Current topics:

- Memory and memory disorders
- Disorders of symbolic functions
- Disorders of intelect
- Disorders of thinking
- Disorders of affectivity and emotions

Terms

**Definition:** ability to store and retrieve past data, events and images at will

Modified by:

- consciousness (general and selective attentiveness, alertness)
- interest (motivation, mood, reward, etc.)

**Memory characteristics:**
1. Exactness (details, objectivity)
2. Familiarity (confidence)
3. Novelty (new vs. old)
4. Orientation (time, space)

**Phases:**
1. Reception (encoding) - better in youth worse in elderly
2. Retention (storage)
3. Recall (retrieval, reproduction)

**Ebbinghaus curve of forgetfulness**

**Ribot gradient** (in retrograde amnesia one tends to lose recent memories compared to old ones)

**Memory skills:**
- mechanical (kids), logical, deductions (adults), visual, auditory, etc.

Attention ➜ Encoding ➜ Storage ➜ Retrieval
Types of memory

According to duration:
- very short (register) (ms, sec)
- short (min, hours)
- long term (years)

According to processing:
- working memory
- permanent memory

No theory that explains why we forget
Forgetting follow some rules - not known
Some rehearsed knowledge will never be forgotten (‘permastore’)

Visual memory task example

1. Perception of new face - visual and frontal cortex
2. Imagination of recently seen face - hippocampus
3. Comparison with previously remembered faces - visual cortex + parietal + frontal assoc. cortices
4. Decision whether the face was seen before - frontal cortex

Disorders of memory I

Loss of memory - forgetfulness
Amnesia
- retrograde (RA), anterograde (AA) (post-traumatic)
- total (trauma) vs. partial (delirium)
Examples: trauma (bilateral temporal damage, prefrontal lesions)
Hypoxia, ischaemia, avitaminosis B1 (Wernicke-Korsakov sy.), epilepsy, malnutrition CO poisoning, commotio, contusion, degenerative brain diseases

Specific disorders of memory
1. Hypermnesia (↑ recall + ↑ sureness <-> ↓ accuracy + ↓ storage)
   Examples: mania, delirium, schizophrenia
2. Hypomnesia (↓ recall + ↓ sureness <-> ↑ storage ↑ pr)
   Examples: drunkenness (alcohol intoxication), brain trauma (commotio)
Disorders of memory II

3. Dysmnnesia

A. Paramnesia - impaired timing of memory traces
   - Ekmnesia (e.g. recent event recalled as far past event)
   - Duplicity (e.g. division of one event into 2 different events; joining of two different events into 1 event)

B. Allomnesia – distorted sureness (certainty) of memory traces
   - Cryptomnesia (hidden memory) - experiences that people believe to be original but which are actually memories they've forgotten.
   - Illusions of memory – sureness that certain pictures, sounds or events happened before (illusiones déjà vu); people remember events that never happened

C. Confabulations (false memories) - fantasy that has unconsciously replaced real facts in memory (e.g. abduction by aliens)

D. Memory hallucination (Pseudoreminiscence) – experience of memories to something that never existed (e.g.)

E. Pseudologia phantastica - the form of falsifying reality (not ordinary lying, or delusion, or false memory)

Hemispheric specialities in cognitive functions

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<tr>
<th>Cognitive processes</th>
<th>Left hemisphere</th>
<th>Right hemisphere</th>
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<td>Speech (full), verbal analytic, deductive sequential processing</td>
<td>Symbols, iconic holistic, synthetic simultaneous processing</td>
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<td>Scenarios, Conscious, planned</td>
<td>Subliminal, automatic</td>
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<th>Visual functions</th>
<th>Left visual field</th>
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<td>Scenarios</td>
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<tr>
<th>Motor functions</th>
<th>Left side of the body</th>
<th>Right side of the body</th>
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<tr>
<td>Right side of the body</td>
<td>Left side of the body</td>
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<tr>
<th>Emotional functions</th>
<th>Left hemisphere</th>
<th>Right hemisphere</th>
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<tbody>
<tr>
<td>Positive emotions</td>
<td>Left hemisphere</td>
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<tr>
<td>Laesions mostly lead to depressive mood</td>
<td>Right hemisphere</td>
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<tr>
<td>Recognition of emotions</td>
<td>Negative emotions – laesions lead to euphoria</td>
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<td>Expression of emotions</td>
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<th>Constructive functions</th>
<th>Left hemisphere</th>
<th>Right hemisphere</th>
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<tr>
<td>Abstraction, rational, reasoning</td>
<td>Factual, intuitive, reasoning</td>
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<tr>
<th>Meaning</th>
<th>Left hemisphere</th>
<th>Right hemisphere</th>
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<tbody>
<tr>
<td>Me in the word</td>
<td>The word inside of me</td>
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Disorders of symbolic functions

