5th Congress of the European Academy of Neurology

Oslo, Norway, June 29 - July 2, 2019

Teaching Course 18

Testing of cognitive functions by the neurologist (Level 1)

Testing cognitive functions with a view on anatomy

Armin Schnider
Geneva, Switzerland

Email: armin.schnider@hcuge.ch

EAN 2019, Oslo
Teaching Course 18

Testing of cognitive functions by the neurologist

Testing cognitive functions with a view on anatomy
Armin Schnider, Geneva, Switzerland

Clinical dementia testing: methods and meaning
Eric Salmon, Liège, Belgium

How to explore confused patients
Jacques Luauté, Lyon, France

When standardized neuropsychological testing is needed
Lisa Cipolotti, London, UK

Testing cognitive functions
with a view on anatomy

Armin Schnider, MD
Chairman, Division of Neurorehabilitation
University Hospitals of Geneva / Switzerland

EAN 2019, Oslo
Teaching Course 18:
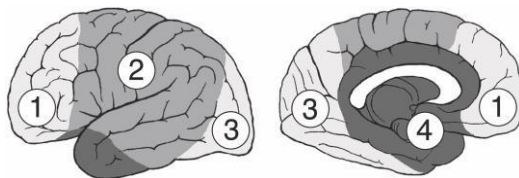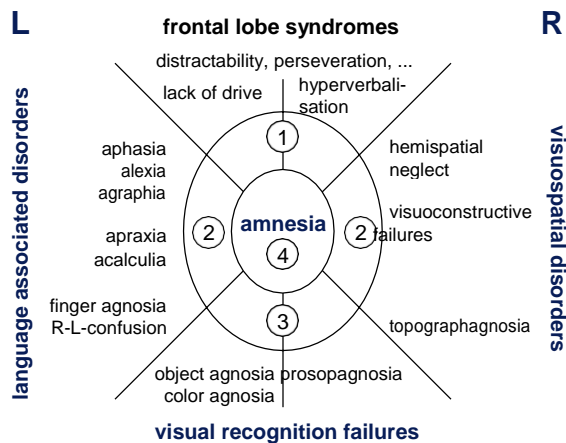Testing of cognitive functions by the neurologist

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Testing cognitive functions
with a view on anatomy

I have
nothing to declare

Armin Schnider, MD
Chairman, Division of Neurorehabilitation
University Hospitals of Geneva / Switzerland

UNIVERSITÉ DE GENÈVE

HUG Hôpitaux Universitaires Genève

Focal cognitive disorders

L   **frontal lobe syndromes**   R

distractability, perseveration, ...
lack of drive   hyperverbali-sation

①

aphasia
alexia
agraphia

hemispatial neglect

visuoconstructive failures

② **amnesia** ②
④

apraxia
acalculia

finger agnosia
R-L-confusion

③   topographagnosia

object agnosia prosopagnosia
color agnosia

language associated disorders

visuospatial disorders

visual recognition failures

Schnider A.
*Verhaltensneurologie,
2. Aufl.* Thieme, 2004

Neurologie du Comportement.
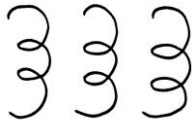Elsevier-Masson, 2008

Reticular formation & ARAS

Basal forebrain

Thalamus

Mesencephalon

Ascending reticular activating system (ARAS)
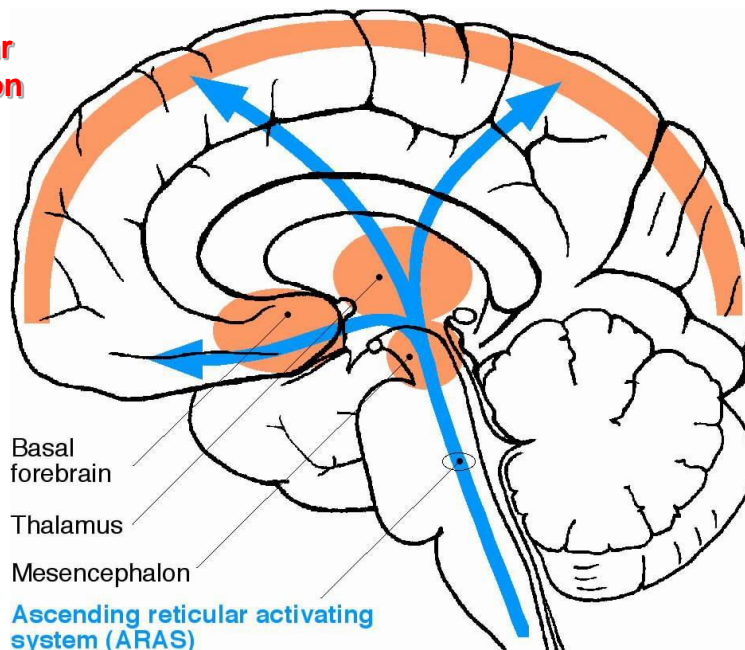
Writing (first name)

Cerme cdedexdctitis deckes

good

not good

Germouiñe

Perseveration

good →

Luria's loops

← **not good**
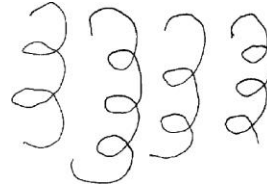
Luria's alternating sequences

Tests of attention

NEUROLOGIE DU COMPORTEMENT

Nom, Prénom: _____   Date de naissance: _____

Examinateur: _____   Date: _____

(1) Attention, orientation   √o.k.; ⊖ non réussi; ✔ diminué

Place pital ____ ville ____ clinique. ____   **Time** : j. de la sem. ____ date ____ mois ____ année ____   **Situation** ____

Digit span _____   **"Serial 7's"s"**: noter la série_____   **Spelling bckwd: "WORLD"** _____

(2) "Frontal" (noter particularités du comportement sur liste séparée)

Stroop: ____s ____fautes / ____s ____F / ____s ____F   Frises de Luria: _____   Séq. alternées.: _____
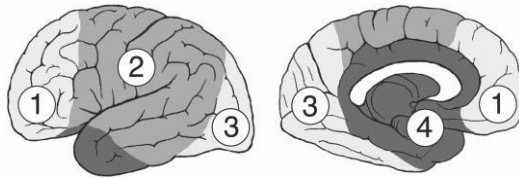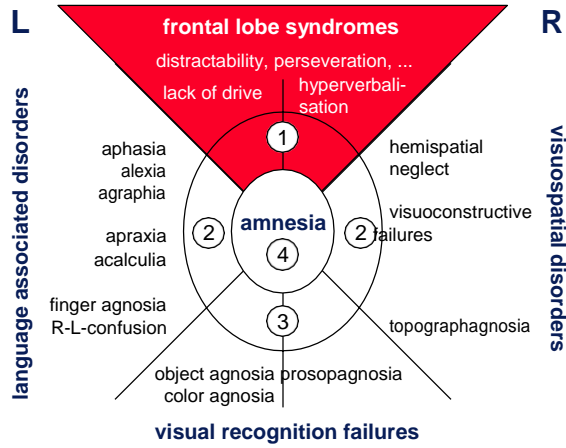
Fluence verbale (lettre. "___", ___ min.): _____ corr, ____rép., ___ fautes   Fluence catég. (catég.: _____): ____ / 1 min.

