in speech articulation). A child that has not learned an articulatory gesture may have a lisp.
- Voice: if you have a cold, your voice may be hoarse. You are still able to articulate speech sounds perfectly, but the quality of your voice is different.
- Fluency: this has to do with the flow of speech (continuity, smoothness, rate, effort). Someone may be able to articulate all speech sounds, and may have perfect voice quality, but experience interruptions in fluency (disfluencies).

Now let's discuss language. Language is all about the formulation of the message that we want to convey - selecting the right words, the right syntactic structure, etc. If someone's speech is impaired (e.g., the person with part of the tongue removed, or someone who stutters), they can still show that their language is perfect by writing down the message, for example. This is why we see it as a different area: it can indeed be independently spared/impaired, and it has a different nature. While speech is all about physical properties and physical execution, language is a cognitive skill.
Please note that many people have impairments in both speech and language, at the same time. But many others, have impairments only in language, or only in certain aspects of speech. Categorizing their impairments in this way makes it quite clear what kind of treatment people may need. For example, those with speech disorders do not need treatment that focuses on aspects of language (e.g., syntax).

Language: message that is contained in speech
Speech: audible representation of language

Speech Disorder: further discussed in following lectures

Language Disorder: impaired comprehension and/or use of a spoken, written, and/or other symbol systems. The disorder may involve the form of language, the content of language, and/or the function of language in communication (ASHA, 1993)

Structure and Components of Language

- Phonology: rules regarding how sounds can be used and combined
- Syntax: the way sequences of words are combined into phrases and sentences
- Morphology: the form and internal structure of words
- Semantics: the understanding of language
- Pragmatics: rules that govern the reasons for communication as well as the choice of codes to be used with communicating

We distinguish comprehension (understanding) and expression (production) of language
Each of the different components of language and abilities to produce and understand language may be differentially impaired in children with developmental language disorders

Specific Language Impairment: SLI is a language disorder that delays the mastery of language skills in children who have no hearing loss or other developmental delays. It is also called developmental language disorder, language delay, or developmental dysphasia. It is one of the most common childhood learning disabilities, affecting approximately 7-8 percent of children in kindergarten. The impact persists into adulthood. (NIDCD, 2011)

The specificity problem: SLI implies that the impairments are specific
Language impairment without other developmental delays or weaknesses
Children must have an IQ of 85 or above
Reilly et al. (2014): there are no differences in the patterns of language impairment when children with high vs low IQ are compared and there is no evidence that high vs low IQ children with language impairment respond differently to treatmens.

➔ There is no justification for the IQ criterion

The problem with calling SLI specific is that these children do not meet the diagnosis of SLI, and are rejected reimbursement for treatment because they do not have a clear diagnosis

Subtypes of SLI: the profiles of children with SLI vary widely

- Expressive vs. Receptive SLI (Edwards & Lahey, 1996)
  Deficits in production may be easier to detect
  Language production and comprehension deficits may co-occur (Leonard, 2009)
- Grammatical vs. Phonological SLI
  Some children may be particularly impaired in one component of language (Bishop et al, 2000)

Developmental Language Disorder (DLD): New terminology and consensus process

The CATALISE project: reach agreement about how people talk about children's language problems
DELPHI method:

- A panel of experts rates and discusses statements about diagnostic criteria and terminology
- Ratings and other comments given anonymously and online
- Statements are revised based on data to reduce disagreement on ratings
- Panel sees full data and statements again and makes further comments/revisions

New diagnostic criteria: the term DLD should be used for children where:

- Language difficulties create obstacles to communication or learning in everyday life
- Language problems are unlikely to resolve by five years of age
- The problems are not associated with a known biomedical condition (differentiating conditions)

Relation to speech, language and communication needs (SLCN)
SLCN is a broad category that covers the wide range of conditions affecting speech, language and communication
Types of SLCN that do not meet criteria for language disorder

- Late talkers: children who tend to make good progress after a late start
- Uncomplicated phonological problems in preschool children
- Language limitations due to lack of exposure to English

SLI vs. DLD
DLD does not require a mismatch between verbal and nonverbal ability
The profile of language skills is not relevant for pha diagnosis of DLD

Lecture 3 – Lexical-Semantic Impairments

One of the first indicators of a DLD is delayed occurrence of the first words (Watkins et al, 1995; Bishop, 1997)

Organization of lexical-semantic knowledge: three levels for each lexical entry (Bock & Levelt, 1994; Dell, 1997)

- The conceptual level / lexical-semantic level: features that, when combined, make up the meaning of a word
- The lemma level: syntactic information that is known about a given lexical item
- The lexeme level / phonological level: the sequence of phonemes (speech sounds) used to pronounce that word

Dollaghan (1992) suggests that children with DLDs have the following differences in organization of the lexical-semantic system:

- Smaller number of entries
- Less information associated with each entry
- Inadequate/fewer connections between entries

Storage hypothesis (Kail et al, 1984): slower vocabulary learning results in less elaborate representations and fewer connections
Evidence for the storage hypothesis
McGregor and Waxman (1998) showed children with word-finding difficulties pictures of familiar objects and asked them questions to evaluate semantic organization

- ➔ Interpreted as representation deficit (storage), less elaborate representations leads to acceptance of incorrect features; IDK errors reveal failure to even activate correct semantic field due to lack of knowledge

Children with WFD made more acceptance errors of incorrect features than TDs and they made predominantly errors of IDK whereas TDs made semantic substitutions

If there is poor conceptual knowledge, then children should also perform poorly in non-speech tasks that require this knowledge

