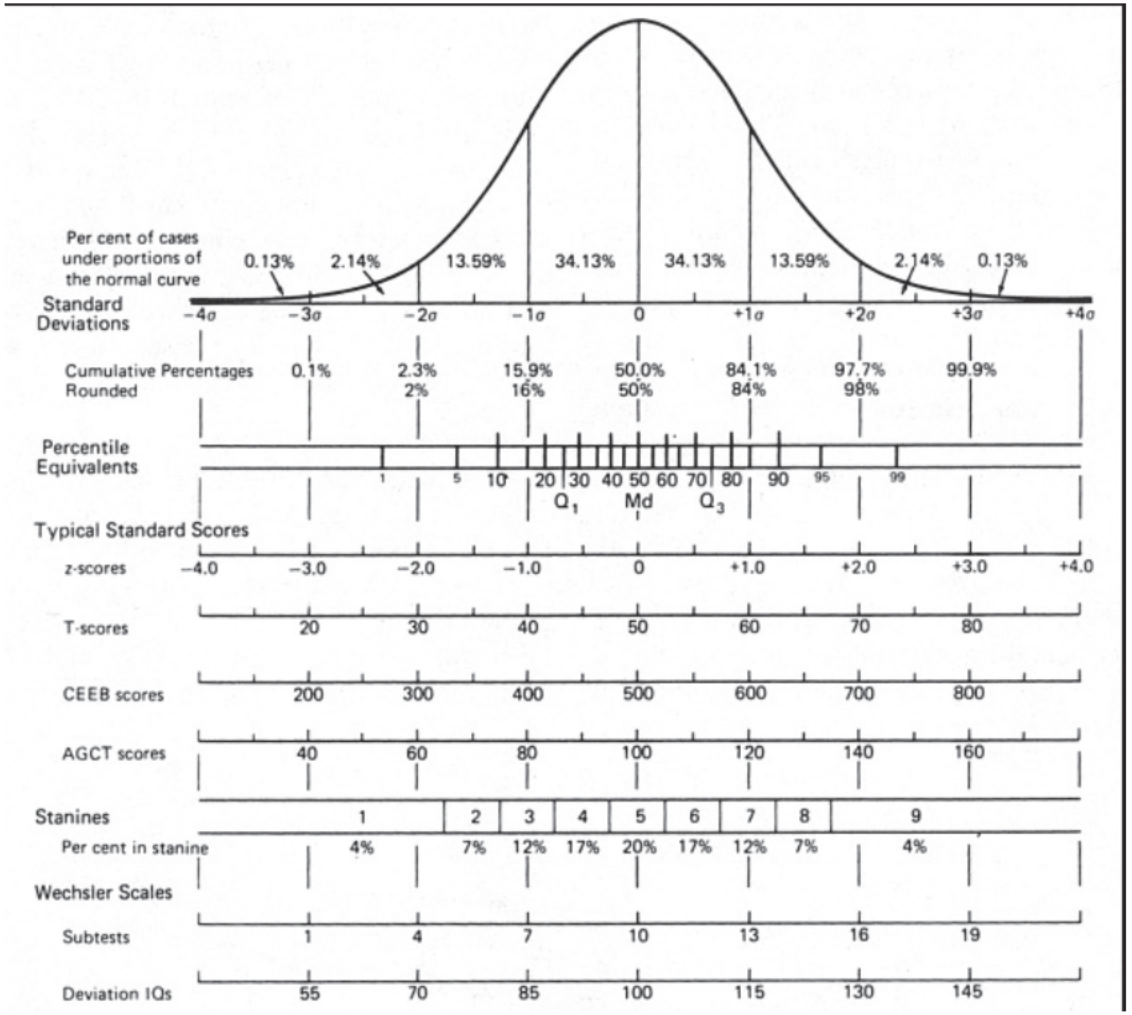
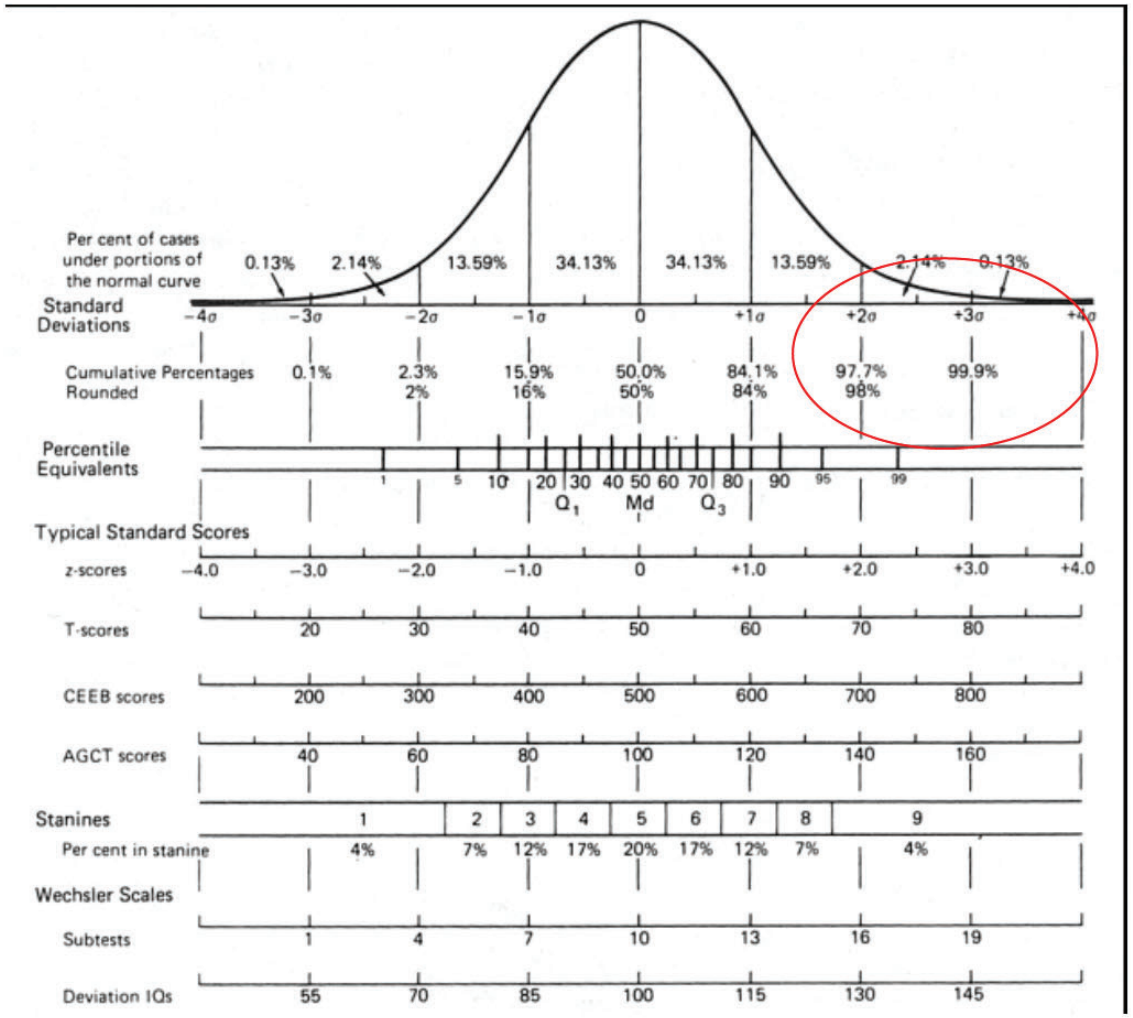


From Lezak, M.D., Howieson, D.B., Bigler, E.D. & Tranel, D. *Neuropsychological Assessment*. N.Y. : Oxford University Press.

DEFENDANT'S EXHIBIT 137

Neuropsychological Test Validity Measures

- Dr. Moberg
  - Reliable Digit Span
  - Dot Counting
  - Green's Word Memory Test
  - Rey's 15 Items
  - Test of Memory Malingering
  - Forced-choice trial of the California Verbal Learning Test 2
- Dr. Martell:
  - Validity Indicator Profile
  - Forced-choice trial of the California Verbal Learning Test 3



"Superior" IQ
Top 10%

From Lezak, M.D., Howieson, D.B., Bigler, E.D. & Tranel, D. *Neuropsychological Assessment*. N.Y. : Oxford University Press.

Sum of Scaled Scores to Composite Score Conversion

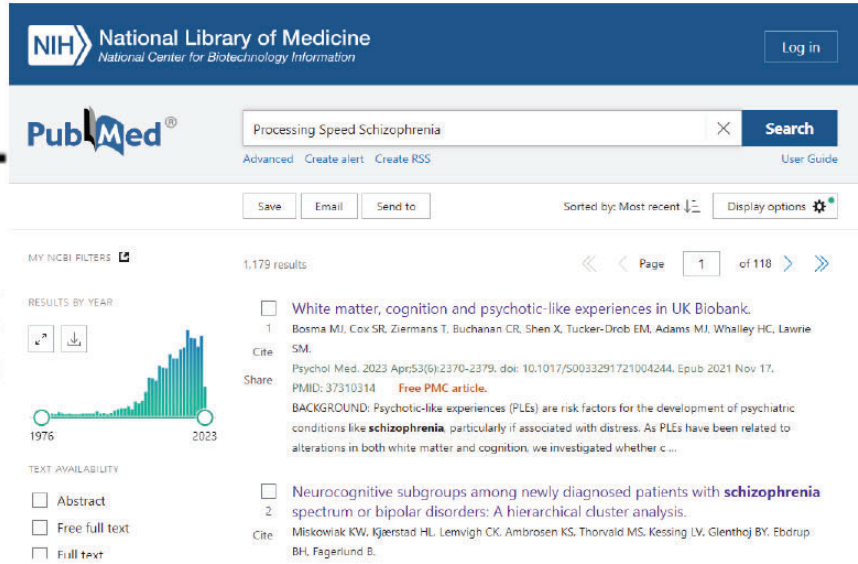
Scale	Sum of Scaled Scores	Composite Score	Percentile Rank	Confidence Interval* 90% or 95%
Verbal Comprehension	37	VCI 112	79	106-117
Perceptual Reasoning	47	PRI 133	99	125-138
Working Memory	30	WMI 128	97	120-133
Processing Speed	15	PSI 86	18	79-86
Full Scale	129	FSIQ 120	91	116-124

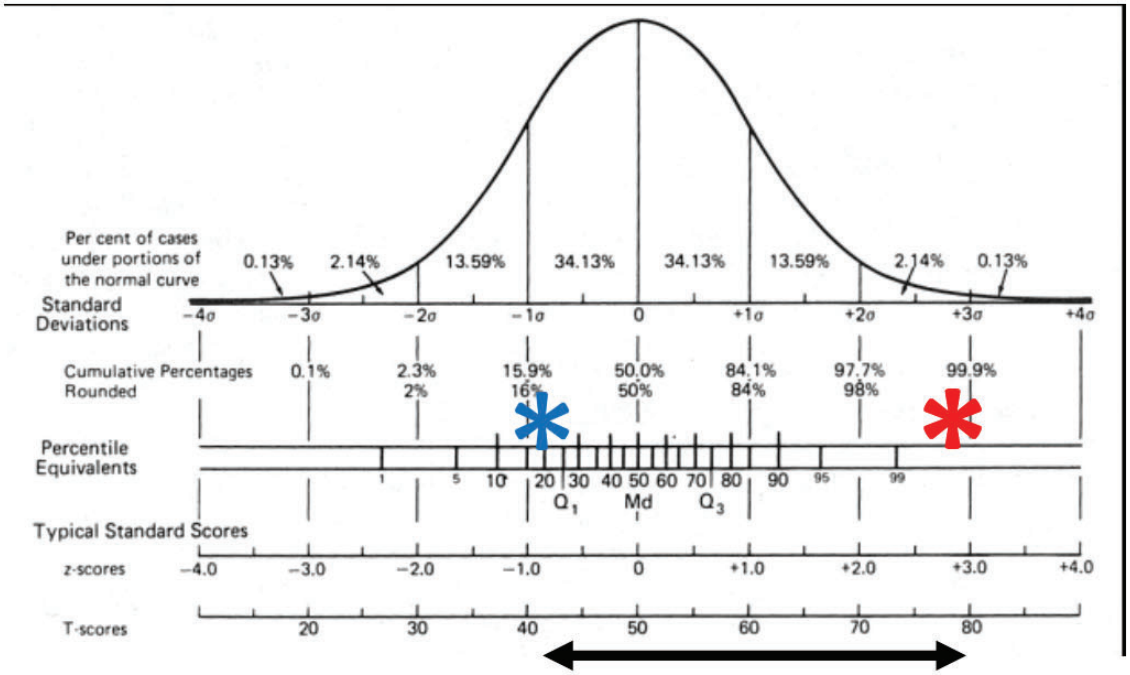
*For *SEM*s used to calculate confidence intervals, refer to Table 4.3 of the Technical and Interpretive Manual.

PEARSON

Product Number 0154980900

Processing Speed Schizophrenia





~4 Standard Deviations

* **Perceptual (Non-Verbal) Reasoning 99th Percentile**

* **Processing Speed 18th Percentile**

From Lezak, M.D., Howieson, D.B., Bigler, E.D. & Tranel, D. *Neuropsychological Assessment*. N.Y. : Oxford University Press.

Memory and Schizophrenia

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10,925 results

Page 1 of 1,093

RESULTS BY YEAR

1950 2023

TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

1 Cite Share

Mnemonic discrimination deficits in multidimensional schizotypy.

Sahakyan L, Wahlheim CN, Kwapil TR.

Hippocampus. 2023 Jun 22. doi: 10.1002/hipo.23566. Online ahead of print.

PMID: 37345675

In nondisordered adults, schizotypy predicts risk for developing **schizophrenia**-spectrum psychopathology. **Schizophrenia** is associated with disruptions in detecting subtle differences between objects, which is linked to hippocampal dysfunction. ...These deficits were ...

2 Cite Share

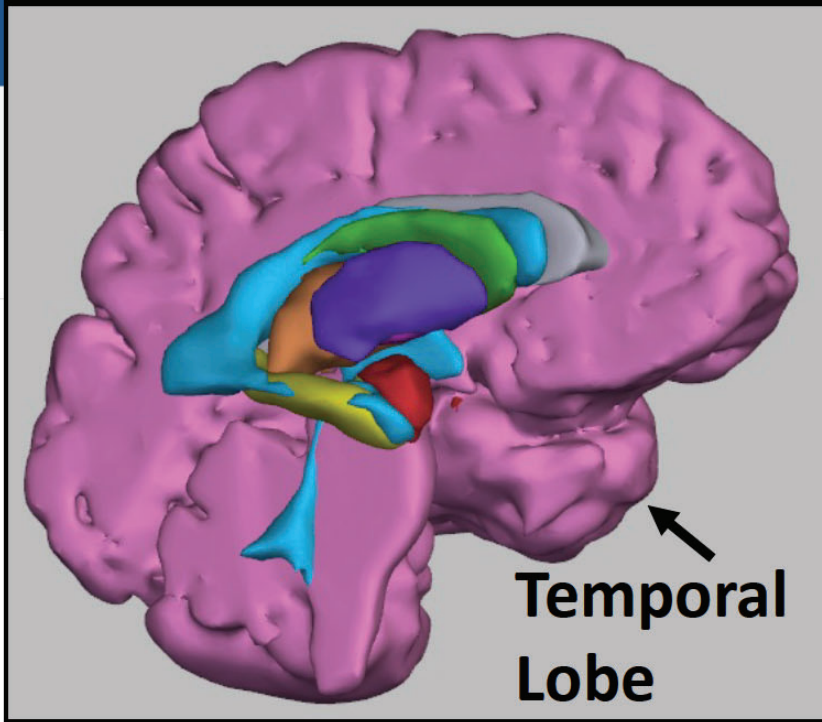
Impaired mnemonic discrimination in children and adolescents at risk for **schizophrenia**.

İmamoğlu A, Wahlheim CN, Belger A, S Giovanello K.

Schizophrenia (Heidelb). 2023 Jun 21;9(1):39. doi: 10.1038/s41537-023-00366-9.

PMID: 37344455

Mr. Bower's Brain MRI



Amygdala = Red Hippocampus = Yellow

Dr. Moberg's results show wide variation on memory testing, dependent on the type of memory being assessed. For instance, on the Wechsler Memory Scale IV and the Brief Spatial Memory test, Mr. Bowers performed in the above average to superior range.