5-points: _____ corr., ____ rép.: ____ fautes

Proverbes: "Pierre qui roule n'amasse pas mousse"_____   "Qui sème le vent récolte la tempête" _____

....

5

Focal cognitive disorders

L · R

frontal lobe syndromes

distractability, perseveration, ...

lack of drive · hyperverbali-sation

language associated disorders · visuospatial disorders

aphasia
alexia
agraphia

apraxia
acalculia

finger agnosia
R-L-confusion

amnesia

hemispatial neglect

visuoconstructive failures

topographagnosia

object agnosia prosopagnosia
color agnosia

visual recognition failures

Schnider A.
*Verhaltensneurologie,
2. Aufl.* Thieme, 2004

*Neurologie du
Comportement.*
Elsevier-Masson, 2008

Frontal haemorrhage

R · L

Frontal failure: **Grasping**

„Do **_nothing_** with your hands."

Motor perseveration

Model | Perseveration - 1 | Perseveration - 2
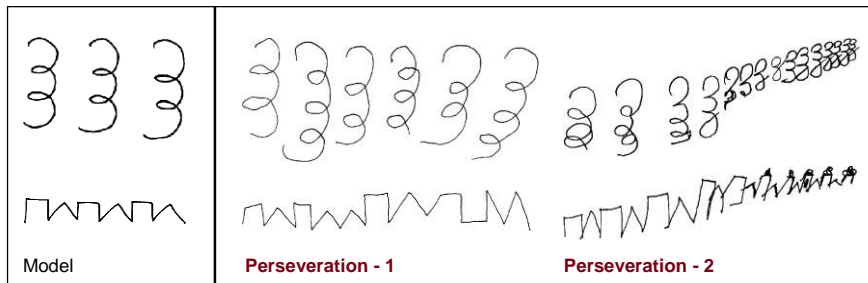
Cognitive perseveration

New task
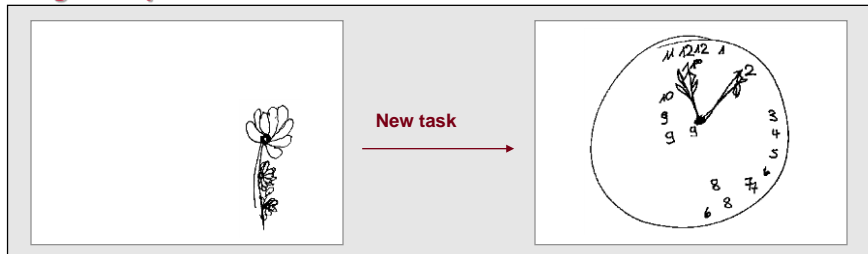
Schnider A. *Verhaltensneurologie*. Thieme 1997

Word production, "verbal fluency"
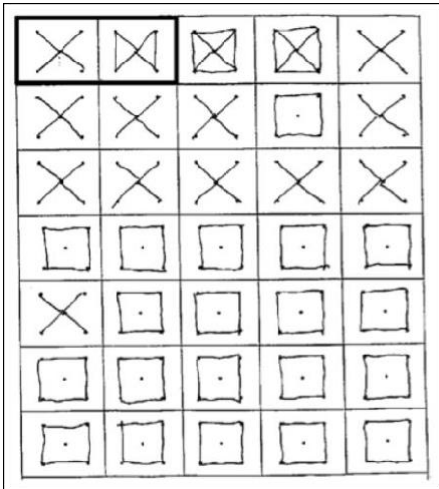(Words starting with "S", "A" … but *no proper names* of people or places)

normal
(≥12/min)

Frontal lobe dysfunction

Severe amnesia

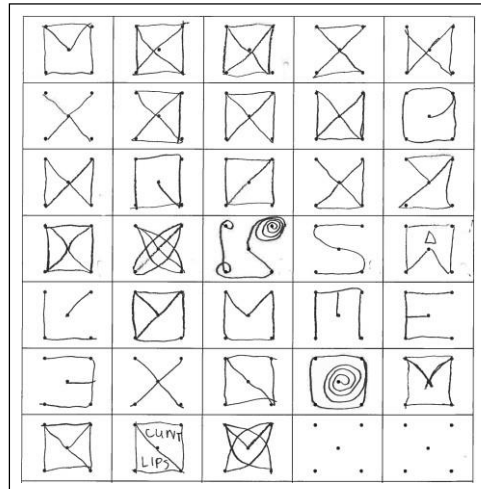Figural fluency – Production of ideas – 5 point test (Regard)
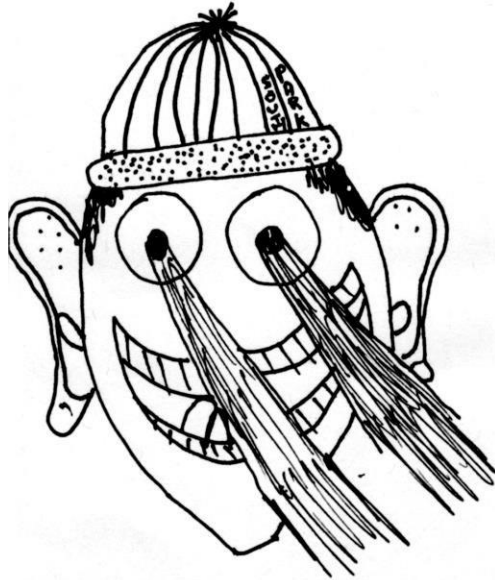

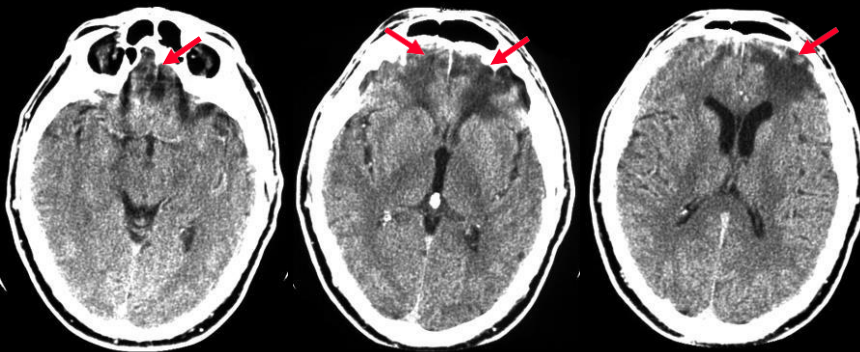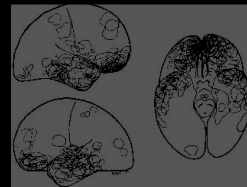**Frontal dementia**
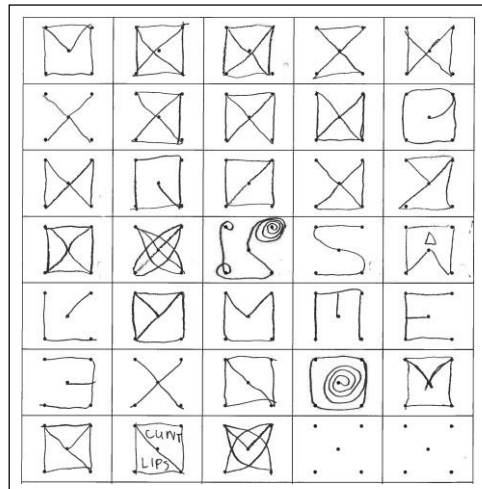
Traumatic brain injury