- They asked children to make drawings of objects
- And to name pictures of the same objects
- Adults rated how accurate and complete each drawing was
  Objects that could not be named were drawn in a more incomplete way, compared to items that could be named

Conclusion: children with SLI revealed poor knowledge of words they could not name, even in a task that did not require naming

➔ Evidence of a lack of knowledge = storage deficit

Retrieval hypothesis (Newman & German, 2002): the processes of accessing lexical-semantic information are not as efficient as those of TD peers (but representations are intact)
Newman and German (2002) showed that children with WFDs naming is influenced by the same psycholinguistic variables than naming of TD children

➔ They say that this means that the representations are adequate

However, the storage hypothesis says that less familiarity leads to poorer representations, and not that performance may not vary along the same dimensions as it does for TDs. Thus, there is really no evidence here against the storage hypothesis

Word learning: children learn most words without direct instruction
Children with DLD also learn words without direct instruction (Dollaghan, 1987), but they do it slower than language and age-matched peers (Rice et al, 1990)

- QUIL studies (QUik Indicental Learning)
  Children viewed animated stories where new vocabulary was presented
  Afterwards, they were tested in their knowledge of new vocabulary (picture naming)

Why is QUIL lower in DLDs? Perhaps some of the processes needed to learn new words is impaired?

1) Perceive and isolate phonological form from auditory input
   Children with DLD have difficulty perceiving rapidly changing acoustic stimuli (Tallal et al, 1981), but performance in such tasks is low in accuracy to diagnose impairments
   Children with DLD are more sensitive to speech rate, learning words less efficiently than TD children, when they are presented faster (Ellis Weismer & Hesketh, 1998)
   Subtle impairments in (1) may increase the cognitive resources needed to perform semantic tasks
2) Hold phonological form in short-term / working memory while activating lexical entry
   Baddeley (2003): short-term / working memory is a memory system that stores and manipulates information necessary for the task that we are performing at a given moment

Phonogical loop: responsible for the short-term storage of auditory stimuli and subvocal rehearsal for retaining that information
Visuospatial sketchpad: does the same for visual information
Central executive: controls the attention that is distributed between the components

Phonological short-term / working memory has limited capacity, and when this capacity is further reduced or impaired, there are lengths effects (shorter words are processed easier, because there is less material to keep active in memory)
Baddeley (2003): children with SLI have an impairment in the phonological loop and fail to maintain representations active or rehearse contents subvocally (subvocal rehearsal). This impairs their word learning because they loose phonological information

3) Generate meaning of the new word and pair it with phonological form

Semantic information from co-occuring words (Gollinkof et al, 1994)
Social-pragmatic cues (the way language is used in a specific social context, to fulfil a certain function) help direct attention to the referent (the intended meaning) (Tomasello, 2003)
Theory of mind (Bloom, 2000) – the cognitive ability to infer/guess/deduce what other people are thinking or what they know in a given situation
Syntactic bootstrapping (Gleitman, 1990)

➔ None of these is impaired in all children with DLDs to justify (by itself) the lower vocabulary (Brackenbury & Pye, 2005)

Summary
Children with DLDs do not seem to have severe impairments in segmenting words from the speech stream (speech processing)
But mild impairments in this ability may increase the processing demands associated with word comprehension and learning
They also seem to use syntactic bootstrapping (similarly to TD children)
Children with DLD have impairments in other aspects of semantics, aside from the size of vocabulary, namely:
- Learning new words without explicit instruction (quick incidental learning)
- Storing and maintaining the phonological forms of new words in short-term memory
- Creating and storing complex lexical-semantic representations
- Expressively using known lexical items (retrieval)

Word Learning: Verbs

Verbs are more difficult to learn than nouns: why?
Different kinds of information are associated with noun and verb knowledge
- Syntax (grammar)
  Number of arguments and argument structures, thematic restrictions
  More arguments = more difficulty in DLD (Pizzioli & Schelstraete, 2008)
- Semantics (meaning)
  Less direct relation to a real-world entity compared to nouns
  However, instrumental verbs (like digging) borrow the semantic richness/complexity of the noun they are related to (the shovel). They are more difficult in the presence of semantic impairments (Kambanaros, 2013)
- Phonology (form)
  In many languages, verbs are shorter than nouns (this is not always true)

Argument structure = number of participant roles required by the verb, which are typically expressed along with the verb in a sentence
Arguments may be optional or obligatory
Argument structure complexity
- Unergatives (1 argument, simple)
- Transitives (2 arguments, complex due to N arguments)
- Ditransitives (3 arguments, even more complex due to N arguments)
- Unaccusatives (1 argument, complex due to non-canonical mapping)

Particularities of verb learning
Novel-verb referents are often dynamic events and depicted with dynamic video scenes. Novel-noun referents are novel objects usually depicted with static images (Fernald et al, 2008)
- Dynamic events require temporal processing
- Different possible interpretations may emerge as event unfolds

The referents encoded by nouns are less complex (no participant roles associated with the referent)
Finally, learning requires generalizing from a single exemplar to other members of the same category
- Nouns are typically learned alone, and thus in learning and test phase there is no change in context
- Verbs may occur with different agents/themes across learning and test phase (He et al, 2020)

Typical verb learning study
Learning phase: child sees photo/video with contexts that introduce the novel verb. A single presentation or several presentations of the verb, seeing (usually) the same character performing the action on (usually) the same object and hearing the word (when there are multiple presentations)
Test phase: child sees two videos side by side and hears the target verb. Child point to correct video
Measures of verb learning (Jackson et al, 2019)
Core meaning (semantics)
Receptive: present alongside semantic distractor and test comprehension
Expressive: definitions, semantic association, drawing, synonyms

Phonology

Receptive: word picture/video matching accuracy with phonological distractors
Expressive: do children produce the correct speech sounds when asked to name the action?