However, he showed mild impairment on the Rey Complex Figure Test copy and recall

His performance on word recall after interference was also mildly impaired

His memory for faces, compared to his memory for words, was significantly discrepant on the Warrington Recognition Memory test (memory for words SS=14-15, memory for faces SS=7)

Recognition Memory Test

Elizabeth K. Warrington

Record Form

Name: RGB

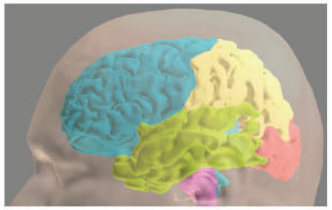
Age: 47

Patient Number: —

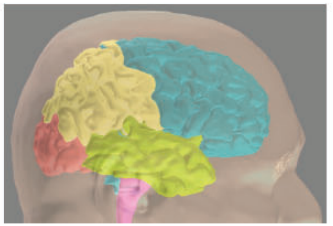
Date: 1-11-2020

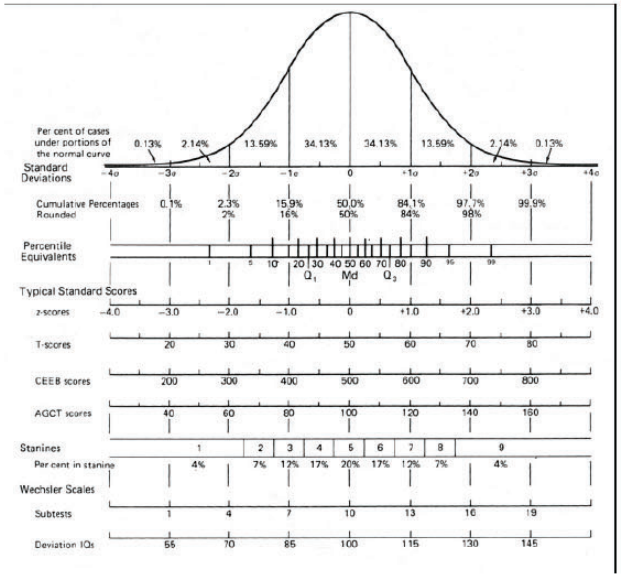
Words	Raw Score	50
	Percentile Score	>90
	Scaled Score	14-15
Faces	Raw Score	40
	Percentile Score	10-25
	Scaled Score	7
	Discrepancy	10
	Raw Score	5
	Percentile Score	

Words ~ Left Temporal Lobe



Faces ~ Right Temporal Lobe





Recognition Memory Test

Elizabeth K. Warrington

Record Form

Name: RGB

Age: 47

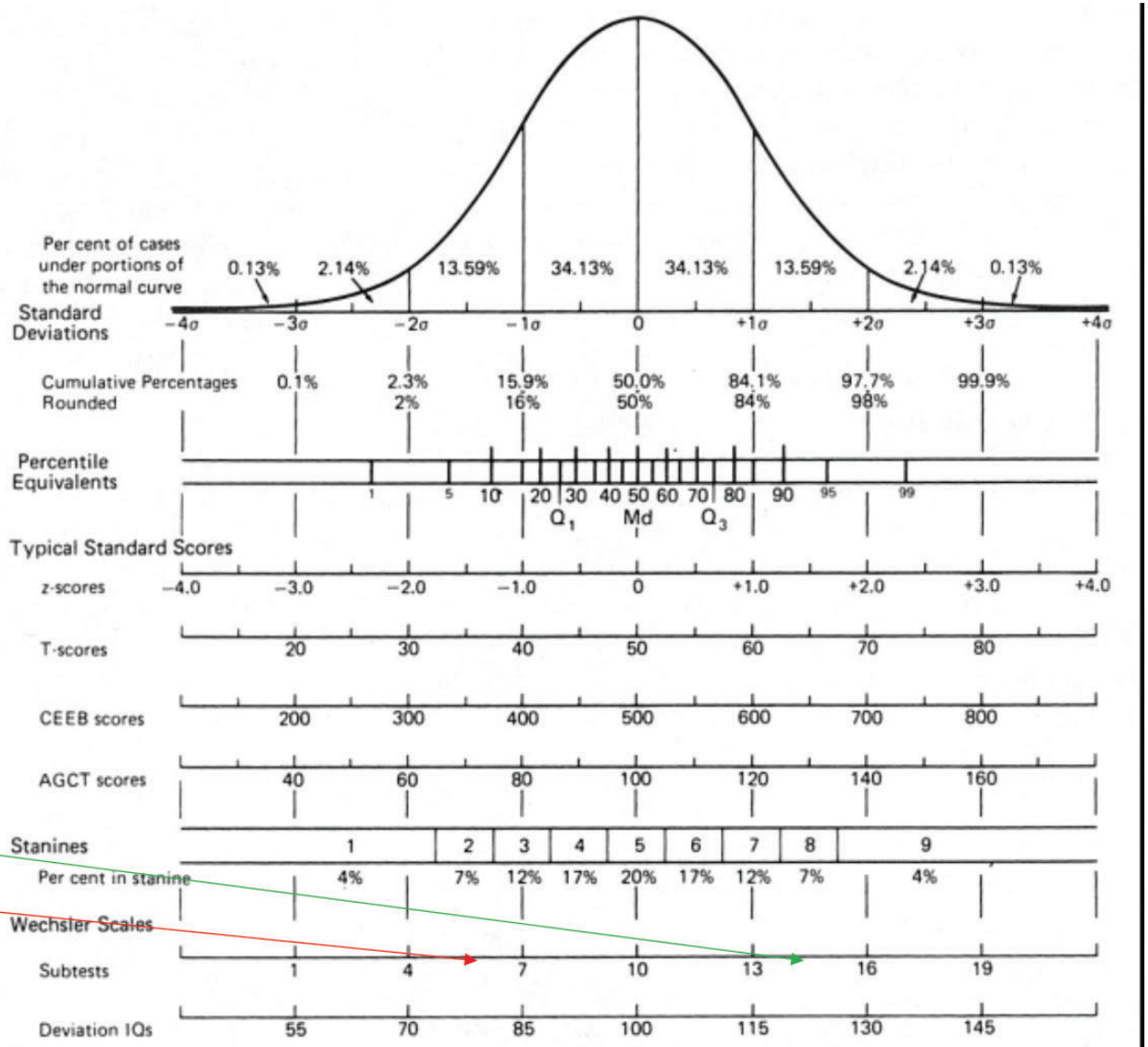
Patient Number: —

Date: 1-11-2020

Words	Raw Score	50
	Percentile Score	>90
	Scaled Score	14-15
Faces	Raw Score	40
	Percentile Score	10-25th
	Scaled Score	7
	Discrepancy	10
	Raw Score	5
	Percentile Score	

Memory for Words **SS = 14-15**

Faces **SS = 7**



Wechsler Memory Scale-IV and Brief Spatial Memory test showed mild impairment in copying and recall

He missed 3/5 short term recall items on Dr. Nadkarni's administration of the MoCA

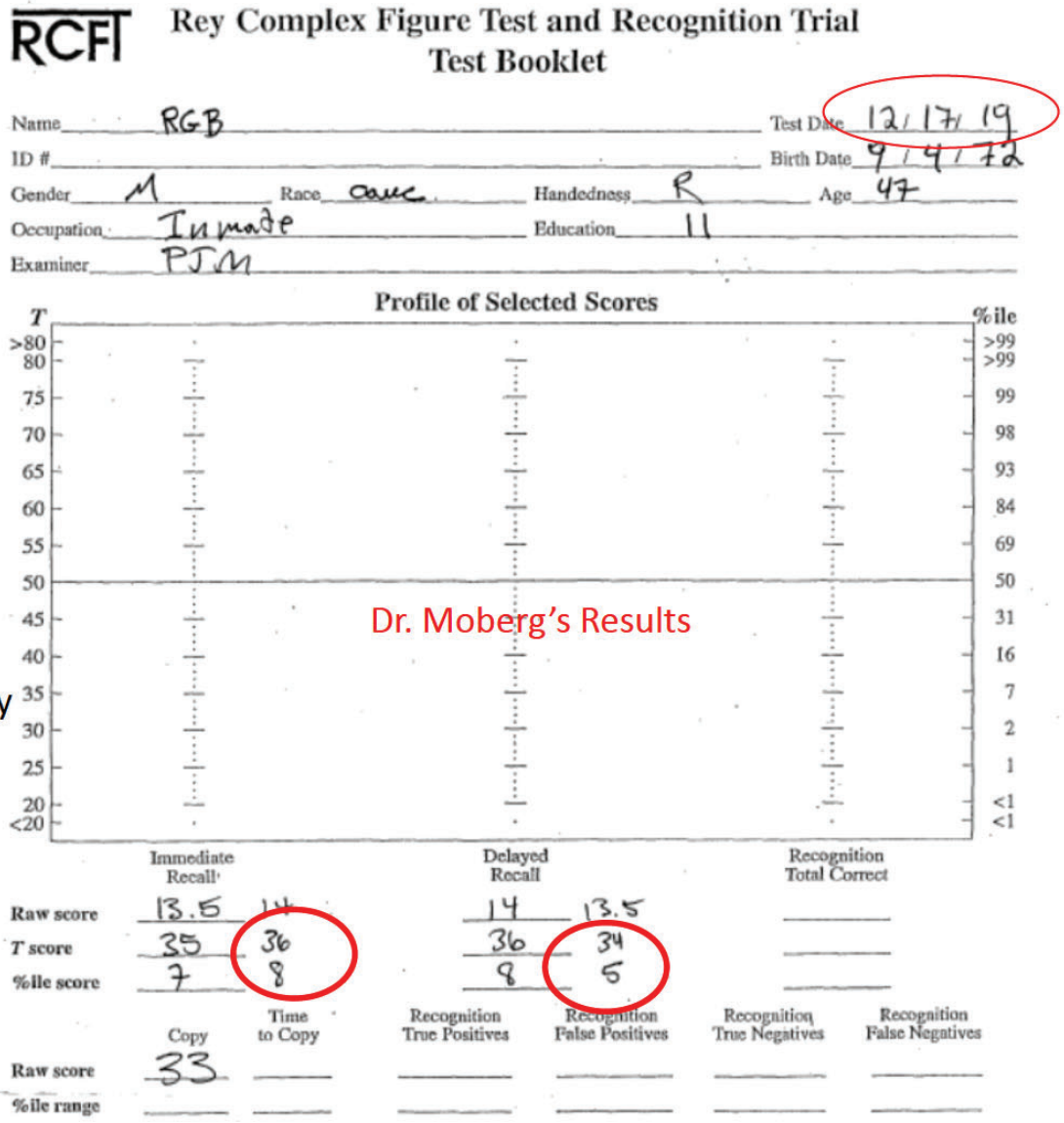
CVLT 3 was within normal limits

Benton Visual Retention Test – within normal limits but with mild clinical evidence of distortions, one design rotation and one perseveration of a design element

On the Warrington, his memory for words was significantly stronger than his memory for faces

Memory for word SS=14-15

Memory for faces SS=7



RCFT Rey Complex Figure Test and Recognition Trial
Test Booklet

Name RGB Test Date 12/17/19
ID # Birth Date 9/9/72
Gender M Race Caucasian Handedness R Age 47
Occupation Inmate Education 11
Examiner PJM

Profile of Selected Scores

Dr. Moberg's Results

	Immediate Recall		Delayed Recall		Recognition Total Correct	
Raw score	13.5	14	14	13.5		
T score	35	36	36	34		
%ile score	7	8	8	5		

	Copy	Time to Copy	Recognition True Positives	Recognition False Positives	Recognition True Negatives	Recognition False Negatives
Raw score	33					
%ile range						

RCFT Rey Complex Figure Test and Recognition Trial
Test Booklet

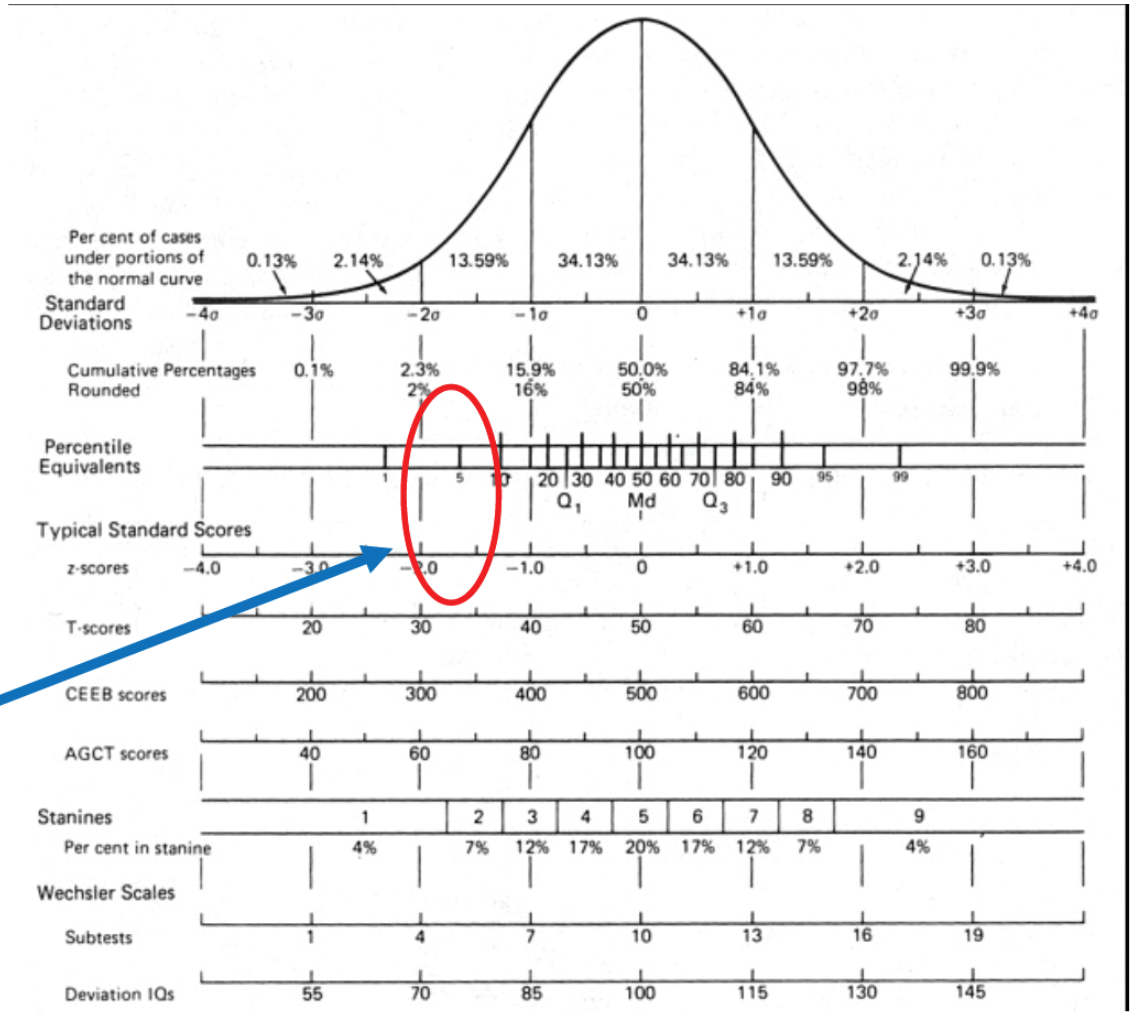
Name RGB Test Date 12/17/19
ID # Birth Date 9/4/72
Gender M Race Cauc Handedness R Age 47
Occupation Inmate Education 11
Examiner PJM

Profile of Selected Scores

T	%ile
>80	>99
80	>99
75	99
70	98
65	93
60	84
55	69
50	50
45	40
40	16
35	7
30	2
25	1
20	<1
<20	<1

Dr. Moberg's Results

	Immediate Recall		Delayed Recall		Recognition Total Correct
Raw score	13.5	14	14	13.5	
T score	35	36	36	34	
%ile score	7	8	9	5	
		Time	Recognition True Positives	Recognition False Positives	Recognition True Negatives / Recognition False Negatives



Dr. Moberg

Dr. Martel

CVLT-II
California Verbal Learning Test® Second Edition • Adult Version

California Verbal Learning Test–Second Edition

Dean C. Delis Joel H. Kramer Edith Kaplan Beth A. Ober

Standard Form

Name: R6B ID#: Examiner: PJM

Sex: ☐ F ☒ M Race/Ethnicity: Cauc. Education (years): 11

Handedness: ☒ R ☐ L ☐ Ambidextrous Hearing adequate? ☒ Y ☐ N Hearing aid? ☐ Y ☐ N

First language: Eng Preferred language: Eng Effort appear adequate? ☒ Y ☐ ? ☐ N

Affect and mood: Physical appearance: Kempt

Other behaviors:

Major complaints:

Diagnostic history:

Current medications:

	Year	Month	Da
Date Tested	1	12	7
Date of Birth	9	4	7
Age at Testing	47		

	Raw Score	Standard Score		Raw Score	Standard Score
Trial 1 Free Recall **Correct**	7	0	Long-Delay Free Recall **Correct**	7	-0.5
Trial 2 Free Recall **Correct**	11	1	Long-Delay Cued Recall **Correct**	12	0.5
Trial 3 Free Recall **Correct**	12	1	Free-Recall **Intrusions** (Immediate & Delayed, All Types)	2	0
Trial 4 Free Recall **Correct**	12	0.5	Cued-Recall **Intrusions** (All Types)	5	1.0
Trial 5 Free Recall **Correct**	9	-1.0	Total **Intrusions** (All Recall Trials, All Types)	7	0.5
Trials 1–5 Free Recall Total **Correct**	50	62 (T score)	Total **Repetitions** (All Recall Trials)	8	1.0
List B Free Recall **Correct**	7	1	Long-Delay Yes/No Recognition **Hits**	16	1.0
Short-Delay Free Recall **Correct**	10	0.5	Long-Delay Yes/No Recognition **False-Positives**	0	-1.0
Short-Delay Cued Recall **Correct**	10	0	Long-Delay Forced-Choice Recognition **Accuracy** (# hits 16 /16) × 100	100 %	Valid

Core Score Summary

Immediate Recall

Score	Raw score	Scaled score	Percentile rank
Trial 1 Correct	7	11	63
Trial 2 Correct	11	12	75
Trial 3 Correct	12	12	75
Trial 4 Correct	11	10	50
Trial 5 Correct	10	8	25
List B Correct	5	10	50

California Verbal Learning Test -3 Dr. Martell

Core Score Summary

Immediate Recall

Score	Raw score	Scaled score	Percentile rank
Trial 1 Correct	7	11	63
Trial 2 Correct	11	12	75
Trial 3 Correct	12	12	75
Trial 4 Correct	11	10	50
Trial 5 Correct	10	8	25
List B Correct	5	10	50

Delayed Recall

Score	Raw score	Scaled score	Percentile rank
Short Delay Free Recall Correct	10	10	50
Short Delay Cued Recall Correct	13	11	63
Long Delay Free Recall Correct	14	13	84
Long Delay Cued Recall Correct	14	12	75

California Verbal Learning Test -3 Dr. Martell

Process Score Summary

Immediate Recall

Score	Raw score	Scaled score	Percentile rank
Trial 5 Semantic Clustering (Chance Adjusted)	3.2	12	75
Trials 1–5 Semantic Clustering (Chance Adjusted)	3.4	14	91
Trials 1–5 Serial Clustering (Chance Adjusted)	-0.2	7	16
Trials 1–5 % Recall Primacy	25	8	25
Trials 1–5 % Recall Middle	47	11	63
Trials 1–5 % Recall Recency	27	10	50
Trials 1–5 Recall Consistency	73	8	25
Trials 1–5 Learning Slope Analysis	0.6	6	9
Trials 1–2 Learning Slope Analysis	4	12	75
Trials 2–5 Learning Slope Analysis	-0.4	4	2
Trials 1–5 Recall Discriminability	2.3	12	75

VISUAL RETENTION TEST

Arthur L. Benton

RECORD FORM

NO._____

NAME R. Bowers AGE_____ SEX_____

PLACE OF TESTING_____ EXAMINER DAM

FIRST TESTING DATE 5/22/25

FORM C ADMINISTRATION A

Design	Score (0 or 1)	Errors*	Number of Errors
I	1		
II	1		
III	1		
IV	1	SmL, for ML	2
V	0		
VI	1		
VII	0	PER PR	1
VIII	1		
IX	0	RML	1
X	0	45RM, MR	2
Number Correct Score	6	Error Score	6

*Use symbols; see Chapter 2 of manual.

ERROR CATEGORIES:

Omissions_____
Distortions_____
Perseverations 1
Rotations 1
Misplacements_____
Size Errors_____
Left Errors ½
Right Errors_____

SECOND TESTING DATE_____

FORM_____ ADMINISTRATION_____

Design	Score (0 or 1)	Errors*	Number of Errors
I			
II			
III			
IV			
V			
VI			
VII			
VIII			
IX			
X			
Number Correct Score		Error Score	

*Use symbols; see Chapter 2 of manual.