Figural fluency – Production of ideas – 5 point test (Regard)

Traumatic brain injury

Isolated personality change after frontopolar lesion

Schnider A. *Verhaltensneurologie.* Thieme 1997/2004 - *Neurologie du Comportement.* Masson-Elsevier 2008

9

Frontal Tests

Service de Neurorééducation
Département des neurosciences cliniques

HUG — Hôpitaux Universitaires de Genève

NEUROLOGIE DU COMPORTEMENT

Nom, Prénom: _____   Date de naissance: _____

Examinateur: _____   Date: _____

(1) Attention, orientation   √o.k.; ⊖ non réussi; ∠ diminué

Lieu: hôpital ____ ville ____ clinique. ____   Temps: j. de la sem. ____ date ____ mois ____ année ____   Situation: ____

Empan verbal: _____   "Serial 7's": noter la série _____   Épeler à l'envers: CHIEN _____

(2) "Frontal" (noter particularités du comportement sur liste séparée)   *Describe your observations !*

Stroop ___s ____fautes / ____s ____F / ____s ____F   **Luria's loops** _____   **Alternating seq.:** ___
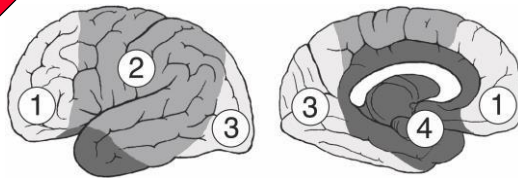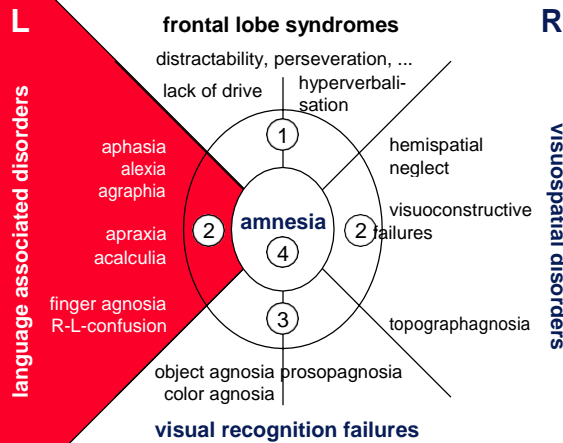
Verbal fluency lettre. "___", ___ min.): _____ corr, ____rép., ___ fautes   **Category fluency** lég.: _____): ____ / 1 min.

5-point (Regard) ·., ____ rép.: ____ fautes

Proverb interpr. qui roule n'amasse pas mousse" _____   "Qui sème le vent récolte la tempête" _____
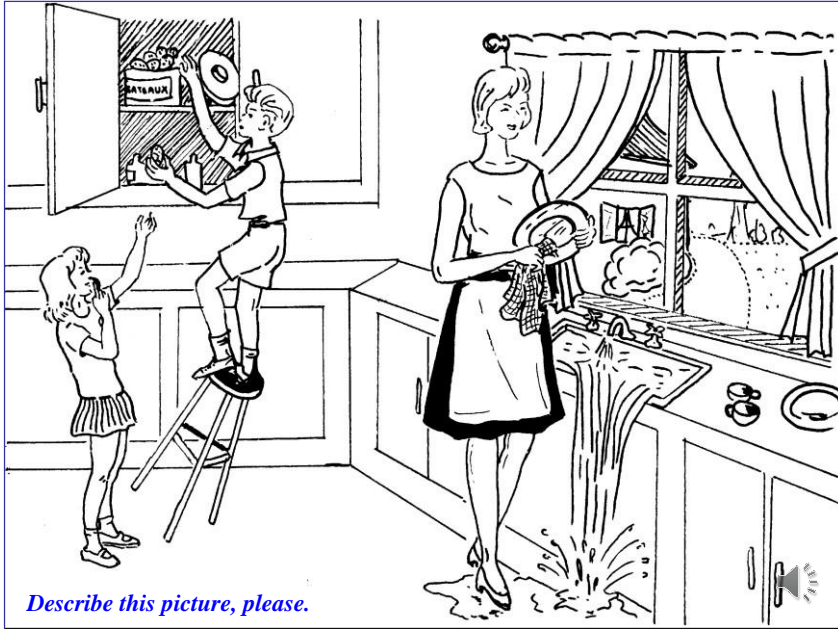
....

Language-associated disorders

L   **frontal lobe syndromes**   **R**

distractability, perseveration, ...

lack of drive | hyperverbali-sation

①

language associated disorders

aphasia
alexia
agraphia

apraxia
acalculia

finger agnosia
R-L-confusion

② **amnesia** ④   ② visuoconstructive failures

hemispatial neglect

visuospatial disorders

③   topographagnosia

object agnosia prosopagnosia
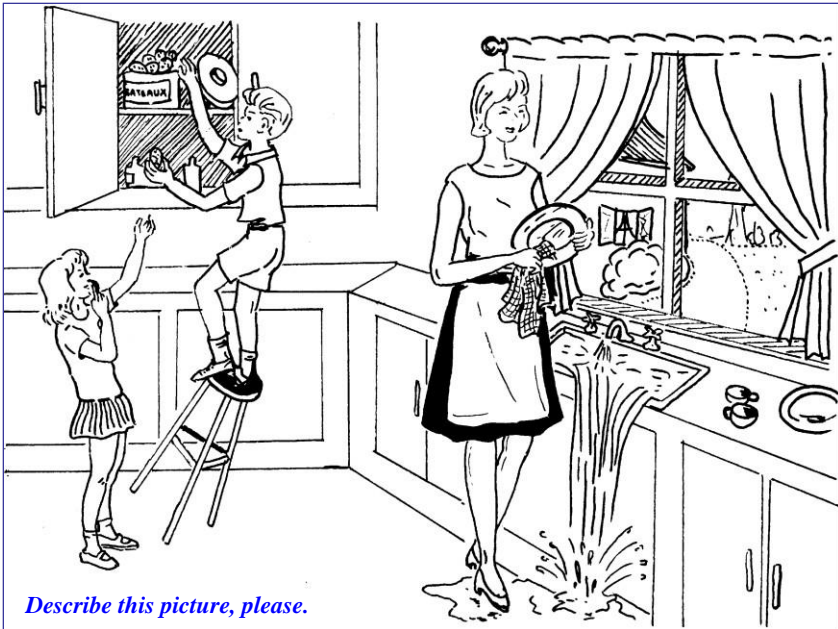color agnosia

visual recognition failures

Schnider A.
Verhaltensneurologie, 2. Aufl. Thieme, 2004

Neurologie du Comportement. Elsevier-Masson, 2008

Fluent aphasia - Jargon *(Wernicke's aphasia)*

Describe this picture, please.