What affects verb learning?

1) Timing

Children understand meaning more often if they hear the verb before the event happens (Tomasello and Kruger, 1992)
Ambalu et al, 1997: optimal timing this may depend on the type of verb
Manner verbs (running, tumbling, sliding, walking): learned better if verb is heard during or before the event
Change of state verbs (break, melt): learned better is the verb is presented after the event

2) Variability of input

It is better for children to learn a new verb always with the same noun (consistent input)

3) Semantic contexts

Semantic contexts contribute to learning the meaning of novel words (Pinker, 1984)

Arunachalam and Waxman (2015)
If toddlers require an informative semantic context (in addition to a rich syntactic context) to learn new verbs, they should only succeed in the Rich Semantics condition
Conclusion:

- Informative semantic context alone is not sufficient
- Informative syntactic frame alone is not sufficient
- Perhaps toddlers would have learned best if the content words were included in the sentences, with the verb, so rich semantics and syntax in one sentence

4) Syntactic contexts

Children's learning of the meanings of new words is facilitated by keeping track of the syntactic structures and roles where novel words occur (Gleitman et al, 1990)

Verb learning in DLD: children with DLD show intact awareness of syntactic contexts (in bootstrapping measure) (Oetting and Shulman and Guberman, 2006) Yet, they have lower accuracy compared to age matched controls in a retention task, where children had to match the learned words to one of four pictures
Conclusion: while perception and encoding of syntactic information seemed intact, storage and retrieval of syntactic information could be impaired, thus explaining poor retention of learned words

Summary
Children learn words better if the context is richer (syntactic context (transitive sentences) and potentially semantic context), but structural complexity may be detrimental to learning

- Keeping track of syntactic contexts is difficult with non-canonical sentences (unaccusatives)
- Learning verbs preceded by a subject in a complex phrase is difficult

Timing matters, and depends on the type of verb
A consistent semantic context also seems to facilitate learning

Lecture 4 – Morphosyntactic impairments

Morphemes: smallest linguistic unit that has a meaning or a grammatical function

How is morphological development studied?

1) Sentence recall: the examiner says some sentences or words, and later on the child has to remember and repeat them
2) Grammatical judgment tasks: the child judges whether the sentences are good or bad
3) Elicitation tasks: create a context in which a specific morpheme has to be produced by the child (may also be a more open task, like elicitation of spontaneous speech through storytelling or retelling, or creating a conversation with the child
4) Some measures extracted from spontaneous speech: mean length of utterances, lexical diversity measures

Utterance (or T-unit): one main clause plus any subordinate clause or nonclausal structure that is attached to or embedded in it (Hunt, 1970)

Mean length of utterance (as an indication of morphosyntactic development)
MLU: number of words/morphemes divided by number of utterances

Choosing a reference point: comparing children with DLD and TD children
In clinical practice, we compare a child to other of the same age, to know whether they are lagging behind
In research we may ask if the child lags behind in comparison to others of the same chronological age (CA), mental age (MA), language age (LA) and CA + LA (double group design)
Why compare children based on MLU: children with the same MLU are expected to have the same morphosyntactic abilities, despite of the age difference

Classification of morphemes, according to
- Semantics
- Position
- Function

Finite morphology

Acquisition of regular and irregular past tense happens in a U-shaped learning curve (Marcus et al, 1992)
TD children initially produce a number of irregular verbs correctly,
(2,5 – 3 years) When regular forms are first acquired, they produce both regular and irregular forms for the same verbs, due to over-regularization
(3 – 6 years) over-regularizations decrease gradually
However, knowledge of irregulars keeps building until about 8 years old and some over-regularization occurs until 11 years old (Kuczaj, 1977)

Regular and irregular past tenses in DLD
In DLD, there is
- Lower MLU than that expected for age
- Consistent differences between DLD and TD in morphemes marking finiteness
- From 5 to 8, the differences become more pronounced

➔ Rice and Wexler (1996)
➔ Rice et al (1998)

Is finiteness the issue?
Compare homophonous forms that do and do not mark finiteness
Children with DLD show more errors in forms that mark finiteness (Leonard et al, 2003)
Can errors with finite forms be used to detect language impairment?
Yes, errors with past tense are clear indicators of language impairment, they have high diagnostic accuracy, so it is possible to detect DLD based on errors in inflection (Conti-Ramsden, 2003)

Later development in DLD
Children with DLD show growth trajectories for specific finite morphemes that are delayed but similar to TD peers (Rice, 2004)

Why is there such a clear difficulty with finiteness: accounts for morphosyntactic deficits in language disorders

1) Structural / grammatical accounts

Specific grammatical knowledge or syntactic operations are missing
Knowledge that finite forms are obligatory is missing: Extended optional infinitives (Wexler, 1994)
Abstract morphological features marking number, tense, gender, etc (Gopnik, 1990)
Syntactic operation 'agree' is impaired (Clahsen, 1989)
Optional infinitives hypothesis: Children with DLD have an extended optional infinitive stage
Alternative hypothesis from grammatical accounts is that they are unable to learn inflectional rules (Pinker, 1989)

2) Processing accounts

A deficit in some processing mechanism leads to the pattern of impairments
General processing mechanism: reduced processing rate or capacity (Bishop, 1994)
Specific processing impairment:
- Speech / phonological processing

- Processing rapid changes in acoustic signal
- Phonological working memory
- Procedural memory