ERROR CATEGORIES:

Omissions_____
Distortions_____
Perseverations_____
Rotations_____
Misplacements_____
Size Errors_____
Left Errors_____
Right Errors_____

REMARKS_____

INTERPRETATION Spreen & Strauss p 694 (Age Ed)
Corr = 6.66 / 1.47 } WNL
Err = 4.90 / 2.42

TABLE 11.11 BVRT Norms for Administration A: Adults Expected Number Correct Scores, by Estimated Premorbid IQ and Age*

	EXPECTED NUMBER CORRECT SCORE, BY AGE		
Estimated Premorbid IQ	*15–44*	*45–54*	*55–64*
110 and above	9	8	7
95–109	8	7	6
80–94	7	6	5
70–79	6	5	4
69 and below	≤5	≤4	≤3

BVRT Norms for Administration A: Adults Expected Error Scores

	EXPECTED ERROR SCORE, BY AGE			
Estimated Premorbid IQ	*15–39*	*40–54*	*55–59*	*60–64*
110 and above	1	2	3	4
105–109	2	3	4	5
95–104	3	4	5	6
90–94	4	5	6	7
80–89	5	6	7	8
70–79	6	7	8	9
69 and below	≥7	≥8	≥9	≥10

*These data are identical to those given in Sivan's 1992 test manual except for slight differences in age range: The three new age ranges for Number Correct scores at 15–49, 50–59, and 60–69; for Error scores they are 15–44, 45–59, 60–64, and 65–69.

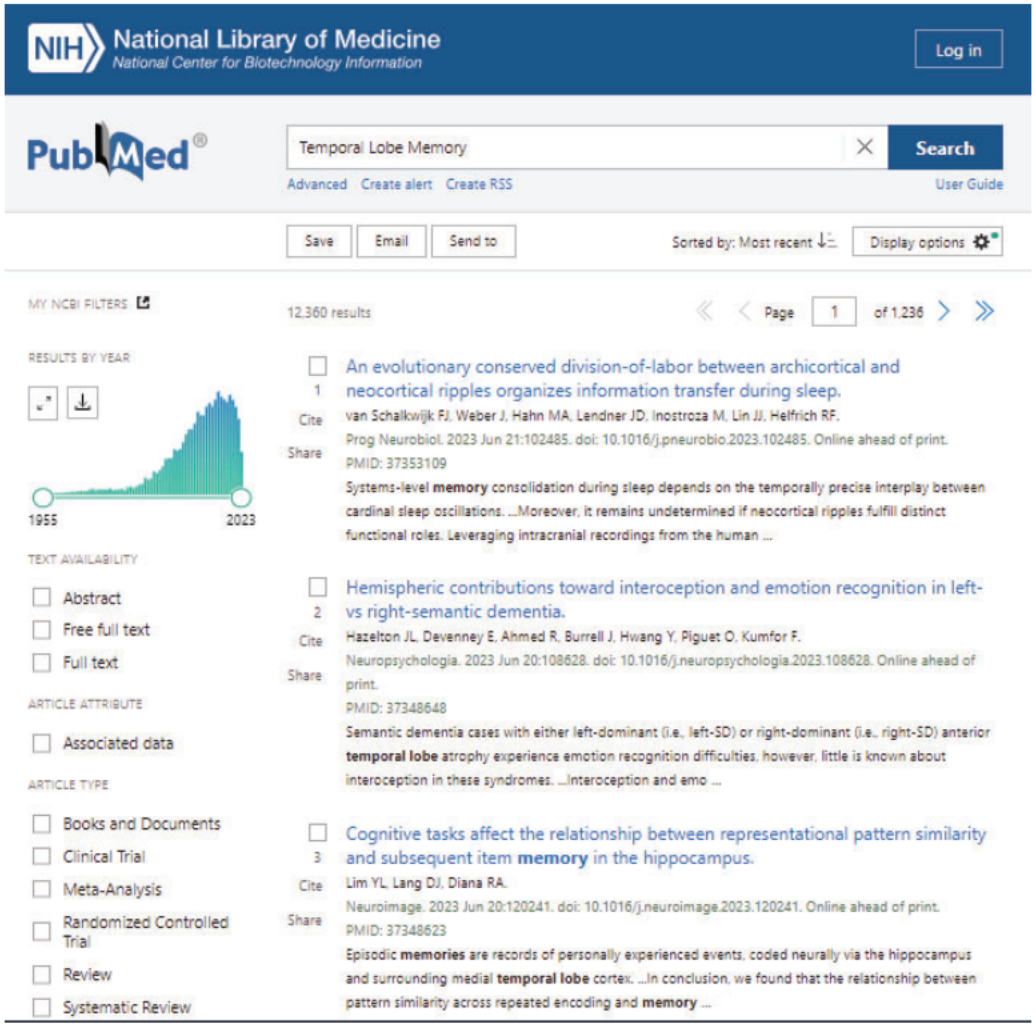
Mr. Bowers -- Temporal Lobe Dysfunction EEG and Neuropsychological Abnormalities

EEG DIAGNOSIS: Abnormal EEG because of
1. Occasional left temporal theta more than delta slow, often in runs, more prominent and at times quasi-rhythmic in drowsiness
2. Rare right temporal delta slow
3. Rare generalized theta more than delta slow

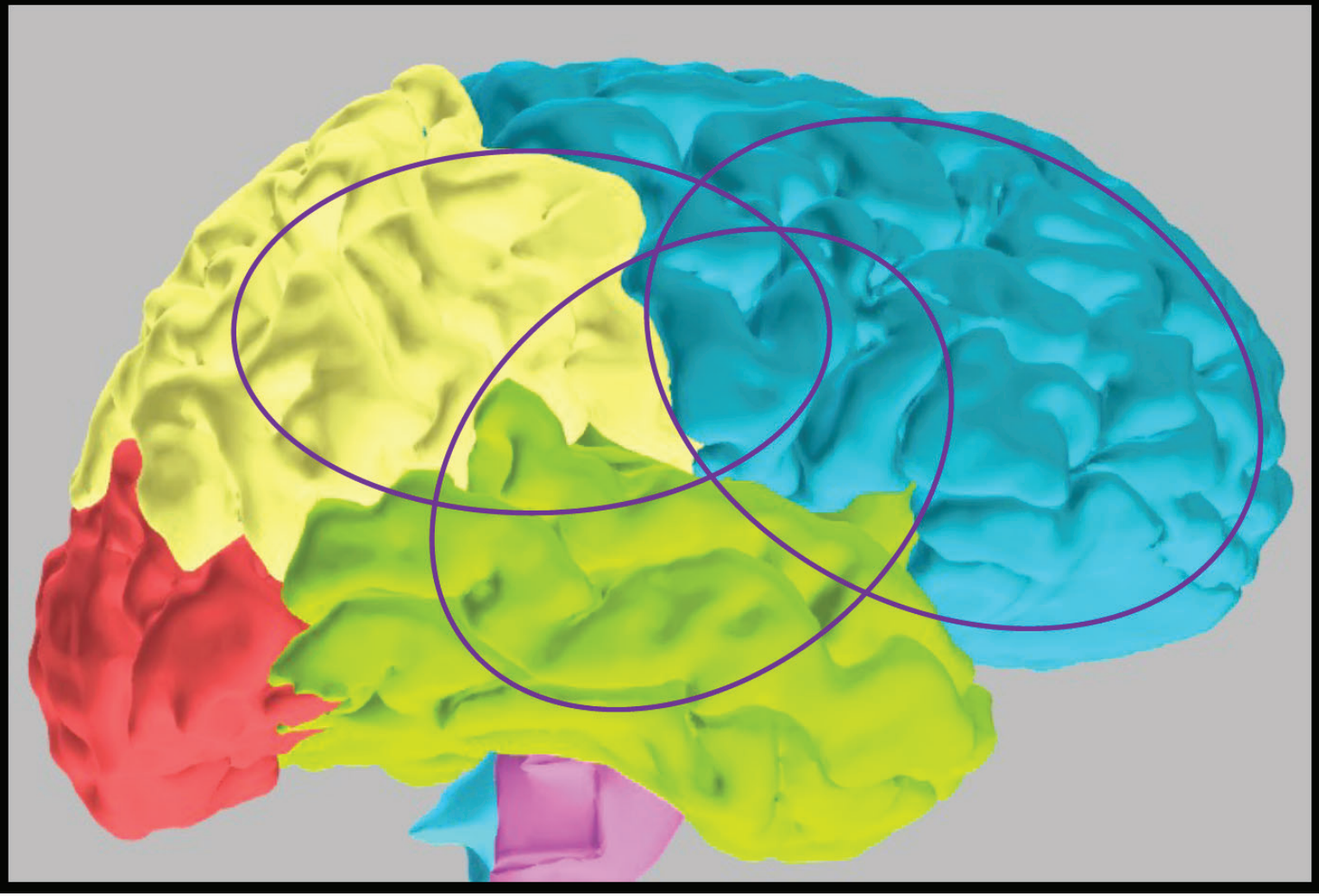
CLINICAL INTERPRETATION: This 43 hour and 48-minute ambulatory EEG without video is suggestive of independent left more than right temporal nonspecific cerebral dysfunction. There is also evidence for mild nonspecific generalized cerebral dysfunction. No epileptiform discharges or EEG seizures were recorded.

Angela Crudele, M.D.
Attending Physician

Temporal Lobe Abnormalities and Memory Function

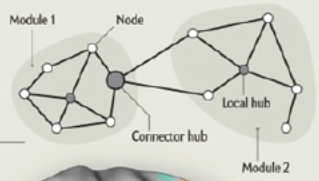


Executive Function Testing



Decoding 100 Trillion Messages

The Milky Way has hundreds of billions of stars—just a fraction of the 100 trillion connections in our brains that enable us to sense, think and act. To unravel this complexity, network neuroscientists create a map, or "graph," consisting of nodes linked by edges that fit into modules, which are tethered to one another with highly connected nodes called hubs.

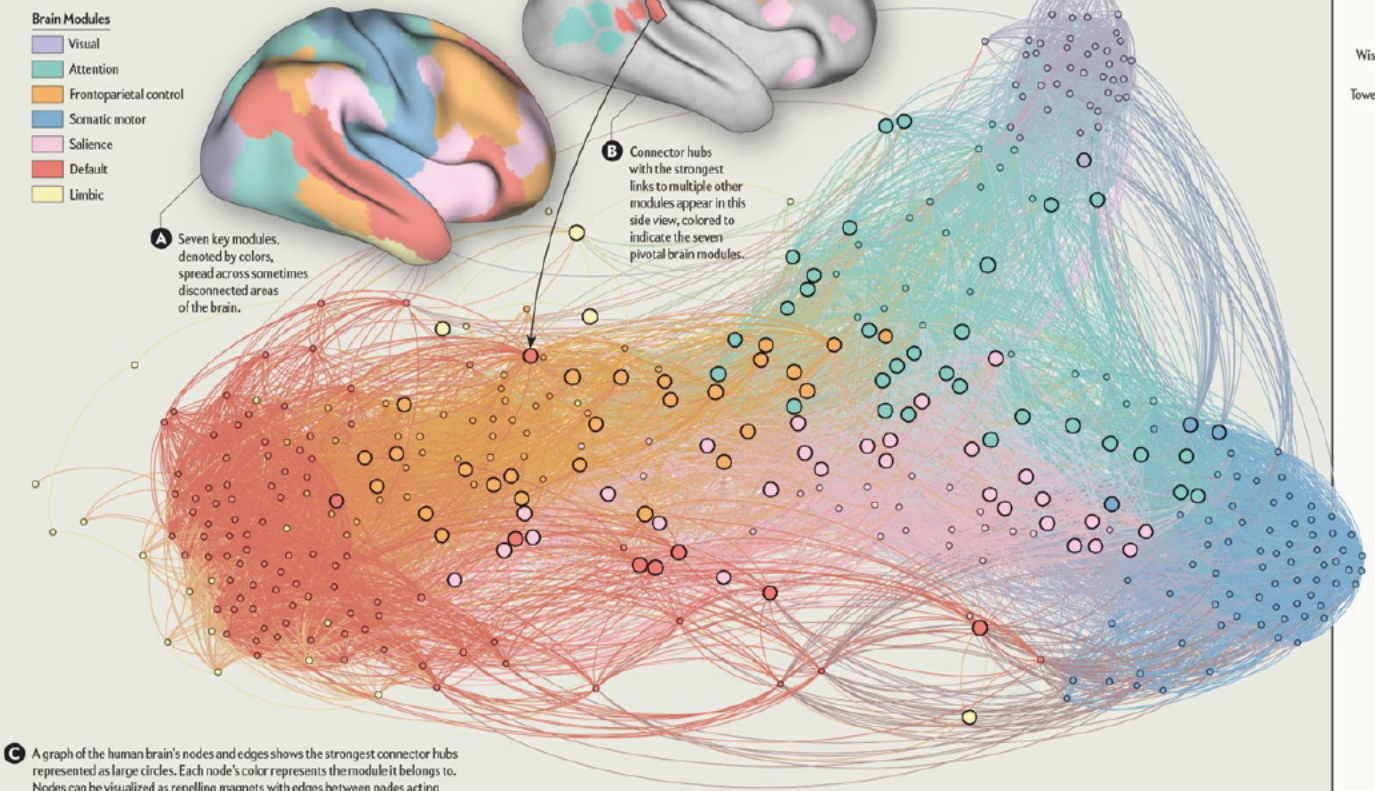


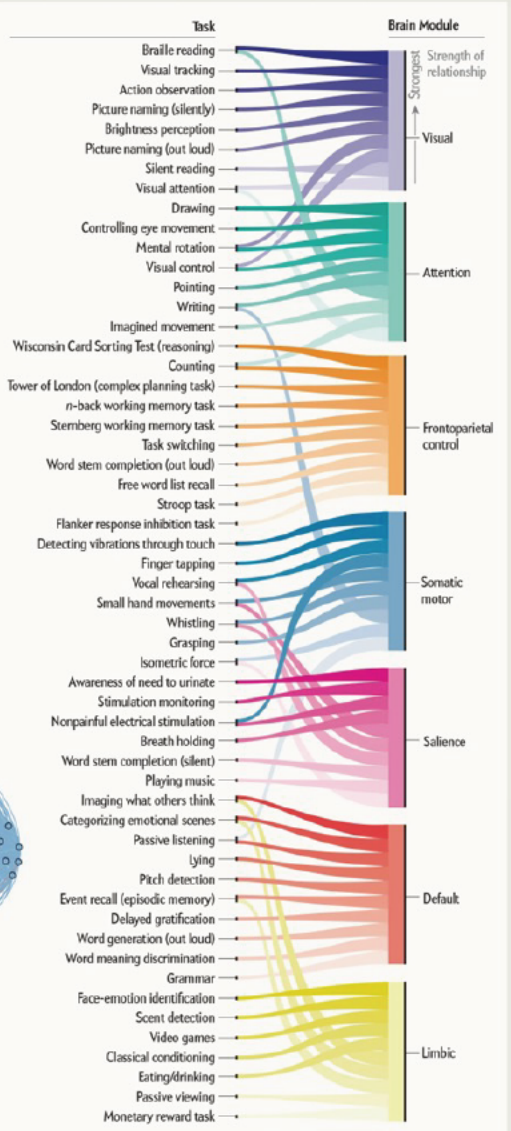
From Modules to Hubs to Thoughts

Collections of nodes form modules that devote themselves to processing vision, attention and motor behaviors, among other tasks **A**. Some of the nodes act as local hubs that link to other nodes in their own module. A node that has many linkages to a lot of modules is known as a connector hub (the type most commonly referenced in this article) **B**. Its diverse connections across the brain's modules are critical for many tasks, particularly complex behaviors **C**.

Putting It Together

Modules for vision, attention and other cognitive functions are dedicated to specific tasks, often represented here by psychological tests. The most active tasks rise to the top. The visual module, for instance, is involved with naming, reading and observing. Many tasks require multiple modules. For example, a mental rotation task recruits both the visual and the attention modules. Some modules are entrusted with more abstract tasks. The frontoparietal module engages in switching tasks or recalling lists. The default mode module attends to subjective emotional states or passive listening when a person is at rest.

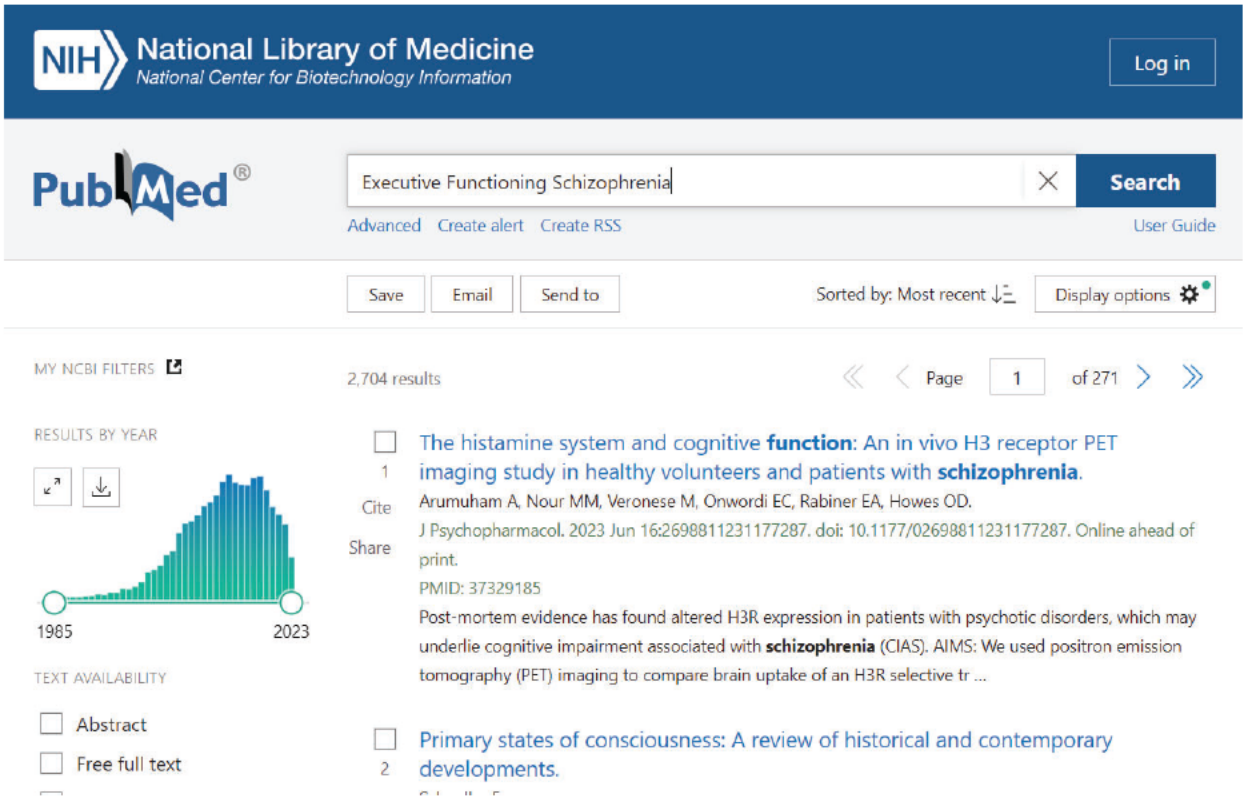




C A graph of the human brain's nodes and edges shows the strongest connector hubs represented as large circles. Each node's color represents the module it belongs to. Nodes can be visualized as repelling magnets with edges between nodes acting as springs that hold them together. Tightly connected nodes cluster together. Connector hubs occupy the center because they are well connected to all modules.