Fluent aphasia - Jargon *(Wernicke's aphasia)*

Describe this picture, please.

Testing language comprehension

Complexity ↗

Close your eyes.

Touch your nose.

Where is your left ear?
...
Where could I wash my hands?
...
Show me the door after showing me the ceiling
...
Touch your right ear with your left index finger.
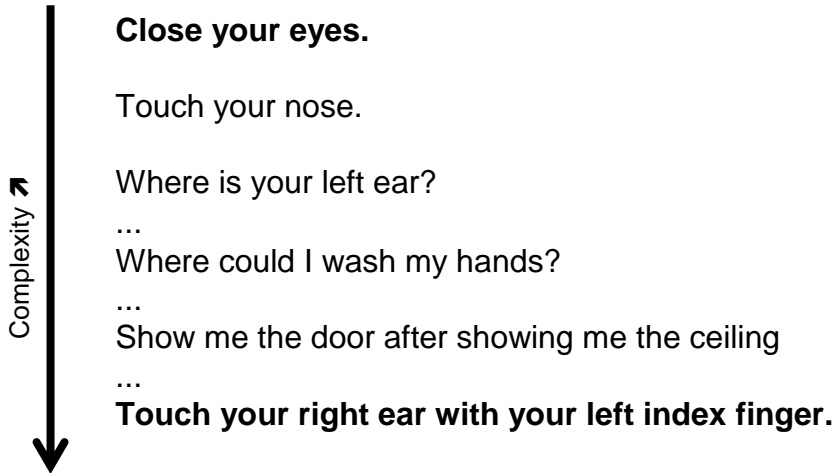
Wernicke's aphasia: writing

"Write a sentence,please."

Une moiselle envoit suisse
employé, avec le masoiselle.

"Write the word…"
"…'électricité' [electricity]." Une invoylées

"…'hôpital' [hospital]." Une omoyele de l'umisiloé

"…'voiture' [car]." Une voitule s'amumélére.

12

Reading

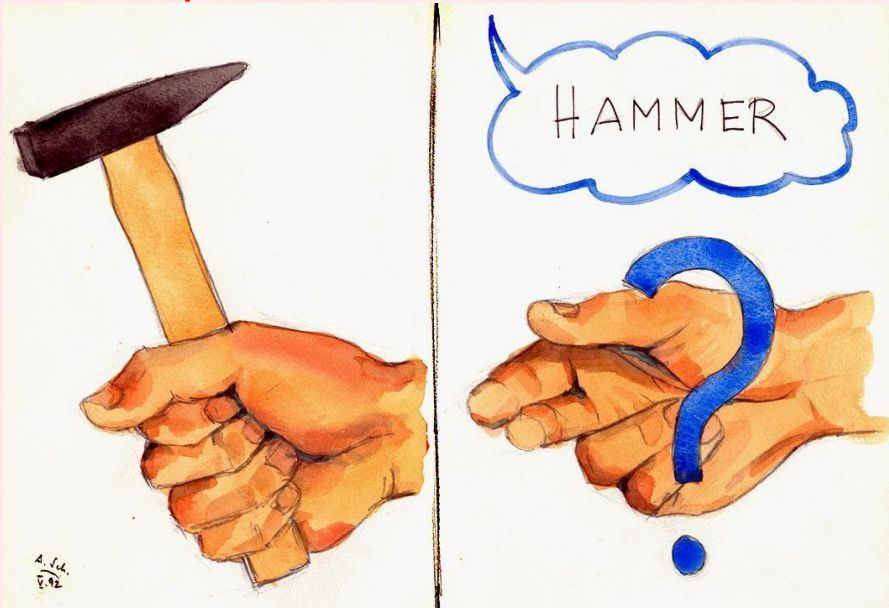# If you easily succeed in reading this text correctly, then you have no alexia.

Aphasic alexia: according to the aphasia

Letter-by-letter reading: pure alexia (alexia without agraphia)

Naming

Rapid exclusion of an aphasia: Naming & Verbal fluency
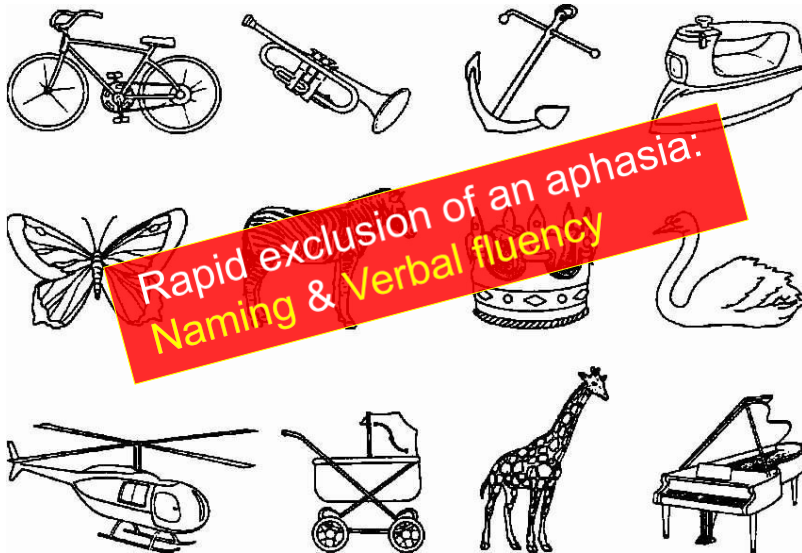
Ideomotor apraxia

Ideomotor apraxia: **Body-part-as-object error (BPO)**

„Show how you use a tooth brush."

14

Apraxia testing: Upper limbs

Transitive movements

- Use a toothbrush
- Use a comb
- Turn a key in a lock
- Throw a piece of money
- Open a bottle
- Use a screwdriver

Intransitive movements

- Signal bye-bye with your hand
- Hitchhike
- Indicate "hallo" from distance
- Greet like a soldier
- indicate "come here" with the hand
- stop!
- vanish!

Language & associated functions

•••••••••••

(2) "Frontal" (noter particularités du comportement sur liste séparée)

Stroop: ____s ____fautes / ____s ____F / ____s ____F   Frises de Luria: _____   Séq. alternées.: _____

Verbal fluency (lettre. "___", ___ min.): _____ corr, ____rép., ___ fautes   **Category fluency** catég.: _____): ____ / 1 min.