Accounts related to processing deficits: DLD is accompanied by speech processing impairments
According to grammatical accounts, these speech processing impairments may co-occur but are not the cause of morphosyntactic deficits (other researchers think morphosyntactic deficits are caused by these speech processing impairments
Nature of this speech processing deficit: processing rapidly changing auditory information (Tallal, 1990)
Salience: inflectional morphemes are typically at the end of words and unstressed, and hence they lack salience in the auditory stimulus

Procedural deficit hypothesis (Ullman & Pierpont, 2005)
Children with DLD have abnormalities in the brain circuits that are involved in procedural memory (memory of procedures that we use to perform certain actions)
Declarative memory = memory of facts
Weak procedural memory may lead to reliance on declarative memory, this means that children with DLD would memorize each past tense form as a 'fact' in their memory, rather than learning a rule that can be applied to many verbs

Lecture 5 – Syntax in DLDs

Narratives: sequences of temporally related clauses (about characters and events) (Labov & Waletzky, 1967)
Information is presented from a particular point of view (narrator comments and gives significance to certain aspects above others -> evaluation)
Eliciting narratives: asking children to retell a story that they know or that we have just told them, to tell a story with a wordless book

Dimensions captured by narratives
- Linguistic: information has to be conveyed using appropriate lexical elements and morphosyntax
- Cognitive: children must infer (guess) thoughts and motivations of the characters, and they must understand and convey the logical relation between events, plus understand the overall theme of the story
  This is subjective, done from the perspective of a narrator
- Social: relation between narrator and audience, effort to engage the audience so that attention to the story is maintained

Three main brain arteries: anterior, middle and posterior cerebral arteries
➔ Strokes in MCA are most often associated with language impairments, see the overlap!

What is a stroke?
Ischemic stroke: a blood clot stops blood blow to certain areas, causing damage
Hemorrhagic stroke: a blood vessel is ruptured, so blood seeps into the brain tissue, causing damage
Damage causes impairments to language functions that are processed in the brain areas that are damaged

The concept of neuroplasticity: ability of neurons and other brain cells to alter their structure and function in response to a variety of internal and external pressures, including behavioural training (Kleim & Jones, 2008)
Two theoretical orientations (Finger & Almli, 1985)
1) Certain non-damaged areas have their functions temporarily disrupted, due to disrupted communication (pathways). Recovery happens when functions return to normal
2) New areas can compensate for lost function (compensatory theories). These areas take up the functions of the damaged areas

Lecture 6 – Pragmatics and social communication in DLDs

Pragmatics: use of language in social contexts (Fujiki & Brinton, 2017)
Social communication: ability to use language in interpersonally appropriate ways to influence people and interpret events (Olswang, Coggins & Timler, 2001)
4 dimensions of social communication (Adams, 2005)

1) Language processing: production and comprehension of the syntactic, morphological, phonological and semantic aspects of language
2) Pragmatics: ability to manipulate language form to communicate a speaker's message appropriately in different contexts
3) Social interaction: social exchanges between infants and caretakers, which require acknowledging the existence of another and discussing or attending to common objects in the world (joint attention)
4) Social cognition: aspects of higher cognitive function which underlie smooth social interactions by understanding and processing interpersonal cues and planning appropriate responses. These aspects are Theory of Mind (requiring knowing what the other knows), inferencing, and emotional intelligence

Pragmatics vs social communication
Pragmatics is one of the dimensions of social communication, but communication requires a constant interaction between all dimensions of social communication to be pragmatically appropriate

- Hence, it is an impossible task to separate pragmatics from social communication
- In the rest of this lecture, we will talk about impairments affecting social communication in different populations

Autism Spectrum Disorders (ASD): developmental disorder affecting social behaviour and communication
Symptoms tend to appear in the first two years of life
Diagnosis is made according to Diagnostic and Statistic Manual of Mental Disorders (DSM-5), a guide created by the American Psychiatric Association used to diagnose mental disorders
Diagnostic criteria:

- Difficulty with communication and interaction with other people
- Restricted interests and repetitive behaviours

These symptoms hurt the person's ability to function properly in school, work and other areas of life
Impairment in social communication is a defining characteristic of ASD
How do impairments reflect Adams (2005) dimensions?

1) Language processing: children with ASD can have impairments to language processing alongside their impairments to social communication, or they may have impairment to social communication without language impairment
2) Social interaction and social cognition: children with ASD show lack of coordination of mutual eye gaze and reduced eye contact in early development. This is thought to have an impact in development of joint attention, and as such is a precursor to problems with interaction and ToM
3) Social cognition: ToM has two components: cognitive ToM (inferencing or knowing what others know/think/feel, that is, their mental states) and Empathizing (having emotional reactions that are appropriate to other's mental states). Children with ASD have particular difficulties with empathizing ToM
4) Pragmatics: reduced variety of communicative acts/functions: children with ASD may have reduced expression of communicative intention, and therefore be limited in expressing the purposes/functions of their communicative interactions. They may not use communication to initiate interactions, to share feelings/comments, or ask for information.