Scientific American 2019

Executive functioning deficits in Schizophrenia



“Frontal” Executive Function Measure

Dr. Moberg

Wisconsin Card Sorting Test™: Computer Version 4

Research Edition

by

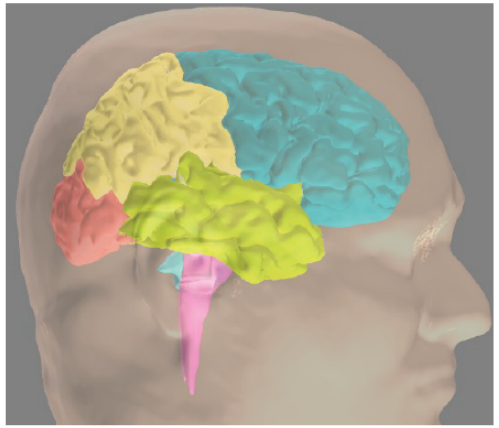
Robert K. Heaton, PhD, and PAR Staff

Client Information

Last Name: B	Test Date: 01/30/2020
First Name: R	Test Description:
Client ID:	
BirthDate: 09/04/1972	Rapport: (not specified)
Age: 47 years, 4 months	Cooperation: (not specified)
Gender: Male	Effort: (not specified)
Ethnicity: Caucasian (not of Hispanic Origin)	On Medication: No
Education: 11 years	Description of Medication:
Handedness: Right	
Occupation: (not specified)	

Mr. Bower’s MRI

Blue = Frontal Lobe



Dr. Newberg PET Findings

Gyrus Rectus	1.87	2.14	1.62
Superior Frontal Gyrus	1.88	2.04	1.46
Middle Frontal Gyrus	1.90	2.20	1.36
Supplementary Motor Area	2.22	2.46	1.69
Inferior Medial Frontal Gyrus	2.32	2.86	1.63
Frontal Lobe	2.33	2.70	1.79
Olfactory Cortex	2.76	3.50	1.68
Superior Medial Frontal Gyrus	3.21	3.09	3.05

925 Chestnut Street, Suite 120, Philadelphia, PA 19107

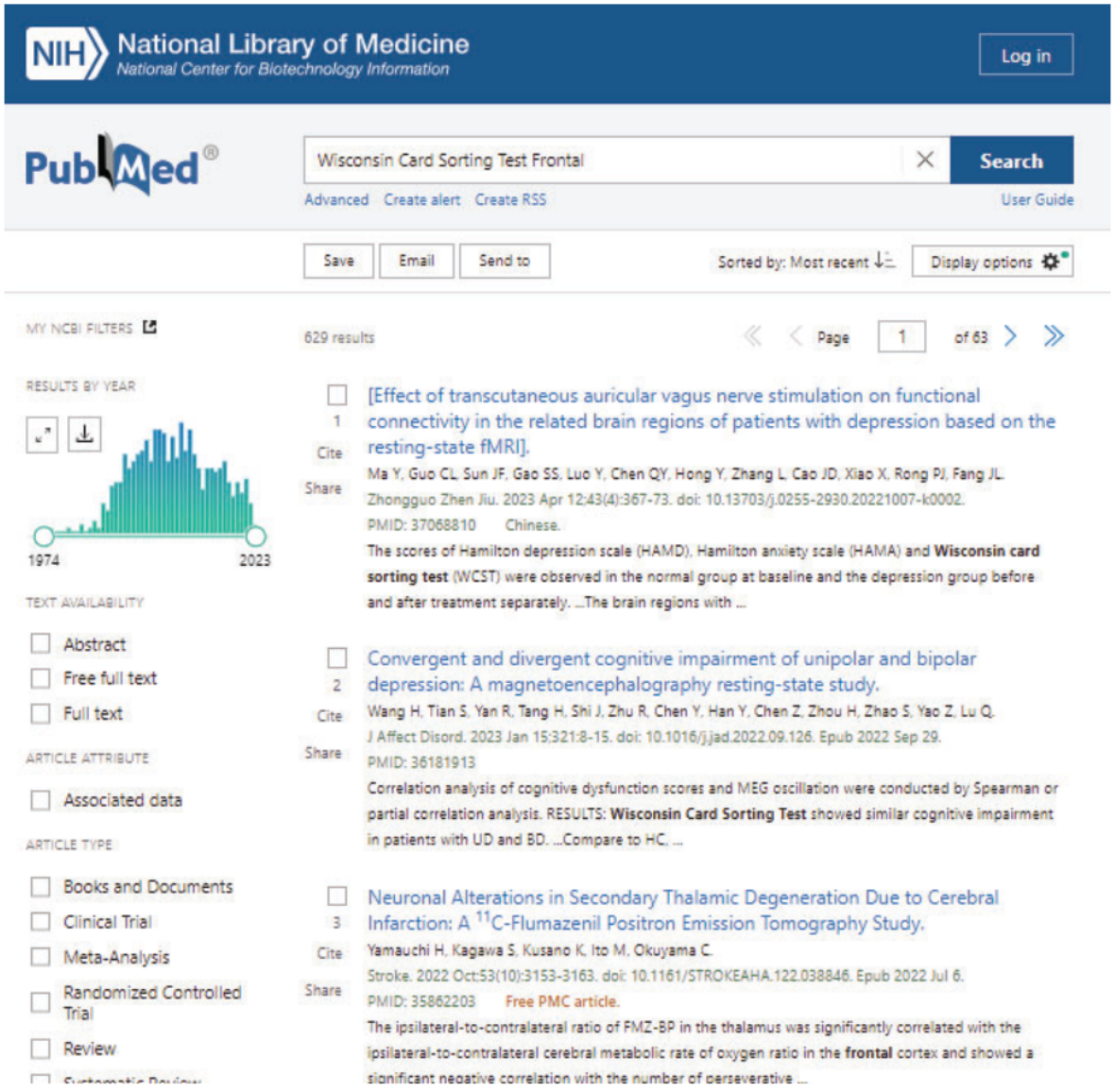
THOMAS JEFFERSON UNIVERSITY AND HOSPITALS

Dr. Moberg Summary Sheet

Test Results

		Age & Education Demographically Corrected			U.S. Census Age-matched		
WCST scores	**Raw scores**	**Standard scores**	***T* scores**	**%iles**	**Standard scores**	***T* scores**	**%iles**
Trials Administered	128						
Total Correct	81						
Total Errors	47	82	38	12%	86	41	18%
% Errors	37%	84	39	14%	87	41	19%
Perseverative Responses	25	86	41	18%	87	41	19%
% Perseverative Responses	20%	88	42	21%	88	42	21%
Perseverative Errors	21	87	41	19%	88	42	21%
% Perseverative Errors	16%	90	43	25%	90	43	25%
Nonperseverative Errors	26	78	35	7%	81	37	10%
% Nonperseverative Errors	20%	82	38	12%	82	38	12%
Conceptual Level Responses	63						
% Conceptual Level Responses	49%	82	38	12%	86	41	18%
Categories Completed	2			2 - 5%			6 - 16%
Trials to Complete 1st Category	10			> 16%			> 16%
Failure to Maintain Set	4			2 - 5%			2 - 5%
Learning to Learn	N/A						

Mr. Bowers only completed 2 out of a possible 6 sorts on the Wisconsin Card Sorting Test


National Library of Medicine
National Center for Biotechnology Information
Log in
PubMed
Wisconsin Card Sorting Test Frontal
Search
Advanced
Create alert
Create RSS
User Guide
Save
Email
Send to
Sorted by: Most recent
Display options
MY NCBI FILTERS
629 results
Page 1 of 63
RESULTS BY YEAR
1974
2023
TEXT AVAILABILITY
Abstract
Free full text
Full text
ARTICLE ATTRIBUTE
Associated data
ARTICLE TYPE
Books and Documents
Clinical Trial
Meta-Analysis
Randomized Controlled Trial
Review
1
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[Effect of transcutaneous auricular vagus nerve stimulation on functional connectivity in the related brain regions of patients with depression based on the resting-state fMRI].
Ma Y, Guo CL, Sun JF, Gao SS, Luo Y, Chen QY, Hong Y, Zhang L, Cao JD, Xiao X, Rong PJ, Fang JL.
Zhongguo Zhen Jiu. 2023 Apr 12;43(4):367-73. doi: 10.13703/j.0255-2930.20221007-k0002.
PMID: 37068810 Chinese.
The scores of Hamilton depression scale (HAMD), Hamilton anxiety scale (HAMA) and Wisconsin card sorting test (WCST) were observed in the normal group at baseline and the depression group before and after treatment separately. ...The brain regions with ...
2
Cite
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Convergent and divergent cognitive impairment of unipolar and bipolar depression: A magnetoencephalography resting-state study.
Wang H, Tian S, Yan R, Tang H, Shi J, Zhu R, Chen Y, Han Y, Chen Z, Zhou H, Zhao S, Yao Z, Lu Q.
J Affect Disord. 2023 Jan 15;321:8-15. doi: 10.1016/j.jad.2022.09.126. Epub 2022 Sep 29.
PMID: 36181913
Correlation analysis of cognitive dysfunction scores and MEG oscillation were conducted by Spearman or partial correlation analysis. RESULTS: Wisconsin Card Sorting Test showed similar cognitive impairment in patients with UD and BD. ...Compare to HC, ...
3
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Neuronal Alterations in Secondary Thalamic Degeneration Due to Cerebral Infarction: A 11C-Flumazenil Positron Emission Tomography Study.
Yamauchi H, Kagawa S, Kusano K, Ito M, Okuyama C.
Stroke. 2022 Oct;53(10):3153-3163. doi: 10.1161/STROKEAHA.122.038846. Epub 2022 Jul 6.
PMID: 35862203 Free PMC article.
The ipsilateral-to-contralateral ratio of FMZ-BP in the thalamus was significantly correlated with the ipsilateral-to-contralateral cerebral metabolic rate of oxygen ratio in the frontal cortex and showed a significant negative correlation with the number of perseverative ...

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Wisconsin Card Sorting Test Schizophrenia

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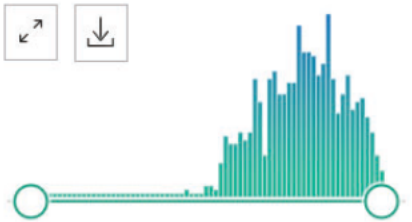
RESULTS BY YEAR



TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

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Study investigating executive function in **schizophrenia** patients and their unaffected siblings.

Xu F, Xian Z.

PLoS One. 2023 Apr 26;18(4):e0285034. doi: 10.1371/journal.pone.0285034. eCollection 2023.

PMID: 37099556 Free PMC article.

INTRODUCTION: **Schizophrenia** (SCZ) is characterized by widespread cognitive impairments, such as executive functions. ...These three groups underwent a computerized version of the **Wisconsin Card Sorting Test** (WCST), and a battery of cognitive neu ...

2 Cite Share

Anhedonia and sensitivity to punishment in **schizophrenia**, depression and opiate use disorder.

Ossola P, Garrett N, Biso L, Bishara A, Marchesi C.

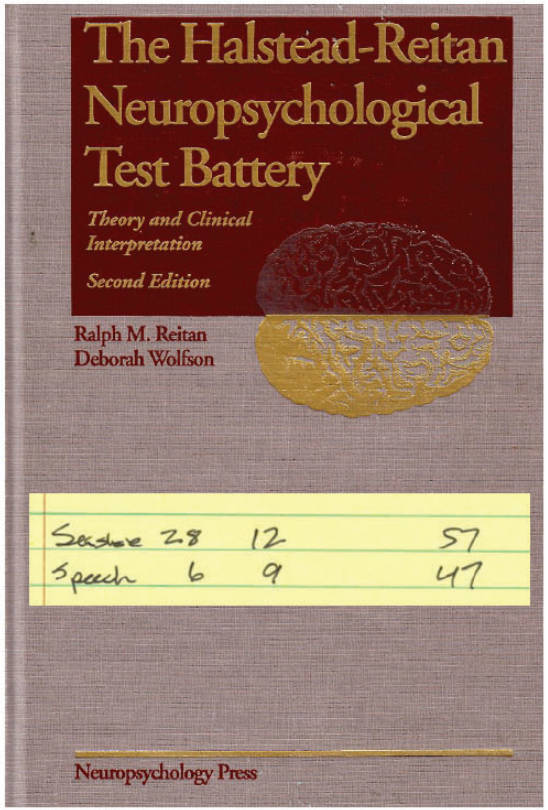
J Affect Disord. 2023 Jun 1;330:319-328. doi: 10.1016/j.jad.2023.02.120. Epub 2023 Mar 6.

Adult Form

Speech-sounds Perception Test

Name Robert Bowers Date 5/22/23 Examiner DAM Score 6 errors

Directions: Underline the syllable which you hear.



Speech Sounds Perception Test

Table 7-1. Rules for computing the General Neuropsychological Deficit Scale score.

Level of Performance				
Variable	**0**	**1**	**2**	**3**
1. Verbal IQ	90+	82–89	73–81	≤72
2. Performance IQ	90+	82–89	73–81	≤72
3. Impairment Index	0–.2	.3–.4	.5–.7	.8–1.0
4. Category Test	0–25	26–45	46–64	65+
5. TPT — Total Time	0′–9.0′	9.1′–15.0′	15.1′–25.0′	25.1′+
6. TPT — Memory	8–10	7	4–6	0–3
7. TPT — Localization	7–10	6	3–5	0–2
8. Seashore Rhythm Test (# correct)	28–30	25–27	20–24	0–19
9. Speech-sounds Perception Test (errors)	0–6	7–10	11–15	16+
10. Finger Tapping — Dominant Hand	55+	50–54	41–49	0–40
11. Finger Tapping — Non-dominant Hand	49+	45–48	37–44	0–36
12. Trail Making Test — Part A	0″–26″	27″–39″	40″–51″	52″+
13. Trail Making Test — Part B	0″–65″	66″–85″	86″–120″	121″+
14. Tactile Form Recognition — Total Time	0″–16″	17″–23″	24″–33″	34″+
15. Bilateral Tactile Stimulation — Total errors	0	1	2–3	4+
16. Bilateral Auditory Stimulation — Total errors	0	1	2	3+
17. Bilateral Visual Stimulation — Total errors	0	1	2–3	4+
18. Tactile Finger Recognition — Both hands (errors)	0–2	3–4	5–8	9+
19. Finger-tip Number Writing — Both hands (errors)	0–3	4–6	7–11	12+

Dr. Martell testing

Dr. Martell: Delis-Kaplan Executive Function System

DELIS • KAPLAN D-KEFS Executive Function System

Score Report
Name: Robert Bowers
Test Date: 5/22/2023

Trail Making Test

	Raw Score	Scaled Score
Primary Measure: Completion Times		
Condition 1: Visual Scanning	16	13
Condition 2: Number Sequencing	24	13
Condition 3: Letter Sequencing	17	15
Condition 4: Number-Letter Switching	48	13
Condition 5: Motor Speed	18	12

	Sum of Scaled Scores	Composite Scaled Score
Primary Combined Measure: Completion Times		
Combined Number + Letter Sequencing	28	15

	Scaled Score Difference	Contrast Scaled Score*
Primary Contrast Measures: Completion Times		
Switching vs Visual Scanning	0	10
Switching vs Number Sequencing	0	10
Switching vs Letter Sequencing	-2	8
Switching vs Combined Number + Letter Sequencing	-2	8
Switching vs Motor Speed	1	11

*A low or high contrast scaled score may reflect different cognitive problems; see examiner's manual.