5-points: _____ corr., ____ rép.: ____ fautes

Proverbes: "Pierre qui roule n'amasse pas mousse"_____   "Qui sème le vent récolte la tempête" _____

(3) Langage   **Spontaneous expr.** ə: (fluence, contenu, …)_____

Comprehension etit doigt gauche sur l'oreille droite" _____   Ordre en (1, 2, 3-)____ points: _____   Autre:_____

Naming objets réels____   Dessins____/____   **Repetition** "il n'y a pas de mais ni de si": _____ "pas dedans mais dessus..": _____
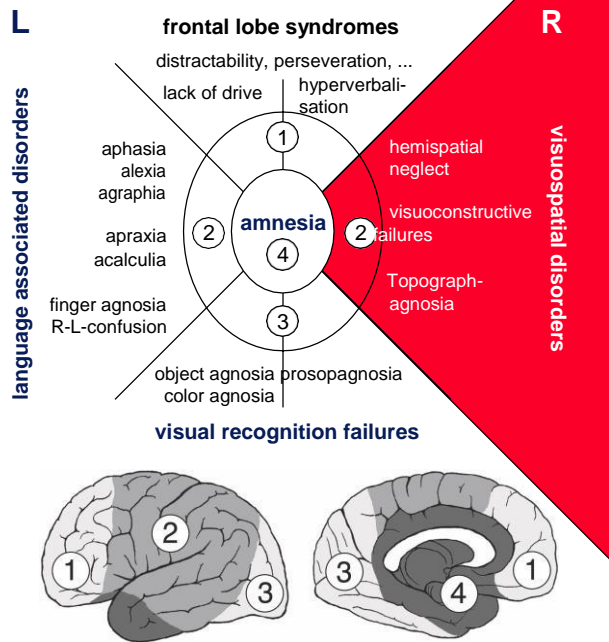
Writing mots: dr _____ g_____   nombres: 4867 + 652_____ (calculer par écrit: ____)   **Reading** (texte)_____

Calculation _____ (___s) 23-9= _____ (___s)   **Finger recognition**les:_____   **R/L-discrimination** _____

Praxia brosse à dent: dr____ g ____ peigne: dr____ g ____ clef: dr____ g ____ ;   Buccofaciale: gonfler ____ téter ____

•••••••••••

Visuo-spatial disorders

L / R

frontal lobe syndromes

distractability, perseveration, ...

lack of drive / hyperverbalisation

1

aphasia
alexia
agraphia

hemispatial neglect

amnesia

apraxia
acalculia

2 — 2

visuoconstructive failures

4

Topograph-agnosia

finger agnosia
R-L-confusion

3

object agnosia prosopagnosia
color agnosia

language associated disorders

visuospatial disorders

visual recognition failures

Schnider A.
*Verhaltensneurologie,
2. Aufl.* Thieme, 2004

*Neurologie du
Comportement.*
Elsevier-Masson, 2008

Left hemispatial neglect

Copying a cube: Hemispatial neglect
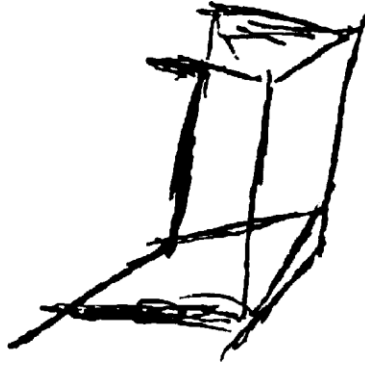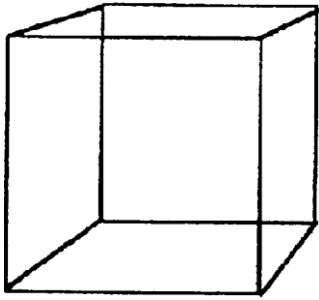
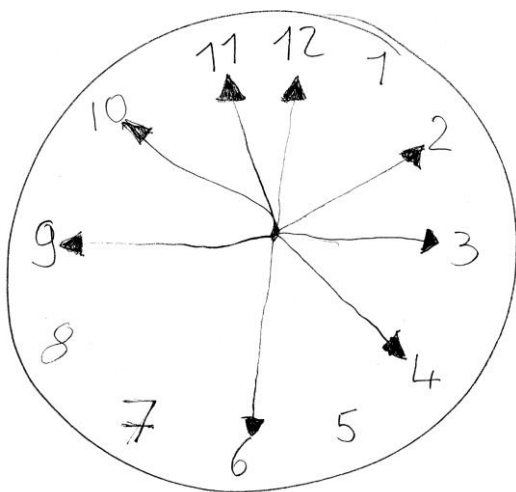Copying a cube: Beginning Alzheimer's dementia
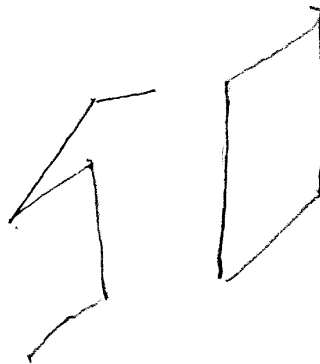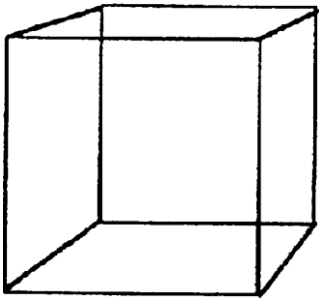
Clock drawing (hemispatial neglect)
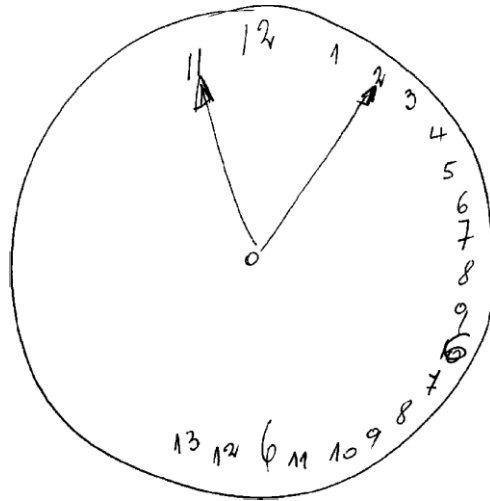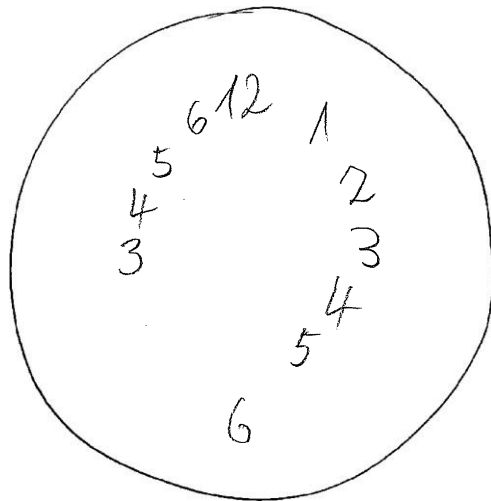