Functions of communication (Halliday)

- Instrumental: to ask for something
- Regulatory: to direct others, tell others what to do
- Interactional: for social interactions
- Personal: to express feelings, share
- Heuristic: to ask for information
- Imaginative: to tell stories, jokes and roleplay
- Informative: to provide descriptions of events or objects

Paul Grice's maxims of social communication
Principle of cooperation: all communication requires that both parts wish to establish communication. Because of that, they engage in some cooperative behaviours, along the following maxims

- The maxim of quantity: be as informative as one possibly can, and give as much information as needed, and no more
- The maxim of quality: be truthful, and do not give information that is false or not supported by evidence
- The maxim of relation: try to be relevant, and say things that are relate to the discussion

- The maxim of manner: be as clear, as brief, and as orderly as one can in what one says

Children with autism have more difficulty perceiving violations to the maxims of quality, relation and manner
Social communication in DLD: children with DLDs do not necessarily have pragmatic or social communication impairments. In fact, most research suggests relative sparing of these competences
Some studies suggest that apparent social communication impairments in children with DLDs are, in fact, an expression of their impairments in language content and form (Craig, 1995)
Other studies suggest that there may also be impairment to social communication, in the following competences:

- Responding to requests
- Maintaining the conversation topic
- Recognizing emotions
- Inferring/guessing emotional states
- Providing socially-appropriate responses

Social pragmatic communication disorder: children with DLD without ASD who have pragmatic impairments
Some researchers have suggested that there should be a subtype of SLI/DLD called Semantic-Pragmatic Language Impairment (PLI) (Bishop, 2001)

➔ Children who exhibit atypical social behaviours, irrelevant utterances, atypical interests, atypical conversational behaviours, poor use of conversation context and other communication limitations (Bishop, 2006)

Given the possible relation between PLI and autism, Bishop suggests having two diagnoses

1) PLI (pure, without autistic behaviours)
2) PLI plus (includes autistic behaviours)

Diagnostic and Statistical Manual of Mental Disorders (DSM-5 , American Psychiatric Association, 2013) includes a category of Social (Pragmatic) Communication Disorder (SPCD) that involves persistent difficulties in verbal and nonverbal communication for the purposes of social interaction, in the absence of other characteristics of autism (restrictive interests and repetitive behaviors).
Diagnostic criteria for SPCD provided by the American Psychiatric Association (2013)
Difficulty in each of four areas:

1) Using communication to interact socially, appropriate to context;
2) Adjusting language for different conversational partners and situations;
3) Participating in different types of discourse, providing repair when needed, and using nonverbal cues effectively
4) Comprehending jokes, idioms, metaphors, and other types of language that require an understanding of nonliteral or figurative forms

These deficits cannot be the result of other clinical conditions (e.g., ASD, intellectual disability) and cannot stem from deficits in language form and content (however DLD may co-occur with SPCD)

Social pragmatic communication disorder vs related disorders?

- SPCD vs (S)PLI: SPCD is the most recent term, with better defined diagnostic criteria, so it should be used istead of PLI or SPLI.
- SPCD vs DLD: the two may co-occur, but the social communication difficulties should be beyond what can be explained by the structural language impairment, for a diagnosis of SPCD
- SPCD vs intellectual disability: intellectual disability may co-occur with SPCD, but the social communication disorder should be more severe than what can be justified by the intellectual disability, for a diagnosis of SPCD
- SPCD vs ASD - Essentially, SPCD is similar ASD but without the other characteristics of autism (restricted interests and repetitive behaviors). If a child is diagnosed with ASD they do not get a diagnosis of SPCD, because those features are already contained in the ASD diagnosis

Lecture 7: Speech Sound Disorders

SSD: the most common child communication disorder (ASHA, 2000)
May have a known cause, eg cognitive impairment, hearing loss, cleft lip and/or palate, cerebral palsy, or may be of unknown cause (most cases are) (Breoomfield & Dodd, 2004)

SSDS of unknown cause: typically diagnosed between 2 and 4 years of age
Restricted speech sound patterns without apparent sensory, structural, neurological, or psychological impairments

Impairments may persist beyond the school years, in which cases children are at risk of poorer academic performance

SSDS are heterogenous
Children with SSDs differ in underlying causes, patterns of speech errors, severity of impairment, co-occuring deficits (DLD or other cognitive impairments), response to treatment, maintenance of improvements obtained from treatment

➔ Given this heterogeneity, several classification systems have been developed to describe subtypes of SSDs

Broad: Etiological approach
The primary assumption of these approached is that there is a medical/underlying cause of the SSD
Broad etiological approaches include diagnoses made based on diagnostic manual like:

1) DSM – Diagnostic statistic manual from the American Psychiatric Association
   'phonological disorder'
2) ICD – International Classification of Diseases, from the World Health Organization
   "developmental speech or language disorder'
3) ICF – International classification of functioning of the WHO
   Describes the impact of SSDs in different domains (body structure, body function, activities and participation, environmental factors and personal factors)

Limitation: unfortunately, these are too broad – no description of the known heterogeneity of SSDs. The diagnostic label do not say much about how children may present (how does their speech sound like?)

Specific: etiological approach
Shriberg's Speech Disorders Classification System (SDCS), includes following categories
Normal speech
Speech delay (genetic, otitis media with effusion, psychosocial)
Cause: polygenic/environmental
Motor speech disorders (apraxia, dysarthria, not otherwise specified)
Cause: monogenic?/oligogenic?
Speech errors (/t/,/s/)
Cause: environmental
Limitations: around 50% of children with SSD fall in the genetic speech delay category, which is still very broad (children will have heterogeneous speech profiles)
Patterns of speech errors are not accurate in distinguishing between these diagnostic categories. This validates the claim speech profiles are heterogeneous

Specific: descriptive linguistic approach
Diagnostic categories are defined based on the patterns of speech errors that are observed
This approach is based on the observation that children who make errors with multiple sounds are better classified as having errors with certain classes or groups of sounds that actually share certain properties
This approach introduces the distinction between normal speech, delayed speech (where a child shows error patterns typical of younger children, such as stopping of fricatives) and deviant speech (where a child shows error patterns that do not occur in typically developing children, such as backing)
The most influential model in this approach is Dodd's Differential Diagnosis system