DELIS • KAPLAN D-KEFS Executive Function System

Score Report
Name: Robert Bowers
Test Date: 5/22/2023

Verbal Fluency Test: Standard Form

	Raw Score	Scaled Score
Primary Measures		
Letter Fluency: Total Correct	33	9
Category Fluency: Total	44	12
Category Switching: Total Correct	17	15
Category Switching: Total Switching	16	14

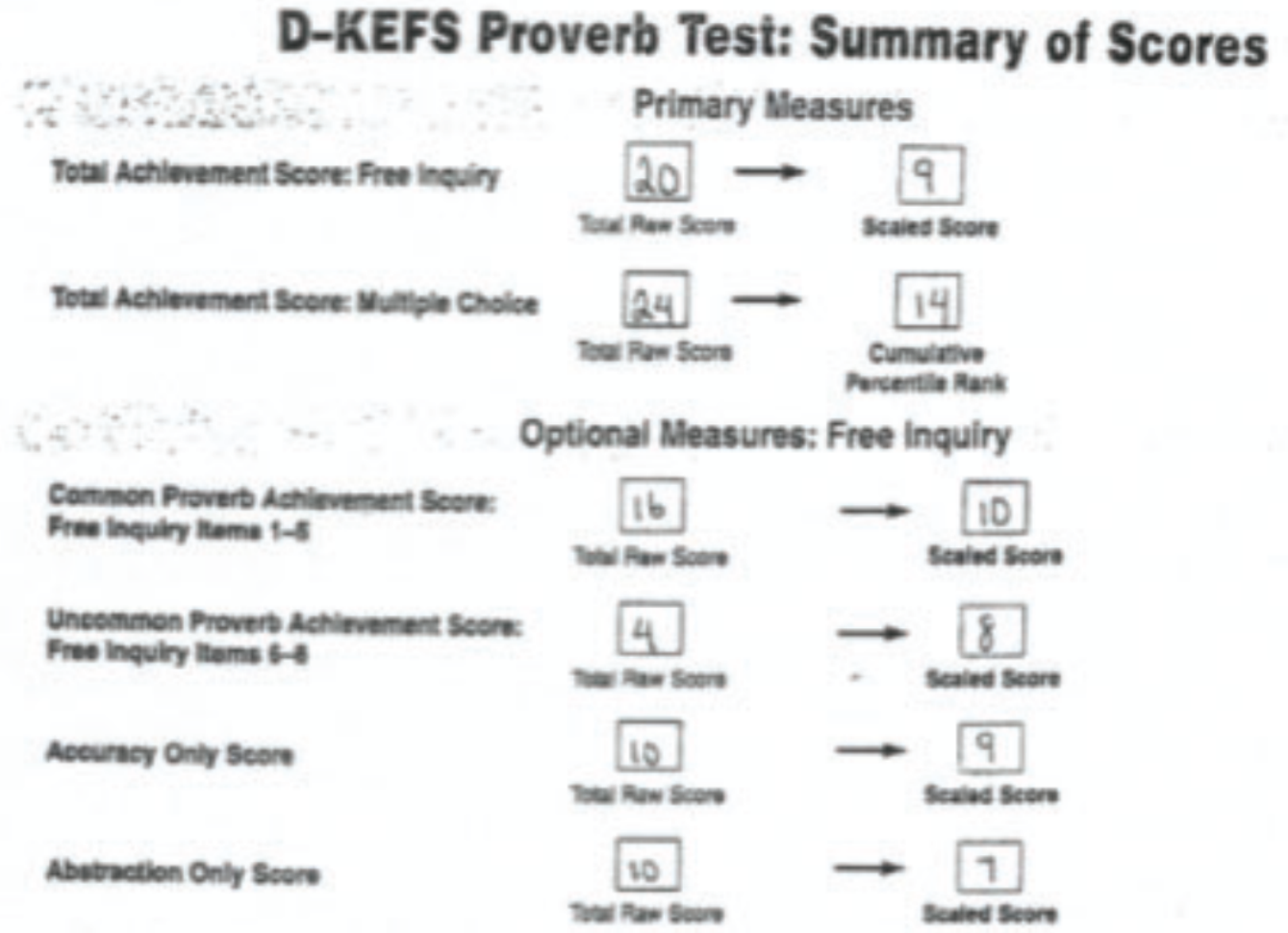
	Scaled Score Difference	Contrast Scaled Score*
Primary Contrast Measures		
Letter Fluency vs. Category Fluency	-3	7
Category Switching vs. Category Fluency	3	13

*A low or a high contrast scaled score may reflect different cognitive problems; see examiner's manual.

	Letter Fluency Raw Score	Category Fluency Raw Score	Category Switching Raw Score	Total Raw Score	Scaled Score
Optional Measures: Conditions 1-3 Combined					
First Interval: Total Correct	13	15	7	35	10
Second Interval: Total Correct	9	10	5	24	11
Third Interval: Total Correct	8	10	2	20	12
Fourth Interval: Total Correct	3	9	3	15	10
Set-Loss Errors	0	0	0	0	13
Repetition Errors	1	0	0	1	12
Total Responses (Correct + Incorrect)*	34	44	16	94	–

*Note: Some Repetition Errors are coded also as Set-Loss Errors; such double-coded error counts as only one response for the Total Responses Measure.

Dr. Rogers D-KEFS Proverbs test



D-KEFS Proverb Test: Summary of Scores

Primary Measures

Total Achievement Score: Free Inquiry	20	Total Raw Score	→ 9	Scaled Score
Total Achievement Score: Multiple Choice	24	Total Raw Score	→ 14	Cumulative Percentile Rank

Optional Measures: Free Inquiry

Common Proverb Achievement Score: Free Inquiry Items 1–5	16	Total Raw Score	→ 10	Scaled Score
Uncommon Proverb Achievement Score: Free Inquiry Items 6–8	4	Total Raw Score	→ 8	Scaled Score
Accuracy Only Score	10	Total Raw Score	→ 9	Scaled Score
Abstraction Only Score	10	Total Raw Score	→ 7	Scaled Score

SCORING AND RECORDING FORM FOR THE BOOKLET CATEGORY TEST

Nick A. DeFilippis, Ph.D. and Elizabeth McCampbell, Ph.D.

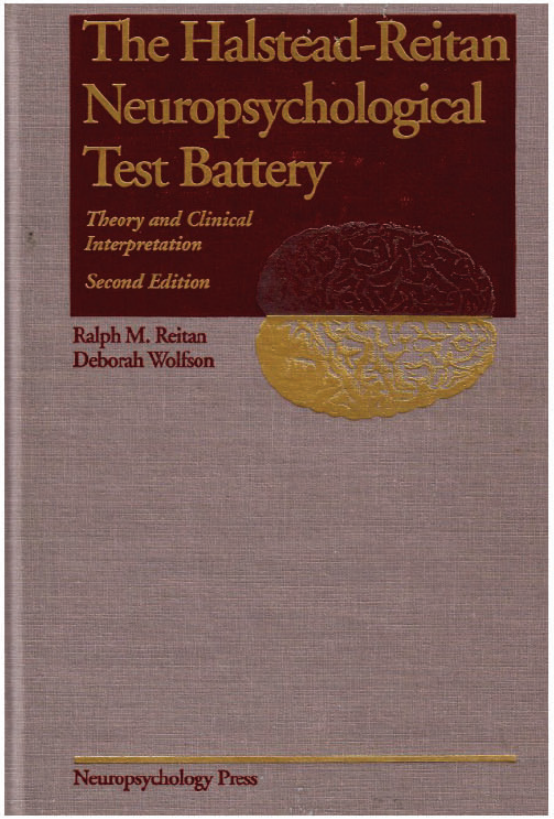
Name R. Bowers Age ____ Sex ____

Education ____ Occupation ____ Premorbid Intellectual Level ____

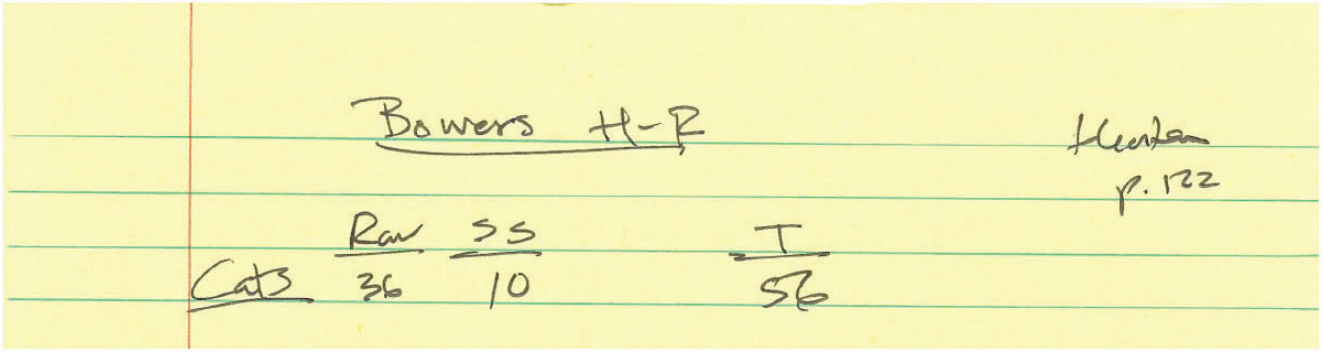
Total No. Errors Subtests I-VII 0+1+6+1+16+11+1=36

Directions: Place an 'X' in the square which coincides with the subjects' choice for each item. The shaded square indicates the correct category for each item. In order to obtain a subject's total error score for the completed test, simply count the number of X's which have been placed in non-shaded squares.

SUBTEST I SUBTEST II SUBTEST II SUBTEST II SUBTEST III



Dr. Martell testing



Category Test
Executive Function Task

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Frontal Lobe Schizophrenia

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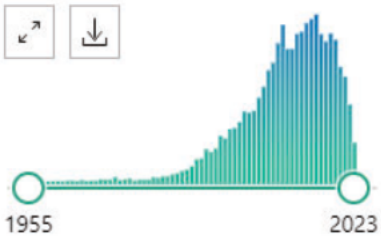
RESULTS BY YEAR



TEXT AVAILABILITY

- Abstract
- Free full text
- Full text

ARTICLE ATTRIBUTE

- Associated data

1 Cite Share

Synaptic Terminal Density Early in the Course of **Schizophrenia**: an in vivo UCB-J Positron Emission Tomographic Imaging Study of Synaptic Vesicle Glycoprotein 2A (SV2A).

Onwordi EC, Whitehurst T, Shatalina E, Mansur A, Arumuham A, Osugo M, Marques TR, Jauhar S, Gupta S, Mehrotra R, Rabiner EA, Gunn RN, Natesan S, Howes OD.

Biol Psychiatry. 2023 Jun 15:S0006-3223(23)01353-7. doi: 10.1016/j.biopsych.2023.05.022. Online ahead of print.

PMID: 37330164

BACKGROUND: The synaptic hypothesis is an influential theory of the pathoaetiology of **schizophrenia**. Supporting this, there is lower uptake of the synaptic terminal density marker UCB-J in patients with chronic **schizophrenia** compared to controls. ...CONCLUSIONS: The ...

2 Cite Share

Chromatic fusion: generative multimodal neuroimaging data fusion provides multi-informed insights into **schizophrenia**.

Geenjaar EPT, Lewis NL, Fedorov A, Wu L, Ford JM, Preda A, Plis SM, Calhoun VD.

medRxiv. 2023 May 26:2023.05.18.23290184. doi: 10.1101/2023.05.18.23290184. Preprint.

PMID: 37292973 Free PMC article.

Motor Function and Frontal Lobe Integrity

Dr. Moberg

Name: RGB Date: 1-11-2020 (PT)

MOTOR FUNCTIONING

Finger Tapping Test

Dominant (R)	Non-dominant (L)
56	50
56	47 NYO
50	47
49	45
49	44
49	43
50	
Mean: 49.4	Mean: 45.2
T-Score: 45 SS=9	T-Score: 49 SS=10

Grooved Pegboard Test

✓ 12-17-19

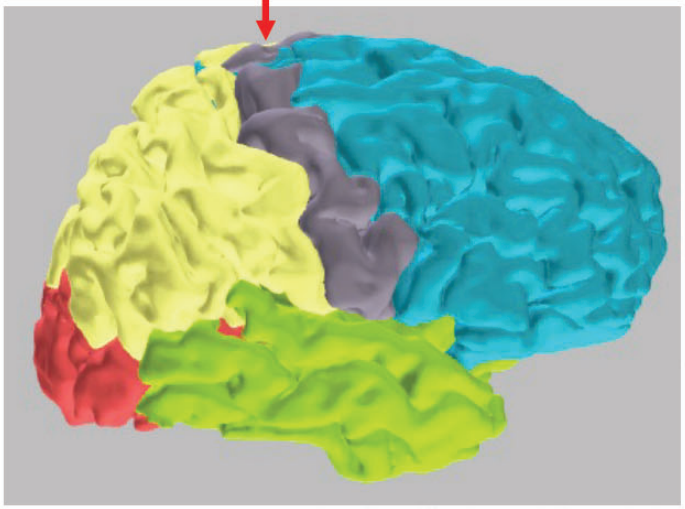
	Time	Drops		Time	Drops
Dominant (R)	1'18"	11	Non-Dominant (L)	1'23"	1
T-Score:	41 SS=7		T-Score:	40 SS=7	

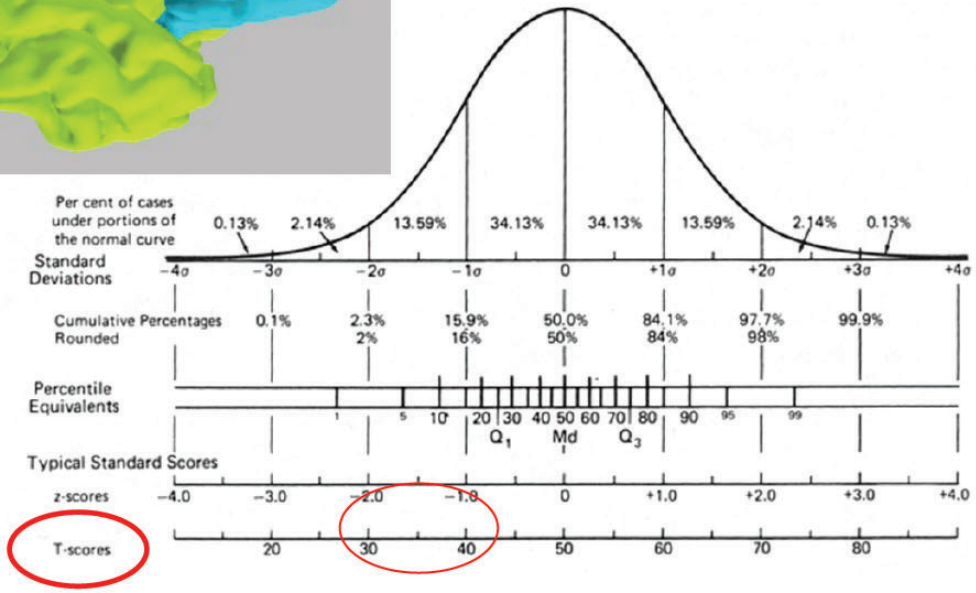
Grip Strength Test

✓ 12-17-19

Dominant (R)		Non-Dominant (L)	
Trial 1:	36	Trial 1:	37
Trial 2:	40	Trial 2:	34
Mean:	38	Mean:	35.5
T-Score:	37	T-Score:	37

Frontal Lobe Motor Cortex
Mr. Bower's MRI





Dominant Hand Should be ~10% Faster/Stronger

> 2 S.D. Difference

› Schizophr Res. 2018 Oct;200:92-96. doi: 10.1016/j.schres.2017.06.047. Epub 2017 Jun 30.

Psychomotor assessment as a tool to differentiate schizophrenia from other psychotic disorders

S Janssens [1], H Moens [2], V Coppens [3], F Vandendriessche [2], W Hulstijn [4], B Sabbe [3], M Morrens [3]

Affiliations + expand

PMID: 28673755 DOI: 10.1016/j.schres.2017.06.047

Abstract

Goal: The aim of this study is to assess to what extent psychomotor assessment can aid the clinician in differentiating between schizophrenia and other psychotic disorders.

Methods: Enrolled subjects were recent in remission patients (n=304), who all met DSM-IV (APA, 2013) criteria for either schizophrenia (Sz; n=117), schizoaffective disorder (SaD; n=36), psychotic disorder not otherwise specified (P-NOS) (n=86), substance/medication-induced psychotic disorder (SIPD; n=33) or major depressive disorder with psychotic features (MDD-p; n=32). The patients were submitted to a psychomotor test battery.

Results: Patients with schizophrenia generally perform worse on most tests. Using cluster analysis a combination of three tests, namely the sensory integration subscale of the Neurological Evaluation Scale (NES), a Figure Copying Task (FCT) and the finger tapping test (FTT), came out to be useful to clinically differentiate between schizophrenia and substance-induced psychotic disorder (SIPD) or psychosis not otherwise specified (P-NOS). When comparing schizophrenia only to a group of patients with SIPD, the differentiation potential becomes even greater with a 76.1% chance to correctly diagnose patients with schizophrenia and 75% chance for patients with SIPD.

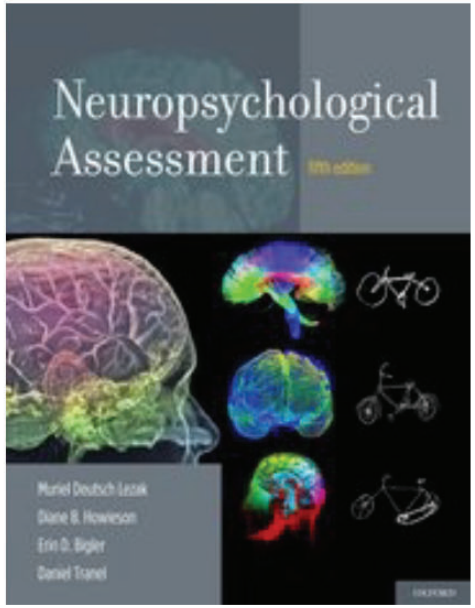
Conclusion: A combination of NES, FCT and FTT shows promising results as a clinical tool in daily practice to differentiate schizophrenia from other psychotic disorders. Future prospective studies to confirm these results are necessary.

Clinical Trial › Brain Dev. 2009 Jan;31(1):52-7. doi: 10.1016/j.braindev.2008.07.003. Epub 2008 Aug 23.

Predicting executive function task scores with the Rey-Osterrieth Complex Figure

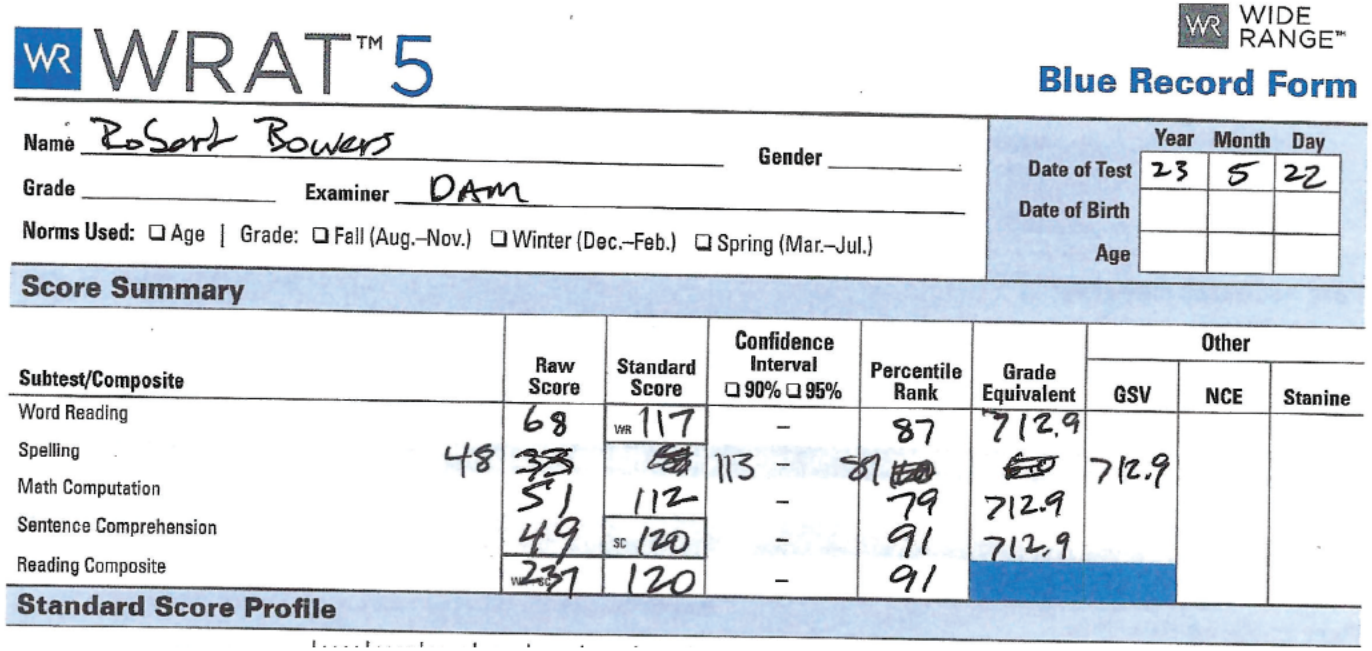
Tatsuya Ogino [1], Kiyoko Watanabe, Kousuke Nakano, Yoko Kado, Teruko Morooka, Akihito Takeuchi, Makio Oka, Satoshi Sanada, Yoko Ohtuska

Complex Figure as a measure of Executive Function (Implications for Fronto-Temporal Lobe Integrity)



Academic Achievement

Dr. Martell



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Name RoSark Bowers Gender

Grade Examiner DAM

Norms Used: ❑ Age | Grade: ❑ Fall (Aug.–Nov.) ❑ Winter (Dec.–Feb.) ❑ Spring (Mar.–Jul.)