"Write the digits of a clock and put the hands to 10 past 10."
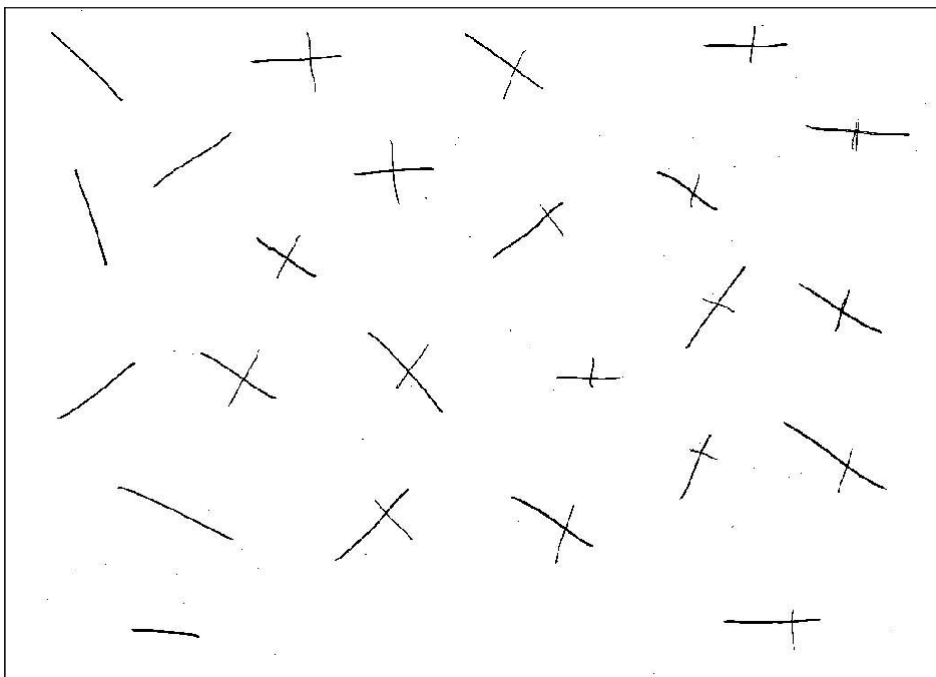
Clock drawing

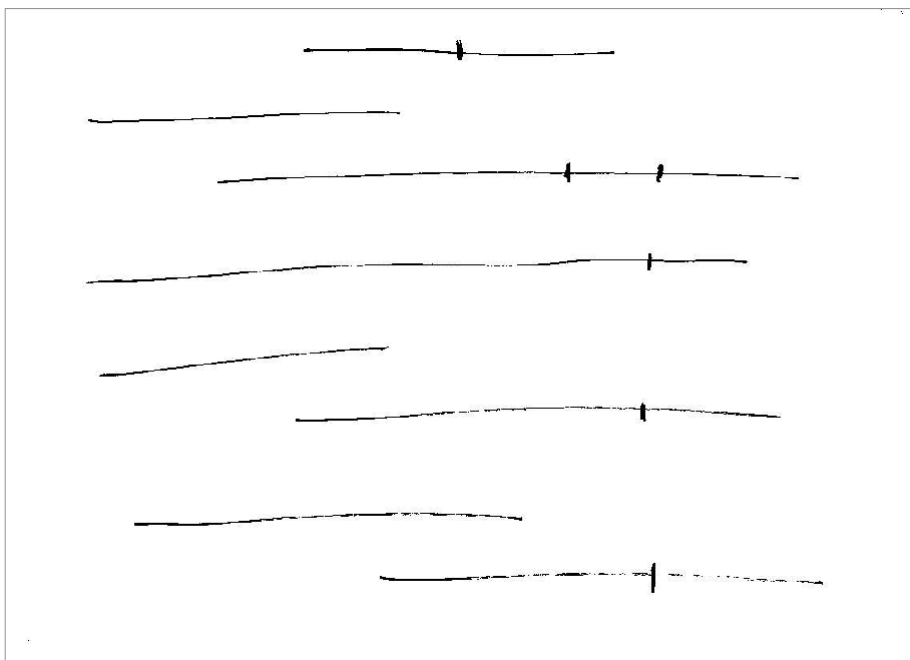Frontal ablation after TBI   Beginning Alzheimer's
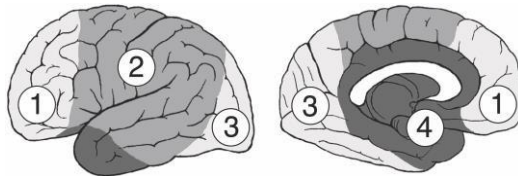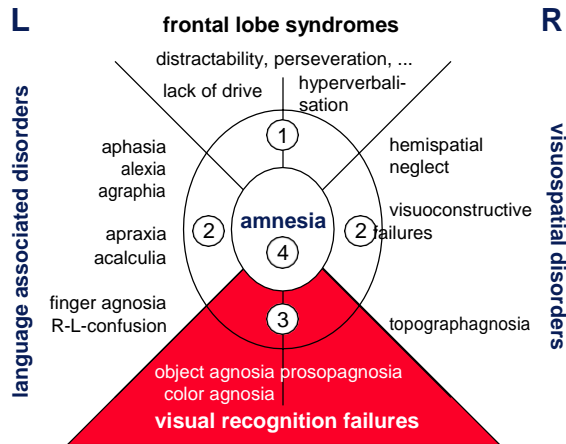
Line cancellation

Line bisection

Visual recognition disorders

L   **frontal lobe syndromes**   R

distractability, perseveration, ...

lack of drive   hyperverbali-sation

①

aphasia
alexia
agraphia   hemispatial neglect

②   **amnesia**   ②   visuoconstructive failures

apraxia
acalculia   ④

finger agnosia
R-L-confusion   ③   topographagnosia

object agnosia prosopagnosia
color agnosia
visual recognition failures

language associated disorders

visuospatial disorders

Schnider A.
*Verhaltensneurologie,
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*Neurologie du
Comportement.*
Elsevier-Masson, 2008

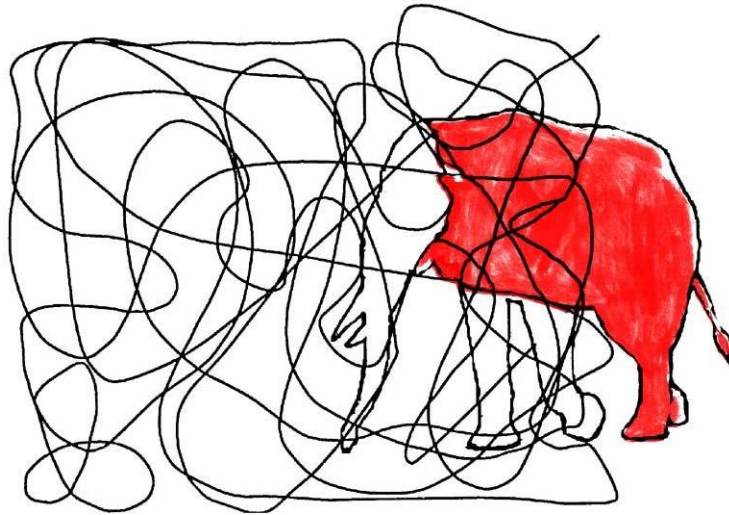**Disturbed Gestalt perception (apperceptive agnosia)**

"Haus" *[House]*

"... Baum?" *[... Tree?]*

"Soll das ein Wort sein?"
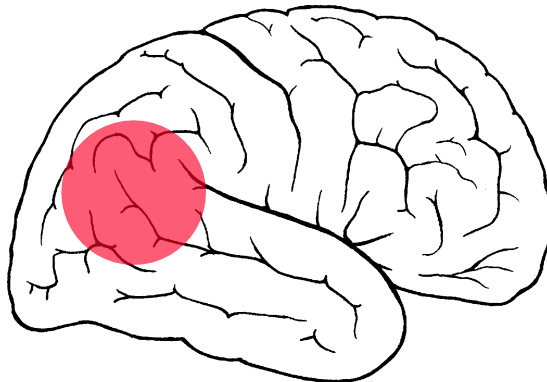*["Is this supposed to be a word?"]*