Phonetic impairment	*Phonological impairment*	*Impairment to motor planning, programming and execution*
Articulation disorder	Phonological delay	Childhood apraxia of speech
	Consistent atypical phonological disorder	
	Inconsistent phonological disorder	

Important distinctions:

- Phonetics: study of physical properties of speech sounds and the articulatory gestures necessary to produce them
- Phone: basic unit of description, which is a sound that can be physically distinguished from another speech sound

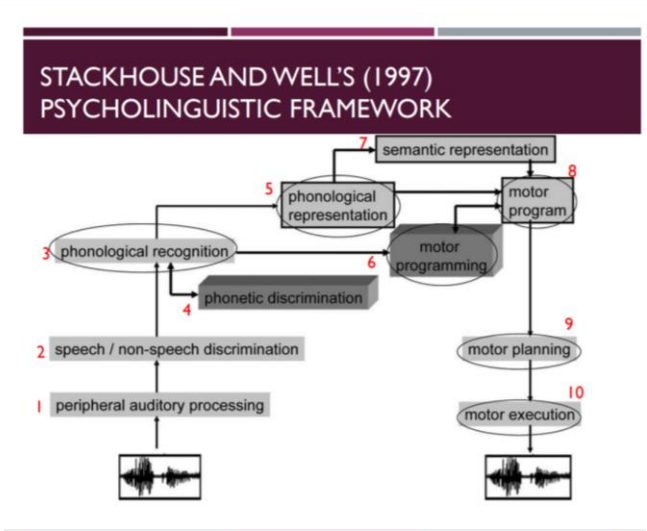
- Phonology: study of mental representation of sounds that distinguish between words of a given language, and the sound patterns that are characteristic of a language and determine developmental patterns in production of speech sound
- Phoneme: basic unit of description, which is an abstract representation of a speech sound which distinguishes between at least two words in a given language

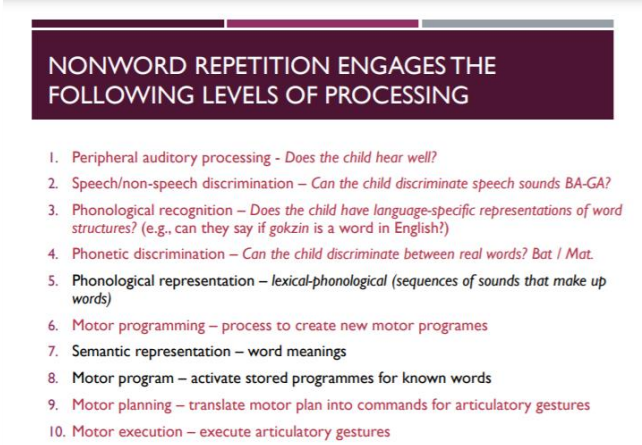
Articulatory errors (ASHA, 1993)
- Omission: a speech sound is left out
- Distortion: a speech sound is produced as a non-existing speech sound
- Substitution: replacement of one or more speech sounds
- Addition: inclusion of one of more speech sounds
- Incorrect sequencing of speech sounds

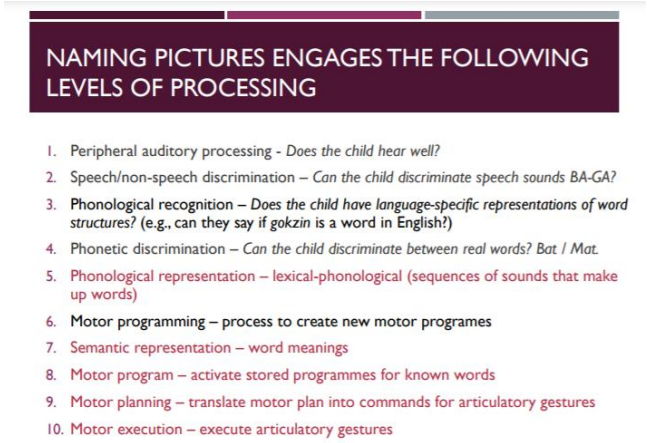
Phonological processes
1) Whole word (syllable structure) processes: the syllable structure of the target word is altered by a reduction, deletion or addition of one or more sounds in the syllable, for example, book becomes bu
2) Substitution processes: phonemes of one class of sounds are altered and turned into phonemes of a different class, by changing the place or manner of production, for example, sun becomes tun
3) Assimilation processes: sounds or sound families that change to become similar to other sounds within the word
- Regressive assimilation: later sounds influence previous sound production
- Progressive assimilation: previous phonemes influencing later-occuring sounds in a word, syllable or across

Atypical phonological processes

Specific: psycholinguistic approach
Employs models of normal speech processing to explain how SSDs occur (which levels of processing are impaired)
A bridge between the etiological approaches and the linguistic descriptive approaches (Kami, 1989)
Cause/ medical = etiological
Mechanism / cognitive = psycholinguistic
Behaviour = linguistic







Phonological representations testing:

- Auditory lexical decision: is figzor a word?
- Word-picture verification: is this word correct for this picture?
  Words a manipulated so that sometimes they mismatch the picture in a phonetic feature
- Manipulation tasks: if we remove /k/ from beak, what do we get?

SSD VS DLD

Shouldn't children with phonological impairments simply receive a diagnosis of DLD?

No, because uncomplicated SSDs (without known medical basis) respond well to intervention and often resolve before the age of 5.