	Year	Month	Day
Date of Test	23	5	22
Date of Birth			
Age			

Score Summary

Subtest/Composite	Raw Score	Standard Score	Confidence Interval ❑ 90% ❑ 95%	Percentile Rank	Grade Equivalent	Other GSV	Other NCE	Other Stanine
Word Reading	68	WR 117	–	87	712.9			
Spelling	48 ~~33~~	~~58~~	113 – ~~81~~		~~[illegible]~~	712.9		
Math Computation	51	112	–	79	712.9			
Sentence Comprehension	49	SC 120	–	91	712.9			
Reading Composite	~~237~~	120	–	91				

Standard Score Profile

Dr. Moberg -- Word read and pronunciation above average on WTAR standard score = 117

Dr. Moberg -- 2019/2020 Testing

Test 8 Writing Fluency

Basal: Item 1
Time Limit: 7 minutes

If not using a stopwatch, record the start and end times in the box below.

Score 1, 0

Time: 7 min. 0 1 sec.

21 Number Correct (0–40)

	min.	sec.
End Time:		
– Start Time:		
= Time:		

Test 8 Writing Fluency
Scoring Table
Encircle row for the Number Correct.

Number Correct	AE (Est)*	GE (Est)*
0	<5-6	<K.0
1	5-9	1.0
2	6-0	1.2
3	6-3	1.4
4	6-7	1.6
5	6-10	1.8
6	7-2	2.1
7	7-5	2.3
8	7-9	2.5
9	8-0	2.8
10	8-4	3.0
11	8-8	3.3
12	9-0	3.6
13	9-4	3.9
14	9-8	4.2
15	10-0	4.6
16	10-4	4.9
17	10-9	5.3
18	11-2	5.7
19	11-7	6.1
20	12-1	6.6
21	12-7	7.1
22	13-2	7.7
23	13-9	8.4
24	14-7	9.2
25	15-7	10.1
26	17-0	11.4
27	>20	12.9
28	>20	13.0
>28	>20	>18.0

AE and GE are estimates of the precise values provided by the software scoring program when time is exactly 7 minutes.

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Tests of Achievement WJ III

STANDARD AND EXTENDED BATTERIES – FORM A — TEST RECORD

IDENTIFYING INFORMATION

Last Name: RGB — First Name:
Sex: ☒ M ☐ F — ID:
Date of Birth: 9 / 4 / 1972 (MM / DD / YYYY)
School/Organization:
Teacher/Department:
Adult Subjects: Education (Years Completed): 11 — Occupation: Truck Driver
Date of Testing: 01 / 11 / 2020 (MM / DD / YYYY)

Additional Information
Does the subject have glasses? ☐ Yes ☒ No
Were they used during testing? ☐ Yes ☒ No
Does the subject have a hearing aid? ☐ Yes ☒ No
Was it used during testing? ☐ Yes ☒ No
Other Information:

Test 6 Math Fluency

Basal: Item 1
Time Limit: 3 minutes

If not using a stopwatch, record the start and end times in the box below.

Score 1, 0

Time: 3 min. 0 0 sec.

94 Number Correct (0–160)

	min.	sec.
End Time:		
– Start Time:		
= Time:		

Test 6 Math Fluency
Scoring Table
Encircle row for the Number Correct.

Number Correct	AE (Est)*	GE (Est)*
0	<5-6	<K.2
1	5-6	K.2
2	5-7	K.3
3	5-8	K.3
4	5-9	K.4
5	5-10	K.5
6	5-10	K.5
7	5-11	K.6
8	6-0	K.7
9	6-1	K.7
10	6-2	K.8
11	6-3	K.9
12	6-4	1.0
13	6-5	1.0
14	6-6	1.1
15	6-6	1.2
16	6-7	1.2
17	6-8	1.3
18	6-9	1.4
19	6-10	1.4
20	6-11	1.5
21	7-0	1.6
22	7-1	1.7
23	7-1	1.7
24	7-2	1.8
25	7-3	1.9
75	11-6	6.1
76	11-7	6.2
77	11-8	6.3
78	11-9	6.4
79	11-10	6.5
80	12-0	6.6
81	12-1	6.7
82	12-2	6.8
83	12-3	6.9
84	12-5	7.0
85	12-6	7.1
86	12-7	7.2
87	12-9	7.3
88	12-10	7.4
89	13-0	7.6
90	13-1	7.7
91	13-2	7.8
92	13-4	7.9
93	13-5	8.0
94	13-7	8.2
95	13-9	8.3
96	13-10	8.4
97	14-0	8.5
98	14-1	8.7
99	14-3	8.8
100	14-5	8.9

Mr. Bower's has a GED

Meta-Analysis > Psychol Med. 2020 Sep;50(12):1949-1965. doi: 10.1017/S0033291720002354. Epub 2020 Jul 20.

Academic achievement and schizophrenia: a systematic meta-analysis

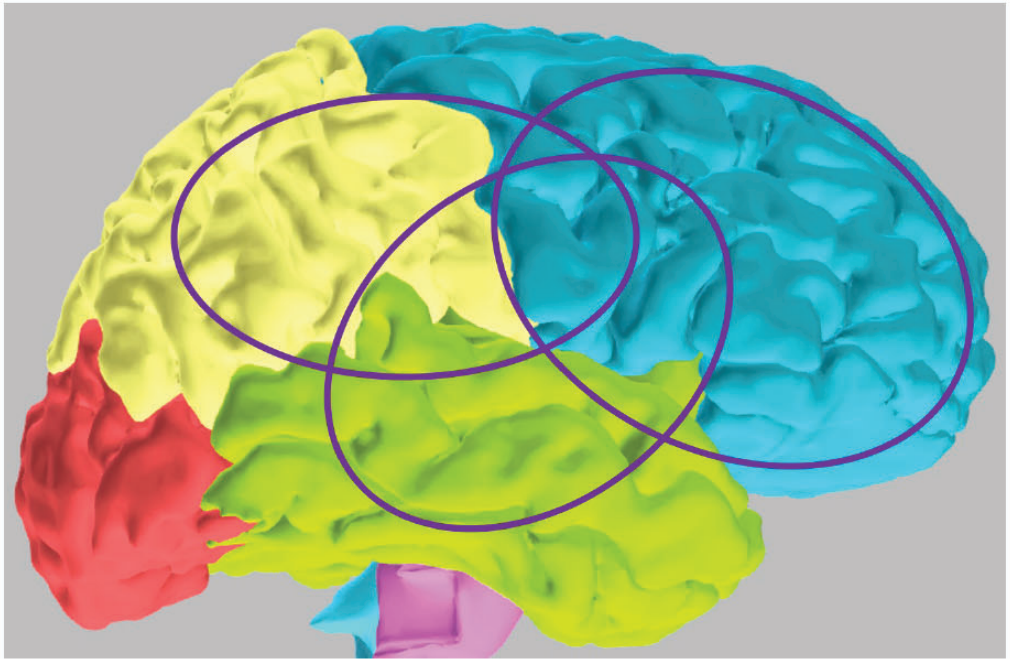
Hannah Dickson [1], Emily P Hedges [1 2], Shin Y Ma [1], Alexis E Cullen [2], James H MacCabe [2], Matthew J Kempton [2], Johnny Downs [3], Kristin R Laurens [2 4 5]

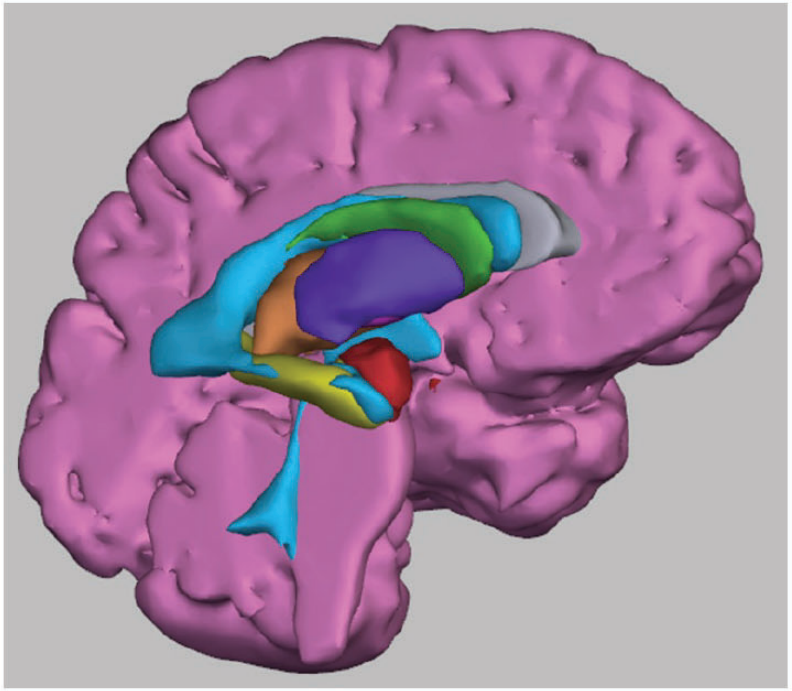
Results: Meta-analyses, comprising data of over four million individuals, found that: (1) by age 16 years, those who later developed schizophrenia had poorer general academic (Cohen's d = -0.29, $p \leqslant 0.0001$) and mathematics achievement (d = -0.23, p = 0.01) than those who did not; (2) individuals with schizophrenia were less likely to enter higher education (odds ratio = 0.49, $p \leqslant 0.0001$); and, (3) youth reporting psychotic-like experiences and youth with a family history of schizophrenia had lower general academic achievement (d = -0.54, $p \leqslant 0.0001$; d = -0.39, $p \leqslant 0.0001$, respectively). Meta-regression analyses determined no effect modifiers.

Discussion: Despite significant heterogeneity across studies, various routinely collected indices of academic achievement can identify premorbid cognitive dysfunction among individuals who are vulnerable for schizophrenia, potentially aiding the early identification of risk in the population.

Keywords: Academic attainment; adolescence; childhood; cognition; psychosis; scholastic achievement.

The Brain and Social Cognition



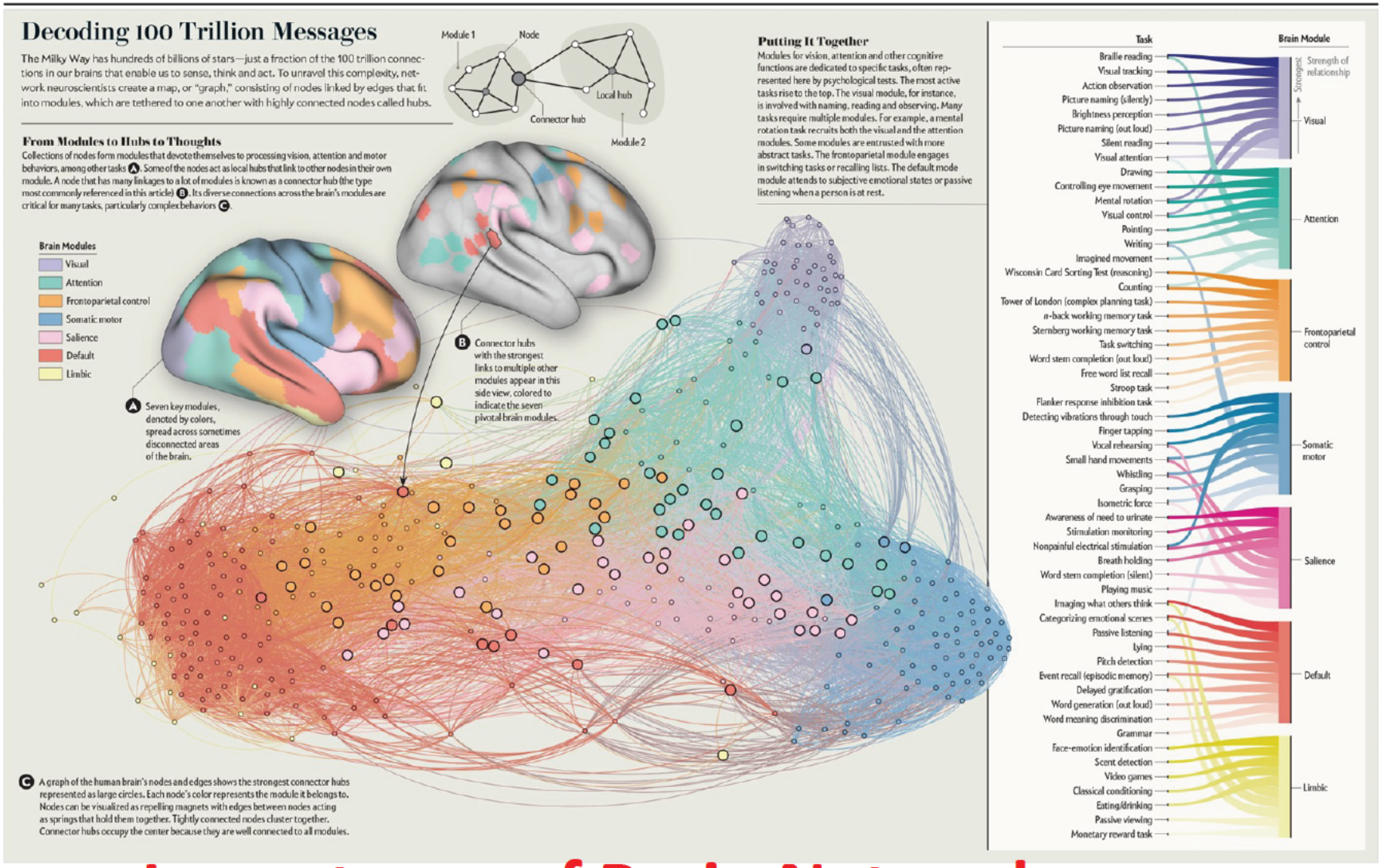


Dr. Martell's ACS Results

Social Perception Score Summary

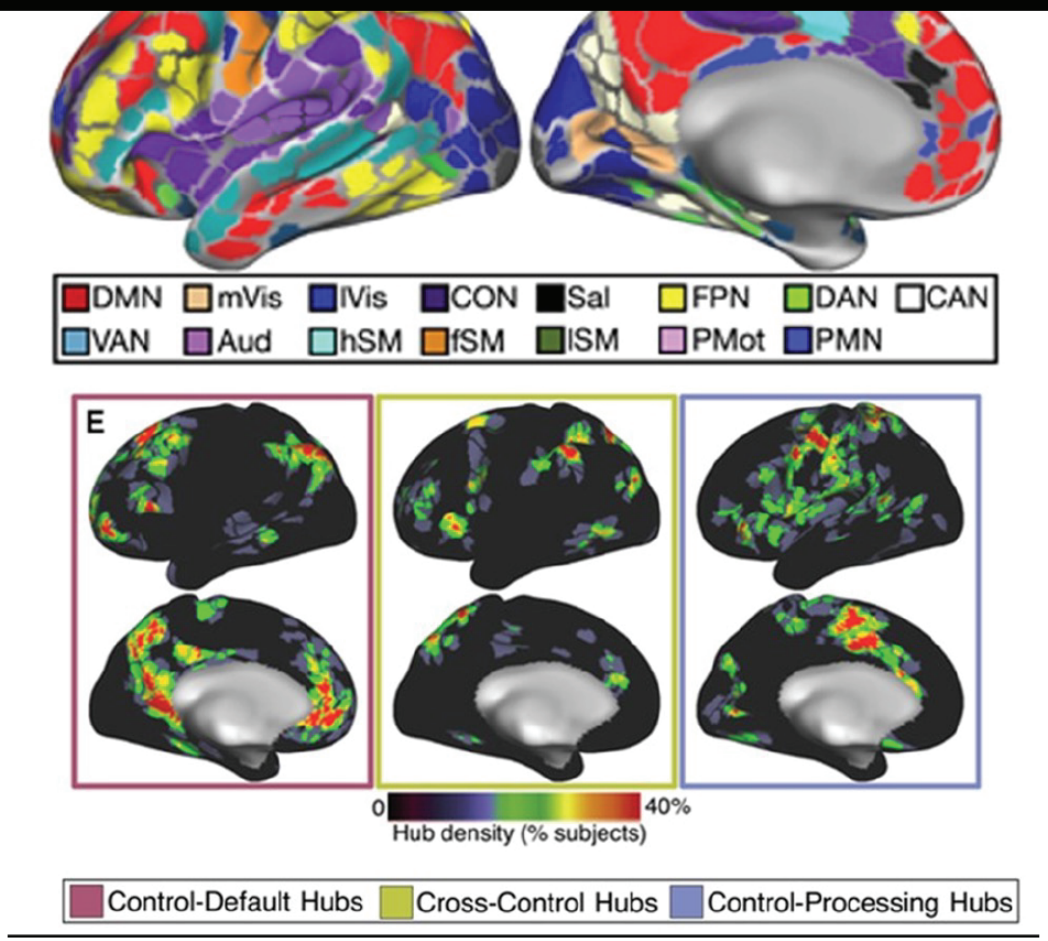
Score	Raw Score	Scaled Score	Percentile Rank
Social Perception	37	11	63
SP Affect Naming	19	11	63
SP Prosody	8	3	1
SP Pairs	23	8	25