1. Dysphasias (disordered usage of symbols)
   - Aphasia (speech)
   - Agrafia (handwriting, printed text)
   - Alexia (reading) Acalculia (calculations)

2. Agnosias (disordered perception of the body and the world outside)

3. Dyspraxia (disordered execution of motor programs)
Disorders of speech

- **Aphasia (dysphasia)** - spontaneous production, understanding and reproduction of read or heared words

- **Disorders of speech content and fluency**
  - Paraphasia (verbal, literary) - erroneous speech (syllables, words)
  - Paralexia (verbal, literary) - erroneous reading (syllables, words)
  - Neologisms - new nonsense words instead of proper naming
  - Circumlocution - description instead of proper name
  - Telegraphic speech - fragmentation and reduction of speech
  - Echolalia - automatic repetition, usually without comprehension, of all or part of what someone has just said (children when learning speech)
  - Glossolalia - rapid, fluent burst of speech, usually unintelligible
  - Stuttering or stammering -
  - Cluttering - uncontrolled speed of speech

Aphasia (dysphasia) - I

Main types

1. **Expressive, motor, Broca’s** - posterior-inferior frontal lobe
   - speech fragmented; seeking for common words, names, terms; understand to listened speech; reading & writing skills little impaired

2. **Receptive, sensory, Wernicke’s** - posterior-superior temporal lobe
   - speech fluent but full of agrammatisms & neologisms; misunderstanding of listened speech; reading & writing impaired + anosognosia (do not realize the defect)

3. **Global sensoric-motor** - frontal & temporal lobes (occlusion a. cerebri media sin., a. carotis interna. sin.)
   - speech fragmented, telegraphic, reč neplynulá, strohá (pár slov, tráz opakovanych dookola), porozumenie počutému nepriľnomné (ani jednoduché slová); čítanie, píšanie narušené

Speech regions

Speech motoric
Aphasia - II

Other types

1. **Auditory sensoric** - temporal lobe; paths between primary and secondary auditory cortex
   speech is fluent, understanding to talk is impaired

2. **Conductive** - g. supramarginalis, insula, fasc. uncinatus (path between temporal lobe and pre-motoric cortex)
   speech is fluent, understanding to speech normal, impaired reproduction of heared speech

3. **Anomia** - g. angularis, g. temporales sup. (transient hypoxia etc.)
   speech is fluent, problems with isolated usage of names, terms etc.

4. **Mixed motoric and sensory**

Other phatic disorders

- **Graphic symbols of speech**
  - *Agraphia* - acquired inability to write the letters, words (literary, verbal)
  - *Dysgraphia* - developmenta inability to write
  - *Alexia* - acquired inability to read and comprehend the text; as a part of aphasica (e.g. expressive, global, sensory, mixed) or isolated (literary, verbal, spatial).
  - agnostic alexia (word blindness) - unable to identify the letters and words
  - aphasic alexia (visual asymbolia) - can neither read nor write alexia+ agraphia
  - *Dyslexia* - developmental (social) inability to read (boys > girls)
  - *Paralexia*

- **Other symbolic disorders**
  - *Acalculia* (+alexia) - inability to manipulate with abstract numbers
  - *Asymbolia* (e.g. pain) - various somatic experiences (agnosia)

Agnosia - I

1. **Tactile (astereognosia)** – false identification of things by touch
   - *Amorphognosia* - shape, surface
   - *Ahylognosia* – matter substance (wood, metal, liquid etc.)
     Parietal association cortex

2. **Visual** – misidentifications of objects by vision (not blindness !)
   - *Global* – identification by touch, hearing and smelling preserved
     Temporal-occipital-parietal lobe borderline zone
   - *Colors* – loss of colour concept (different from color blindness)
     Corpus callosum, occipital lobe

3. **Auditory** - misidentification of meaningful sounds (not deafness !)
   - *Verbal* – inability to recognize sounds of speech from other sounds
     Amusia – inability to recognize melodies, music from other sounds
     Temporal-parietal borderline zone

Agnosia - II

4. **Asomatognозia** Parietal lobes (mostly parietal)
   - *Autotopagnosia* – wrong determination of different parts of the own body
   - *Acoenesthesia* – misidentification of the own body
   - *Prosopagnosia* – wrong identification of human faces
   - *Anozognosia* – unawareness of own illness or the deficits resulting from illness (transiently in 50% of stroke victims)