74 yo. M, bilateral posterior brain damage after cardio-pulmonary arrest

Disturbed Gestalt perception (apperceptive agnosia)

75 yo. F, right posterior stroke (hobby: painting)

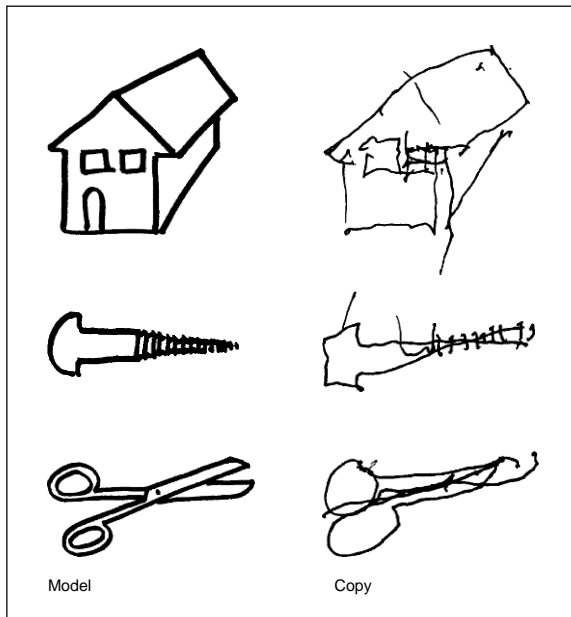**Apperceptive agnosia** *sensu strictu*

**Right parietal / parieto-temporal / parieto-occipital lesion
(Severe form: bilateral lesion)**
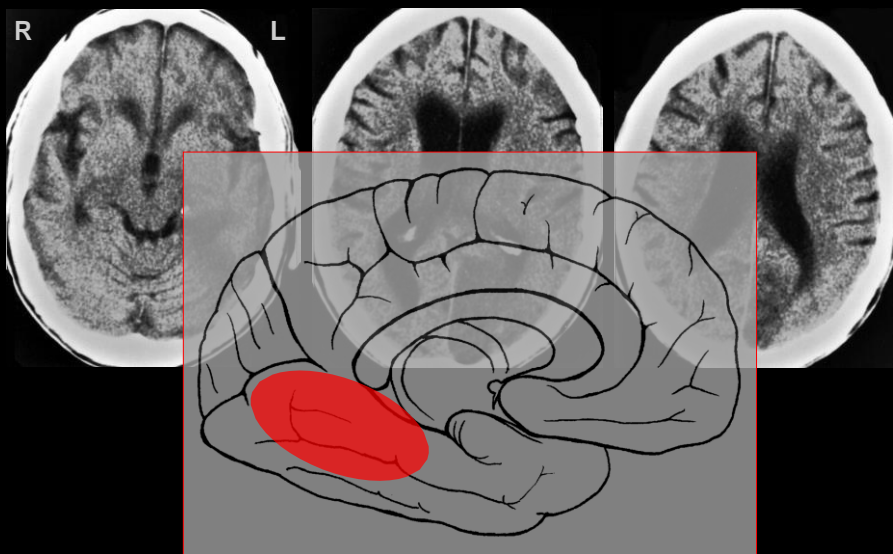**Stroke, inflammation, traumatic brain injury, hypoxia …**

**Apperceptive agnosia = failure of automatic extraction
(or closure) of visual forms**

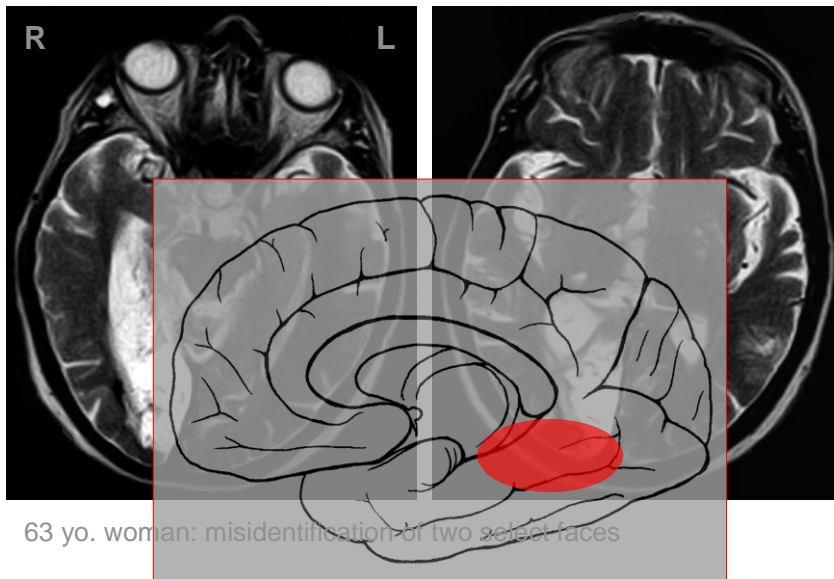**Associative visual agnosia**

Model   Copy
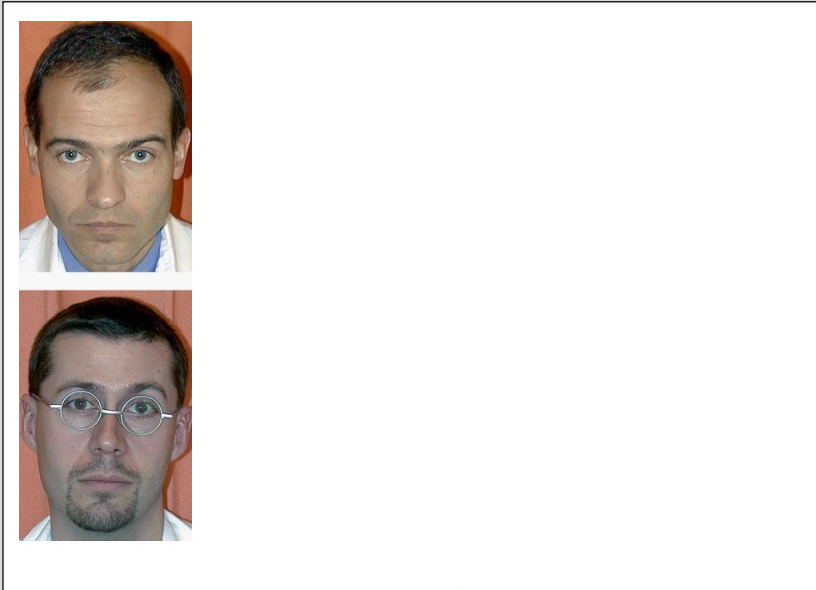
Left posterior stroke (M, 72 yrs)

R   L

Reading

If you have no difficulty in reading this text, you have neither alexia nor aperceptive agnosia.