Severe impairment in matching emotion-laden speech to a person's affective state



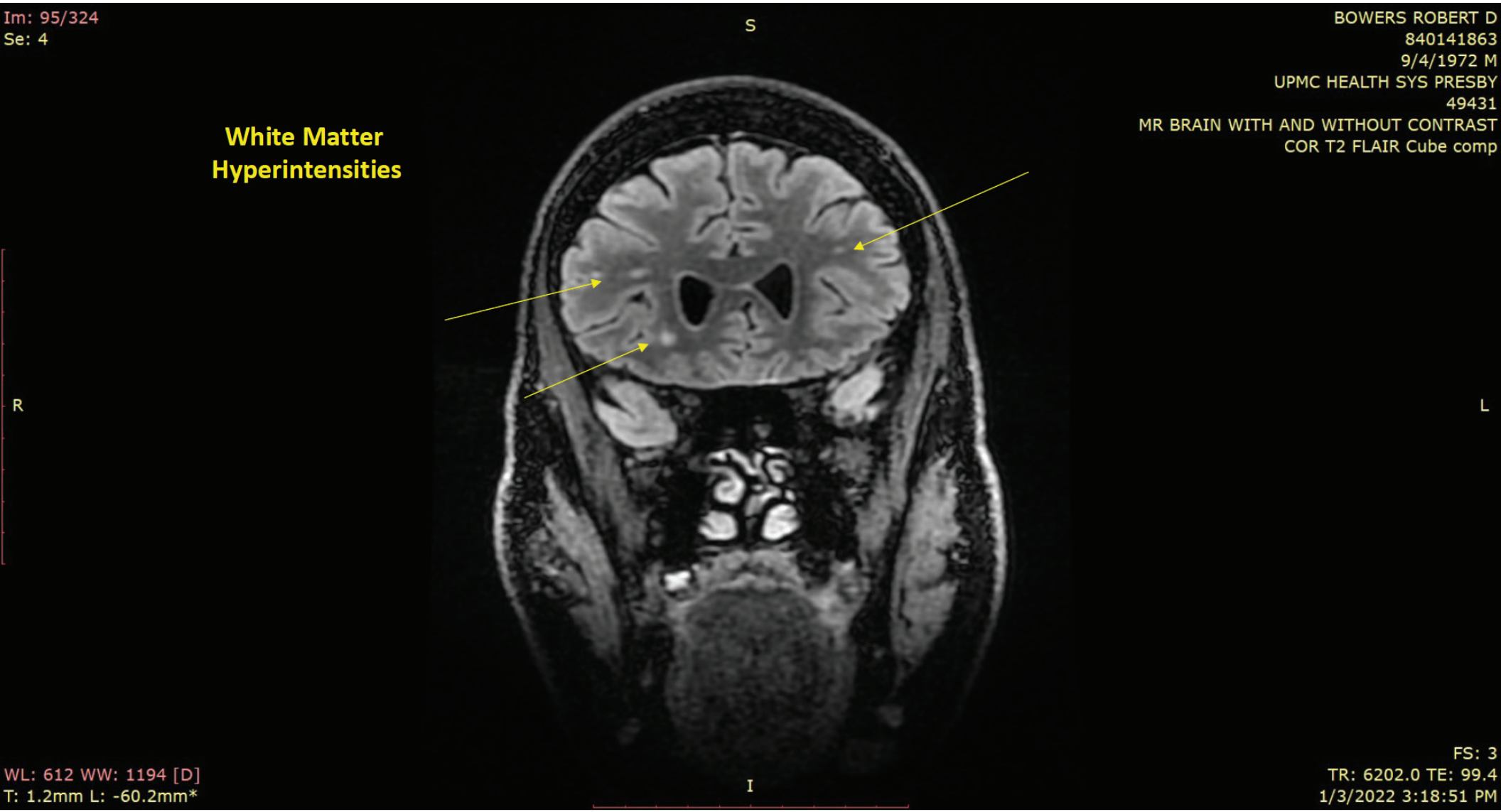
Importance of Brain Networks

Importance of Brain Networks



Conclusions

- Mr. Bowers performance on the testing performed by Dr. Moberg and Dr. Martell was valid
- Consistent with other people diagnosed with Schizophrenia, Mr. Bowers has meaningful variability and discrepant scores across all the testing
- These valid and objective neuropsychological test results are consistent with brain abnormalities seen in Schizophrenia
- The findings on the neuropsychological testing are what would be expected given the objective EEG brain abnormalities indicating nonspecific cerebrocortical as well as bilateral temporal lobe dysfunction combined with the neuroimaging findings.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COR T2 FLAIR Cube comp
White Matter Hyperintensities
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WL: 612 WW: 1194 [D]
T: 1.2mm L: -60.2mm*
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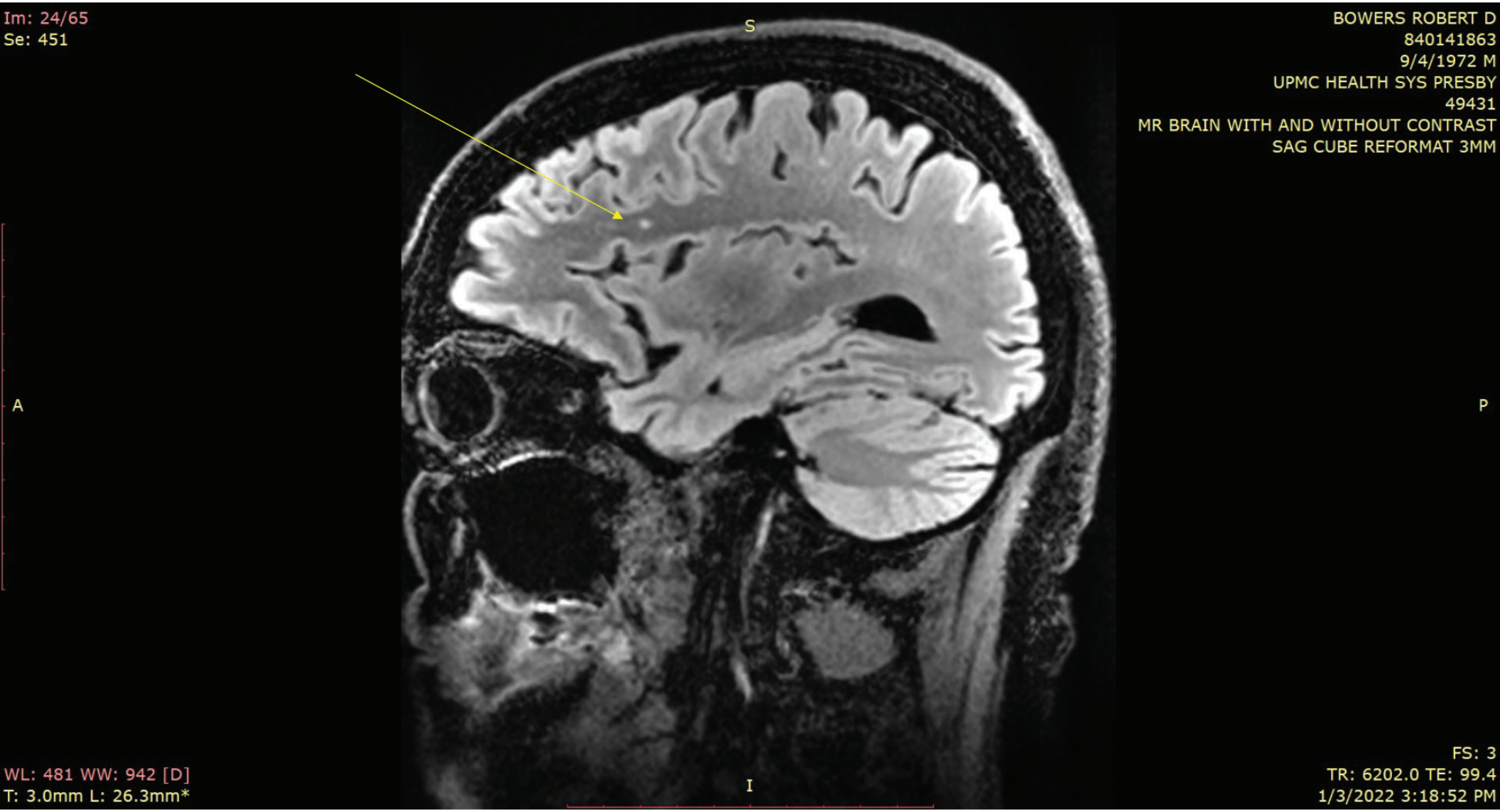
FS: 3
TR: 6202.0 TE: 99.4
1/3/2022 3:18:51 PM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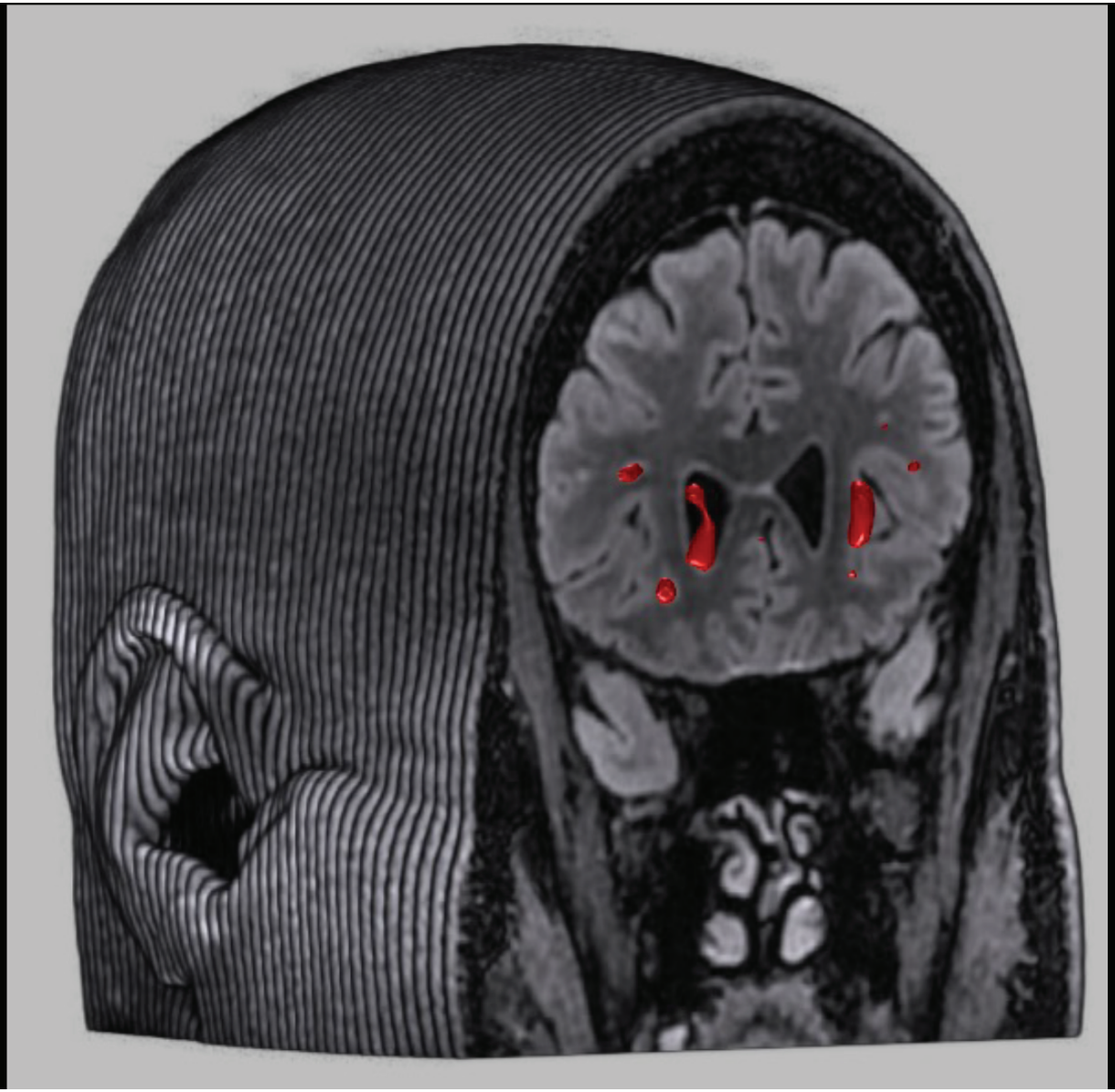
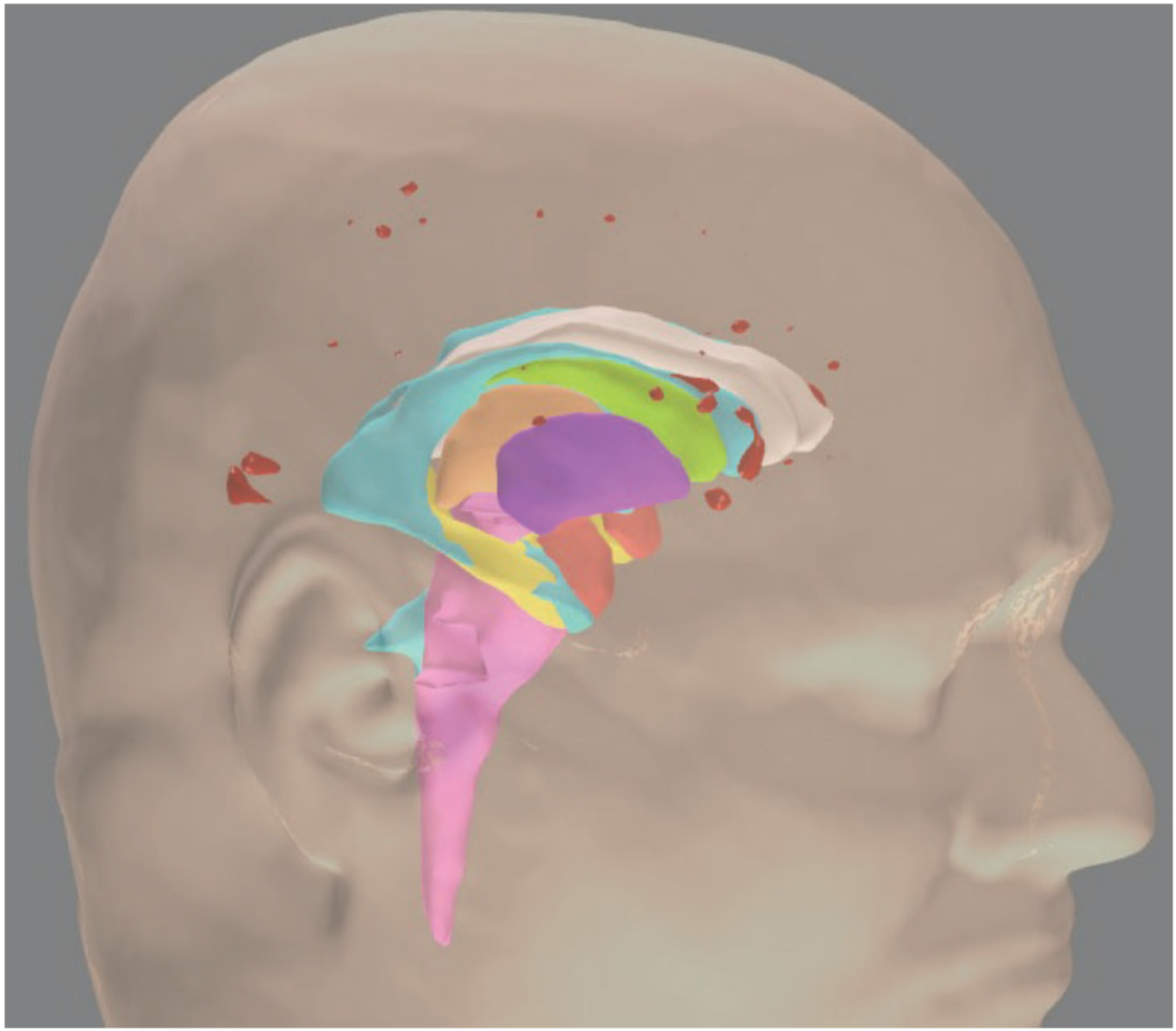
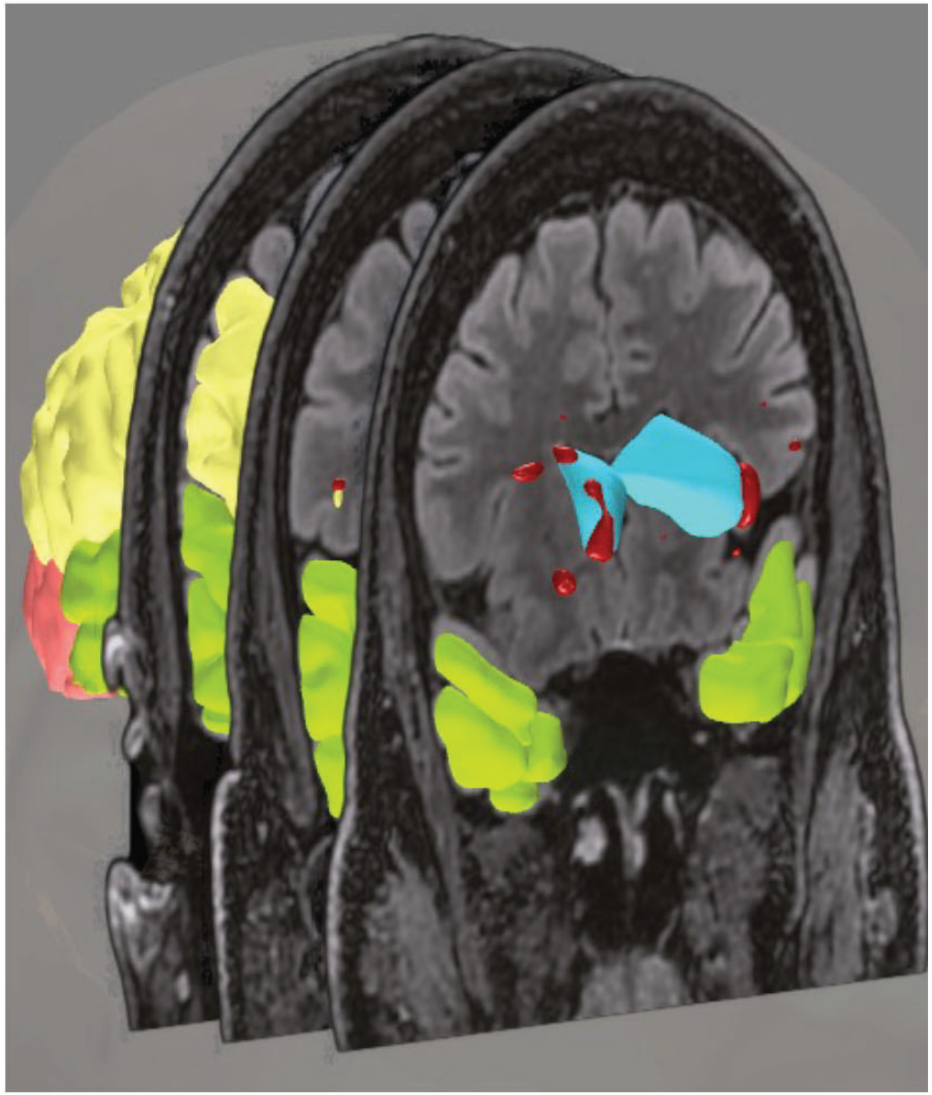
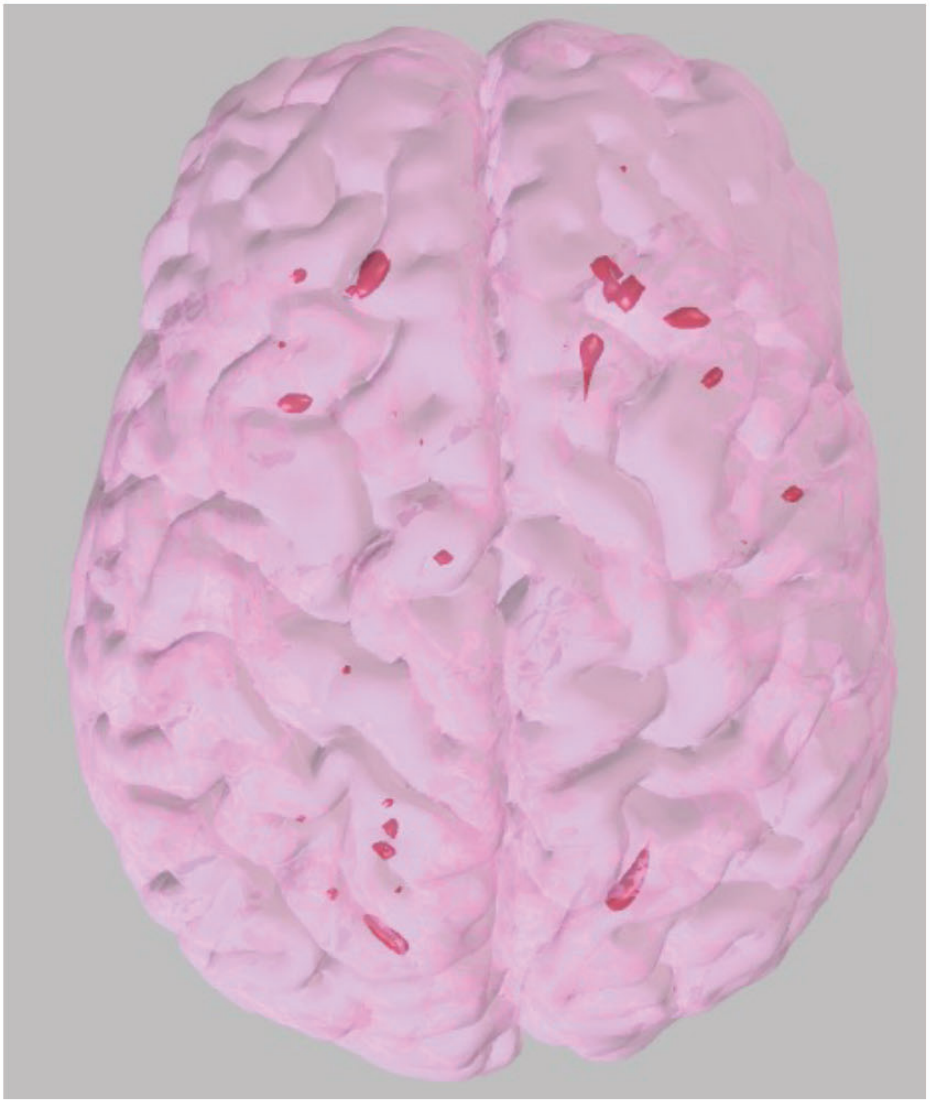
Se: 451
S
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
SAG CUBE REFORMAT 3MM
A
P
WL: 481 WW: 942 [D]
T: 3.0mm L: 26.3mm*
I
FS: 3
TR: 6202.0 TE: 99.4
1/3/2022 3:18:52 PM