➔ Remember that, according to Bishop et al. (2017), the diagnosis of DLD is not generally done before 5, unless there are indicators of poor prognosis (noticeable comprehension deficits, or deficit across several language areas, or poor use of gesture, or family history)

Lecture 8: fluency and fluency disorders

Meanings of fluency

- Reading fluency: speed, accuracy and expression in reading
- Foreign language fluency: proficiency when speaking a foreign language
- Native language fluency: (Fillmore, 1979)

ASHA definition (1999): the aspect of speech production that refers to the continuity, smoothness, rate, and/or effort with which phonologic, lexical, morphologic, and/or syntactic language units are spoken

Disfluency: an interruption of speech: pause, hesitation, repetition

Everyone has events of disfluency (normal disfluency)

Less typical, stuttering-like disfluencies (Yairi, 2007)

- Part-word or sound/syllable repetitions
- Prolongations
- Blocks

Stuttering
ASHA definition: stuttering, the most common fluency disorder, is an interruption in the flow of speaking characterized by repetitions (sounds, syllables, words, phrases), sound prolongations, blocks, interjections, and revisions, which may affect the rate and rhythm of speech

Core behaviours: basis speech behaviours of stuttering
- Repetitions of sounds, syllables or single-syllable words
- Prolongations: may have later onset than repetitions, or become prominent later (differ from blocks, in that airflow and sound continue)
- Blocks: last core behaviour to appear, or to become prominent (interrupted movement of articulators, as well as airflow and voicing)

Secondary behaviours: reactions to core behaviours
- Escape behaviours: attempt to terminate a disfluency (eye blinks, head nods, interjections)
  This behavioural pattern is reinforced, when followed by the termination of a disfluency, leading to further use of the same behaviour (instrumental learning)
- Avoidance behaviours: a behaviour in anticipation of a disfluency
  Attempt to avoid stuttering, and associated with negative feelings
  May be an escape behaviour, used in anticipation
  May be changing the word, reformulating a sentence, etc.

The ABC's of stuttering (Cooper, 1986)
Affective -> feeling
  Feelings and emotions toward stuttering
Behavioural -> doing
  Core behaviours and secondary behaviours (escape and avoidance)
Cognitive -> thinking
  Self-esteem, self-confidence (attitudes)
Stuttering onset
Age: roughly around 4 years of age (early research), more recent studies mark average onset at 2,8 years of age
Manner:
Typical first signs: simple relaxed repetitions of syllables and words

Conditions under which fluency (or stuttering severity) varies
Consistency: tendency to stutter on the same words, when reading the same passage several times
Anticipation: ability to predict which sounds she or he will stutter on
Adaptation: gradual decrease in disfluencies when reading the same passage several times

Normal disfluency vs. stuttering

Normal disfluency: 1.5 – 6 yoa
Many children will go through a phase of increased normal disfluency in this age range
In different moments, they may range from being exceptionally fluent, and excessively disfluent
Normal disfluencies peak between 2.5 – 3 years of age, but continue to occur throughout childhood and adulthood
These swings in fluency are part of normal development
May be associated with:
- Language development
- Motor learning
- Other developmental and environmental pressures

Core behaviours: useful to distinguish normally disfluent children from children who stutter
Consider:
- Amount of disfluency
  No more than 10 disfluencies per 100 words
- Number of units of repetitions and interjections
  Typically one-unit repetitions, occasionally to-unit
- Type of disfluency in relation to age

Secondary behaviours: typically no secondary behaviours are observed

Feelings and attitudes: the child rarely notices the disfluencies
Underlying processes (what is responsible for the observed behaviour)
Normal disfluencies may be the product of learning to integrate all the subcomponents of spoken language, at increasingly faster rates with increasingly greater options for vocabulary, syntax, and prosody (Guitar, 2014)

- Language development
  Syntax: structures that are still being learned/ automatized (Colburn & Mysak, 1982)
  Pragmatics: disfluencies more common when interrupting, directing another's activities, and responding to commands to change their own activities
- Relatively inefficient speech motor control
- Environment: psychological stresses
- Excitement
- Competition to be heard

Borderline stuttering: 1.5 – 3.5 yoa
Children who are neither entirely normally disfluent, nor definitely stuttering
Core behaviours: there is no single core behaviour that is unique to borderline stuttering

- Amount of disfluency: more than 10 disfluencies per 100 words
- Number of units of repetitions: more than one unit of repetition
- Type of disfluency: more than 50% of disfluencies are stuttering-like disfluencies
  Part-word and monosyllabic whole word repetitions and prolongations
  May also be tense pauses and dysrhythmic phonation (distortion, prolongation, and/or break in phonation) (Yairi, 1997)

Feelings and attitudes: due to little awareness, they do not show concern or embarrassment. Exceptionally, may appear surprised or frustrated when more obvious disfluencies occur
Underlying processes:

- Stresses of speech, language and psychosocial development
- Combined with constitutional predisposition
- Combined with environmental factors

Beginning stuttering: 3.5 – 6 yoa
Core behaviours:

- Repetitions: become more tense, rapid and with irregular rhythm
  Final phoneme of repeated segment is often abrupt or changes
  Changes in pitch, due to laryngeal tension
- Prolongations: go from occurring in word onset, to also in sounds in the middle of words
- First signs of blockages appear

Secondary behaviours:

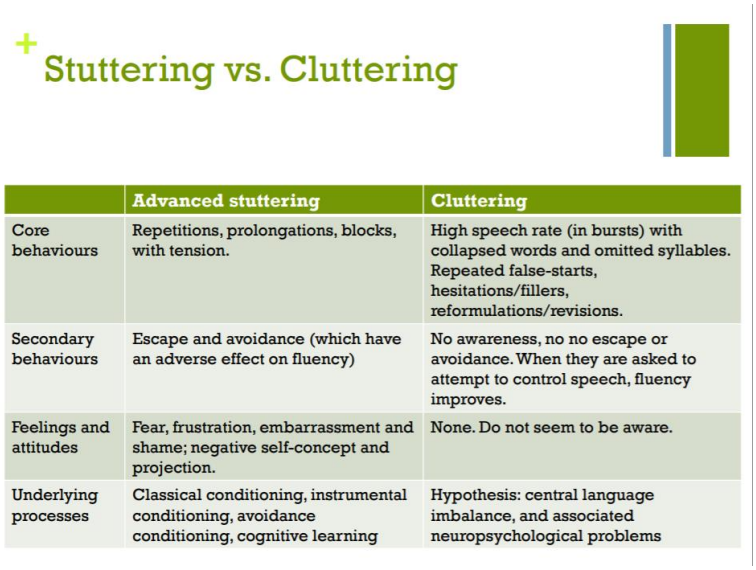
- Escape: the earliest secondary behaviours
  Head nods, squinting their eyes, blinking while trying to push a word out
- Avoidance: the child starts employing these strategies earlier in the disfluency, moving from escape to avoidance

Underlying processes:

- Transition to this stage is related to an interplay between constitutional factors and environmental factors
- Constitutional predisposition
- Environmental factors
- Increases in muscular tension associated with disfluencies
- Increase in amount and speed of repetitions
- Effects of learning on stuttering
- Instrumental conditioning

Intermediate stuttering: 6 – 13 yoa
Core: blocks
Secondary: escape and avoidance
Feelings and attitudes: fear, frustration, embarrassment and shame
Processes: same as before, plus avoidance conditioning (avoiding situations, words or sounds where child thinks he or she will stutter, to prevent embarrassment)

Advanced stuttering: 14 yoa and above
Core: long, tense blocks (some with tremor)
Secondary: escape and avoidance behaviours
Feelings and attitudes: same as before, plus negative self-concept and projection to listeners
Processes: same as before, plus cognitive learning (learning of negative attitudes about themselves and projection of those)



	Advanced stuttering	Cluttering
Core behaviours	Repetitions, prolongations, blocks, with tension.	High speech rate (in bursts) with collapsed words and omitted syllables. Repeated false-starts, hesitations/fillers, reformulations/revisions.
Secondary behaviours	Escape and avoidance (which have an adverse effect on fluency)	No awareness, no no escape or avoidance. When they are asked to attempt to control speech, fluency improves.
Feelings and attitudes	Fear, frustration, embarrassment and shame; negative self-concept and projection.	None. Do not seem to be aware.
Underlying processes	Classical conditioning, instrumental conditioning, avoidance conditioning, cognitive learning	Hypothesis: central language imbalance, and associated neuropsychological problems

Lecture 9: Consensus paper on post-operative pediatric cerebellar mutism syndrome: the Iceland Delphi results

Posterior fossa: small space in the skull, near brainstem and cerebellum. Cerebellum is responsible for balance (but also cognition) Brainstem controls the vital body functions
If a tumor grows, it blocks the flow of spinal fluid, which increases pressure on the brain
One of the most troublesome post-operative complications of cerebellar and fourth ventricular tumor surgery is cerebellar mutism (CM) and its associated features

Purpose of the current study: to present the results of an international consensus process specifically aimed at refining the terminology in the context of pediatric posterior fossa tumor patients. It features a new, proposed working definition of post-operative pediatric CMS and includes preliminary suggestions for diagnosis and follow-up of the patients.

Historical review of terms and definitions
- Daly and Love: introduced the term Akinetic Mutism (AN)
- Rekate et al: introduced the term Cerebellar Mutism (CM)
- Neurology committee of the Children's Cancer Group in the USA
- Van Dongen et al (1994): introduced the term syndrome of cerebellar mutism and subsequent dysarthria (MSD)
- Kirk et al (1995): PFS = posterior fossa syndrome
- Schmahmann and Pandya (1987)

Why is a consenus needed: inconsistent use of terms

Method
Mechanism for achieving agreement between internationally dispersed, multiprofessional group of experts
1. Express opinions privately via online questionnaires
2. Come together to discuss views at a face-to-face consensus development conference
3. Express opinions privately via online questionnaires again

What is the modified Delphi technique and how was it conducted in this study?
- Initial drafts of proposed consensus statements were created using evidence from reviews
- Before the conference: two rounds of online survey with statements. Anonymized results were sent to all respondents

- Consensus conference: The results were reviewed together. Three working groups discussed and presented issues related to definition, diagnosis, and followup. All of this was then debated
- After the conference: again, two rounds of online survey with statements

Summary of results
Current definition of CMS as stated in the paper
Post-operative pediatric CMS
Characterized by:
Delayed onset mutism;
Reduced speech;
Emotional lability
After cerebellar/4th ventricle tumor surgery in children
The mutism is always transient, but recovery from CMS may be prolonged
Speech and language may not return to normal
Other deficits of cognitive, affective and motor function often persist
Additional results of the consensus process as stated in the paper
Sharpening the definition; absence of speech and not absence of non verbal sounds
All patients be subject to pre-operative and immediate post-operative CMS scoring
Post-operatively, but prior to radiotherapy brief neurophsychological assessment. Full assessment at 12 months posttreatment, then annually for the next 5 years.