6. **Sy. of sensory extinction**
   moderate form of combined tactile and visual agnosia (ignoring of perceptions from impaired part of the body)

7. **Neglect sy.** (sensory extinction, autotopagnosia, visual agnosia)

7. **Gerstman sy.** (agraphia, acalculia, alexia, agnosia of fingers, „right-left“ confusion) G. angularis of dominant hemisphere
Apraxia (dyspraxia)

A. General dyspraxias
1. Ideative apraxia  Diffuse cortical damage
   purpose of movement is unrecognized; plan and execution of movement are correct
2. Ideomotoric apraxia  Gg. pariet. inf + tempor. sup.+ frontalis
   purpose of movement is recognized; plan of movement is missing (which separate activities are involved and what is their order)
3. Constructive apraxia  Premotor area - frontal lobe
   intention, purpose and plan of movement are correct; execution of movement is impaired (buter-fingers, clumsiness)

B. Specific dyspraxias
1. Constructive dyspraxia (perspective, shapes, geometry)
2. Speech dyspraxia (motor program of voice muscles)
3. Mimic dyspraxia (disorder of articulation and facial mimic)
4. Gait apraxia (frontal ataxia)
4. Dyspraxia of corpus callosum (cross – coordination of limbs)

Intelect disorders

• Definition
Intellect (mind) – complex of psychic functions defining the persons abilities to dominate in certain area; inborn and acquired mental comprehensions, knowledge, solutions, experiences + usage of this knowledge (memory, abstract thought, analysisi and synthesis, creativity, motivation, judgment, vocabulary)
Intelligence – hereditary basis of intelect (individual abilities)
Talent – well developed intellect in certain (mostly) physical dispositions are activities (art, science, technical skills)
Geniality – exceptional ingenuity and creativity in certain rather abstract areas of human phynking(science)

• Disorders
1. Mental retardation (oligophrenia, mental deficiency) – inconsistent or incomplete development of intellect
2. Mental degradation (dementia) – reduction, or gradual or sudden loss of intellect after 2nd y of life

Mental retardation

• Characteristics: incomplete psychomotoric development of speech, abstract thoughts, cogitation, reasoning, memories, learning disabilities incl motor skills (Psycho-motor r.), Social oligophrenia
• Etiology:
  – hereditary (phenylketonuria, fragile X chromosome),
  – inborn – congenital (Down sy., Klinefelter sy., Turner sy.),
  – perinatal (labor injury), postnatal (infection, intoxication),
• Grades:
 1. Mental retardation - moron, freeble-minded IQ 70-80
  2. Mental deficiency (hypophrenia):
     Light (debility) IQ 50-70 (mainly abstraction)
     Mild (imbecility) IQ 35-49 (speech)
     Severe (idiotism) IQ 20-34 (most qualities)
**Mental degradation (dementia)**

**Characteristics:**
- extinction of mental abilities (memory), practical skills, verbal communication, social habits; retrieval of new knowledge mostly affected
- develops over time (experiences may compensate learning disabilities)
- partial demencia vs. total demencia
  - Heller’ infantile demencia (dementia occurring in childhood)
  - Pseudodemencia – mental supression - “purposeful” (specific) deficit for certain tasks, events memories, e.g. stressful part of life (violence)

**Causes:** diffuse organic (structural), biochemical brain changes

**PA:** gray matter atrophy, frontal-parietal area

**Manifestation:** disorder of intellect+ memory+ emotion+ action
1. Disorders of attention -> learning, retention of data
2. Disorientation in time and space, delayed thinking, loss of criticism confabulations, depressive mood, dysphoria, psychomotoric apraxia
3. Wasting of self-care practise, ethical limitations, abusiveness, irresponsibility, anosognosia

**Clinical syndromes:**

**Organic psychosyndrome** (trauma, inflammation, hypoxia, intoxication (CO), ATS, hereditary & acquired neurodegenerative diseases

**Dementia syndrome** - disorders of memory and thoughts prevail
- Common reasons: Alzheimer’ disease, cerebrovascular disorders - multiinfarction dementia, AIDS - dementia complex, Parkinson’ disease, metabolic syndromes, cerebral tumors, hydrocephalus
- Rare reasons: neusyphilis, Huntington’ disease, Creutzfeld-Jakob’ disease, Wilson’ disease,

**Pseudodementia** – without organic damage, rather specific involvement

**Korsakoff syndrome** – memory impairment, confabulations (trauma, intoxications, inflammations in CNS)