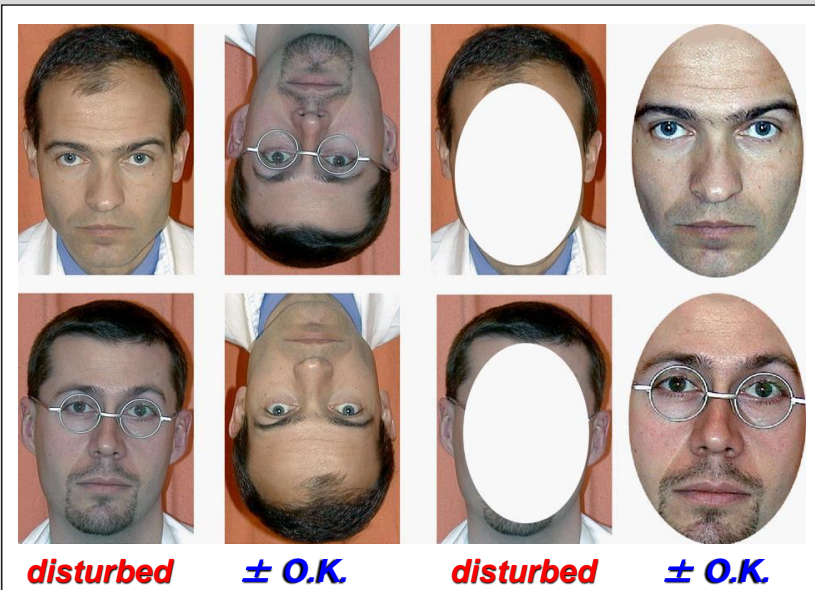---

Right posterior stroke: Failure to recognize faces

63 yo. woman: misidentification of two select faces

Confusion of two faces

Confusion of two faces (almost a prosopagnosia)

disturbed   ± O.K.   *disturbed*   ± O.K.

("disturbed", "O.K.": in comparison to other faces)

Visual "battery"

handkerchief ~~thunderstorm~~ — *Reading of masked words*

Kanisza (illusory contours)

Color naming

Street (fragmented designs)

Poppelreuter (overlaid drawings)

Famous faces

Masked animal pictures

Memory disorders

L — **frontal lobe syndromes** — R

distractability, perseveration, ...

lack of drive | hyperverbalisation

①

language associated disorders

aphasia
alexia
agraphia

apraxia
acalculia

finger agnosia
R-L-confusion

② **amnesia** ②

④

hemispatial neglect

visuoconstructive failures

visuospatial disorders

③

object agnosia | prosopagnosia
color agnosia

topographagnosia

visual recognition failures

Schnider A.
Verhaltensneurologie, 2. Aufl. Thieme, 2004

Neurologie du Comportement. Elsevier-Masson, 2008

Verbal long term memory

|	Learning trials 1-5					Long delay free recall (≥20') LDFR	Cued recall Indicé	Recognition Reconnaissance		
(6) Mémoire verbale	2	3	4	5						
1. **tulip**							Fleur	*oeillet*	tulipe	rose
2. **17**							nombre	13	*17*	19
3. **belt**							Pièce d'habillement	pantalon	*ceinture*	soulier
4. **Toyota**							Automobile	Mercedes	Honda	*Toyota*
5. **fog**							Intempérie	éclair	*grêle*	nuage
The lazy version (only 5 words)										
Total										
Intrusion										

Non-verbale: figure de Rey: _____   Fig. simples: rappeler spontanément ____/_____   reconnaître: ____/_____
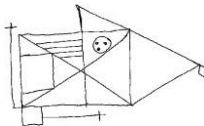
Recent events: _____

Names of grand children: _____

"Non-verbal" memory failures (Rey figure)
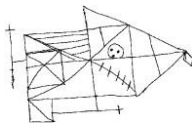
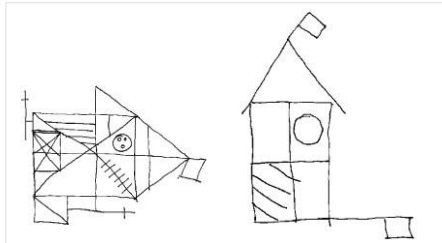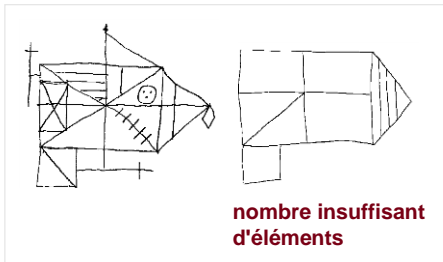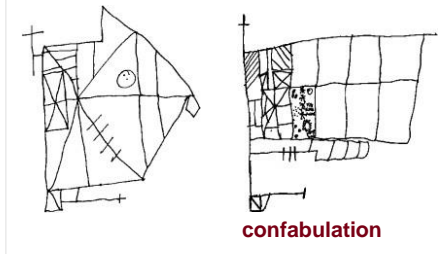Copie   Rappel différé

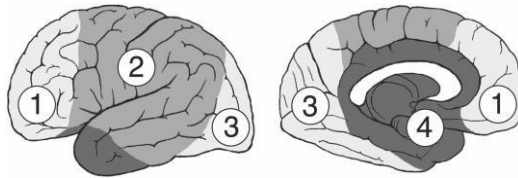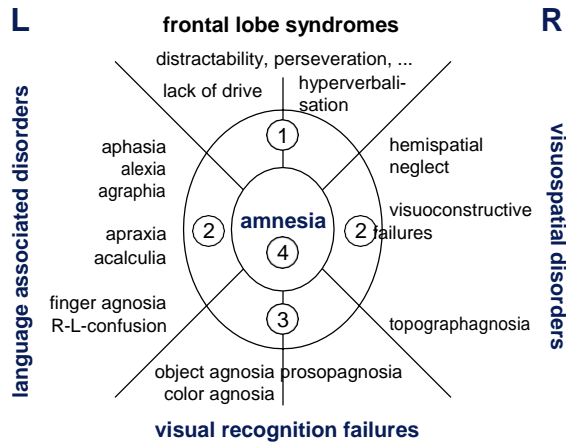**normal**

rotation

nombre insuffisant d'éléments

confabulation

26

Focal cognitive disorders

Schnider A.
*Verhaltensneurologie,
2. Aufl.* Thieme, 2004

*Neurologie du
Comportement.*
Elsevier-Masson, 2008

Take home messages

1. Every patient is testable

2. Think about what you are testing

3. Just do it !

Verhaltensneurologie
Die neurologische Seite der Neuropsychologie
Armin Schnider
Eine Einführung für Ärzte und Psychologen
2., erweiterte Auflage
armin.schnider@hcuge.ch
2004
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Neurologie du comportement
La dimension neurologique de la neuropsychologie
Armin Schnider
Avec la collaboration de Bruno Dubois
■ Évaluation clinique
■ Anatomie et étiologies
■ Évolution des troubles cognitifs
Traduction par Fabienne Perren
2008
MASSON

Schnider A. Neuropsychology - Bedside approaches. In: Goldenberg G and Miller BL, eds. **Handbook of Clinical Neurology. Neuropsychology and Behavioral Neurology. Vol 88** (3rd series). Edinburgh: Elsevier Science, 2008, pp. 137-154.