Red = White Matter Hyperintensity







NeuroQuant® Morphometry

General Morphometry Report

Patient Information

Patient: BOWERS, ROBERT
Patient ID: 840141863
Sex: M
Age: 49
Referring Physician: NONASSIGNED, PHYSICIAN

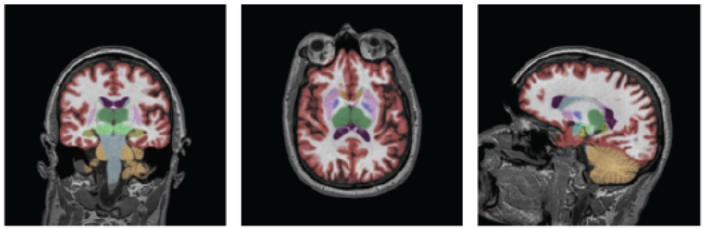
Report Information

Scan Date: 2022-01-03
Scan Accession: 102136820
Report Date: 2022-01-03
Software Version: 3.1.0

Site Information

UPMC
_
_
_

Brain Structure Visualization



Brain Structure Volumes

Intracranial Volume (ICV) (cm³)	1636.32

Brain Structure	LH Volume (cm³)	LH Volume (% of ICV)	RH Volume (cm³)	RH Volume (% of ICV)	Asymmetry Index (%)*
Forebrain Parenchyma	561.67	34.33	565.64	34.57	-0.70
Cortical Gray Matter	261.79	16.00	269.68	16.48	-2.97
Superior Lateral Ventricles	13.49	0.82	12.75	0.78	5.66
Inferior Lateral Ventricles	0.69	0.04	0.93	0.06	-28.71
Hippocampi	5.03	0.31	4.52	0.28	10.65
Amygdalae	1.97	0.12	2.09	0.13	-5.95
Caudates	3.02	0.18	2.69	0.16	11.50
Putamens	5.66	0.35	5.18	0.32	8.87
Pallidums	0.58	0.04	0.55	0.03	4.26
Thalamus	8.04	0.49	8.49	0.52	-5.50
Cerebellum	73.57	4.50	74.71	4.57	-1.53

*The Asymmetry Index is defined as the percentage difference between left and right volumes divided by their mean.

Brain Structure Volumes

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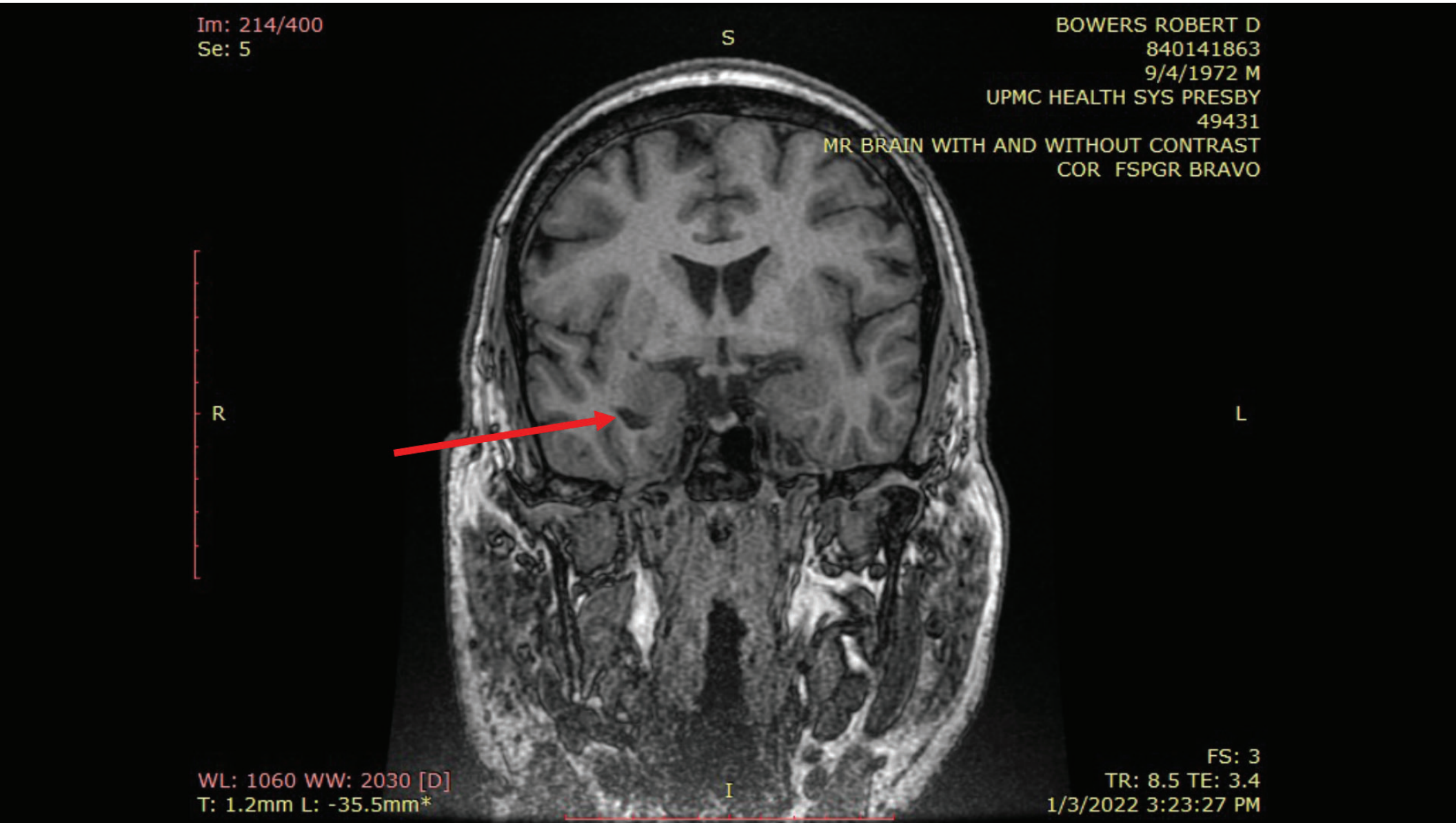
*The Asymmetry Index is defined as the percentage difference between left and right volumes divided by their mean.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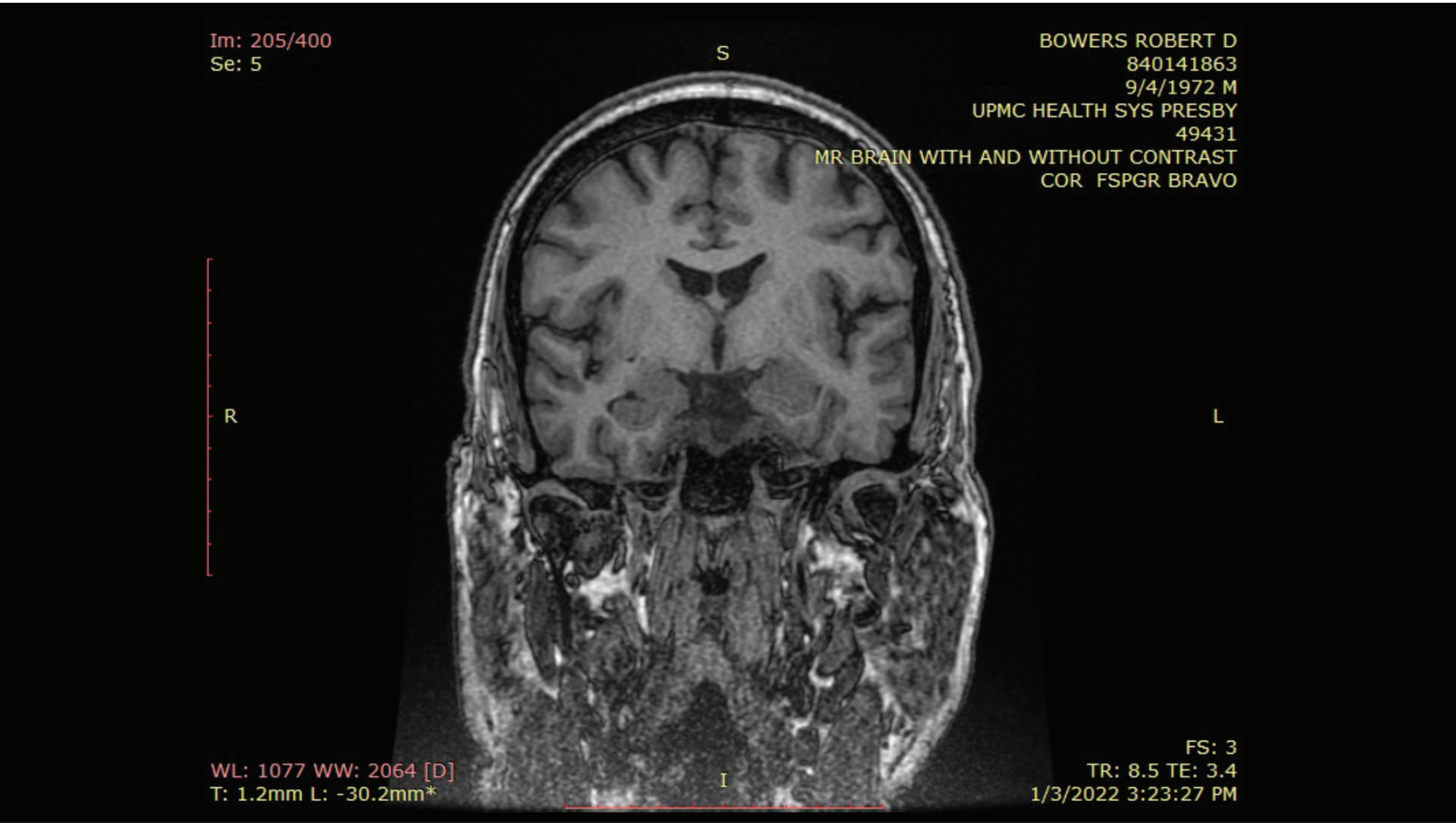
S
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
COR FSPGR BRAVO
R
L
WL: 1060 WW: 2030 [D]
T: 1.2mm L: -35.5mm*
I
FS: 3
TR: 8.5 TE: 3.4
1/3/2022 3:23:27 PM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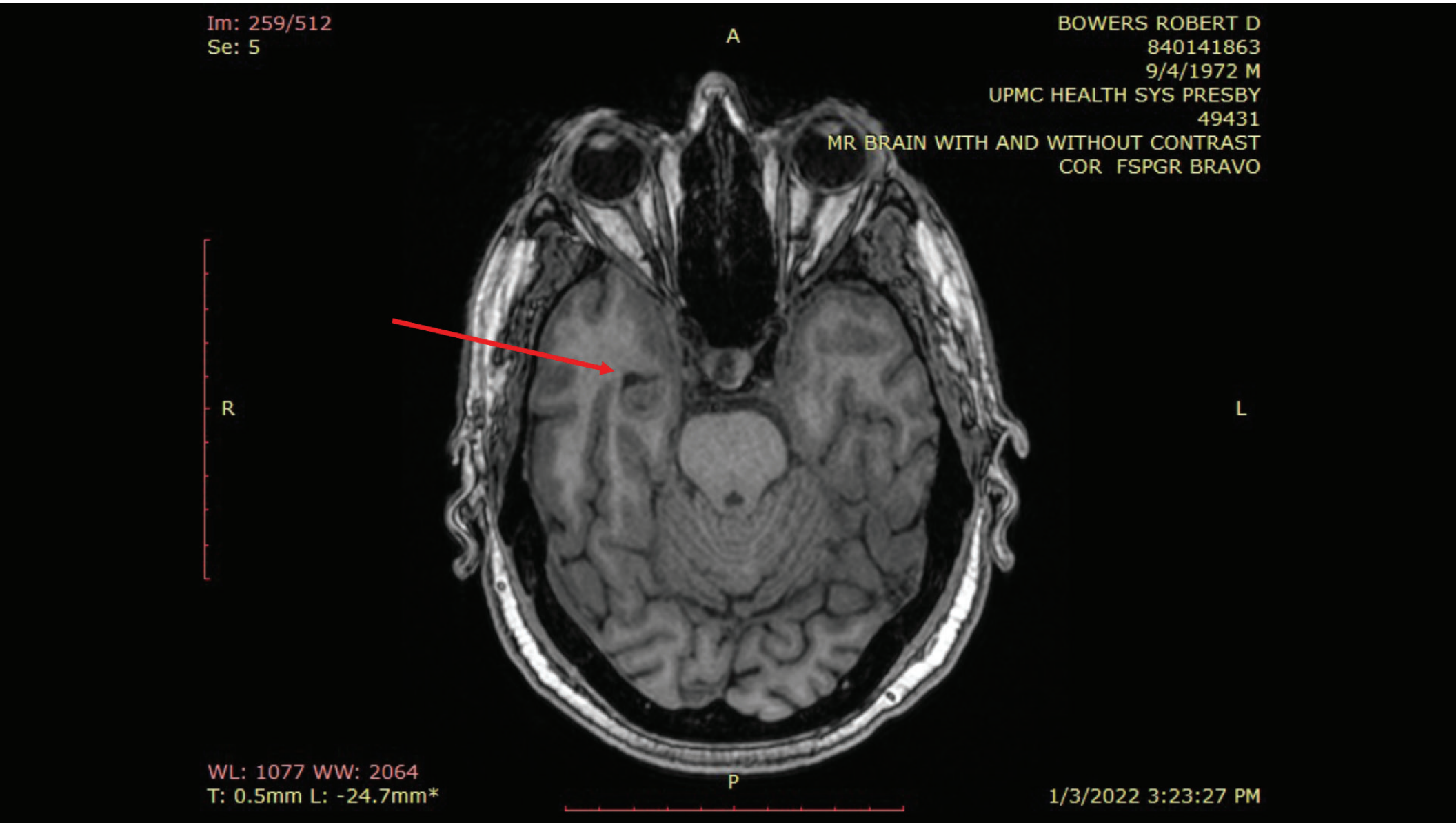
S
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
COR FSPGR BRAVO
R
L
WL: 1077 WW: 2064 [D]
T: 1.2mm L: -30.2mm*
I
FS: 3
TR: 8.5 TE: 3.4
1/3/2022 3:23:27 PM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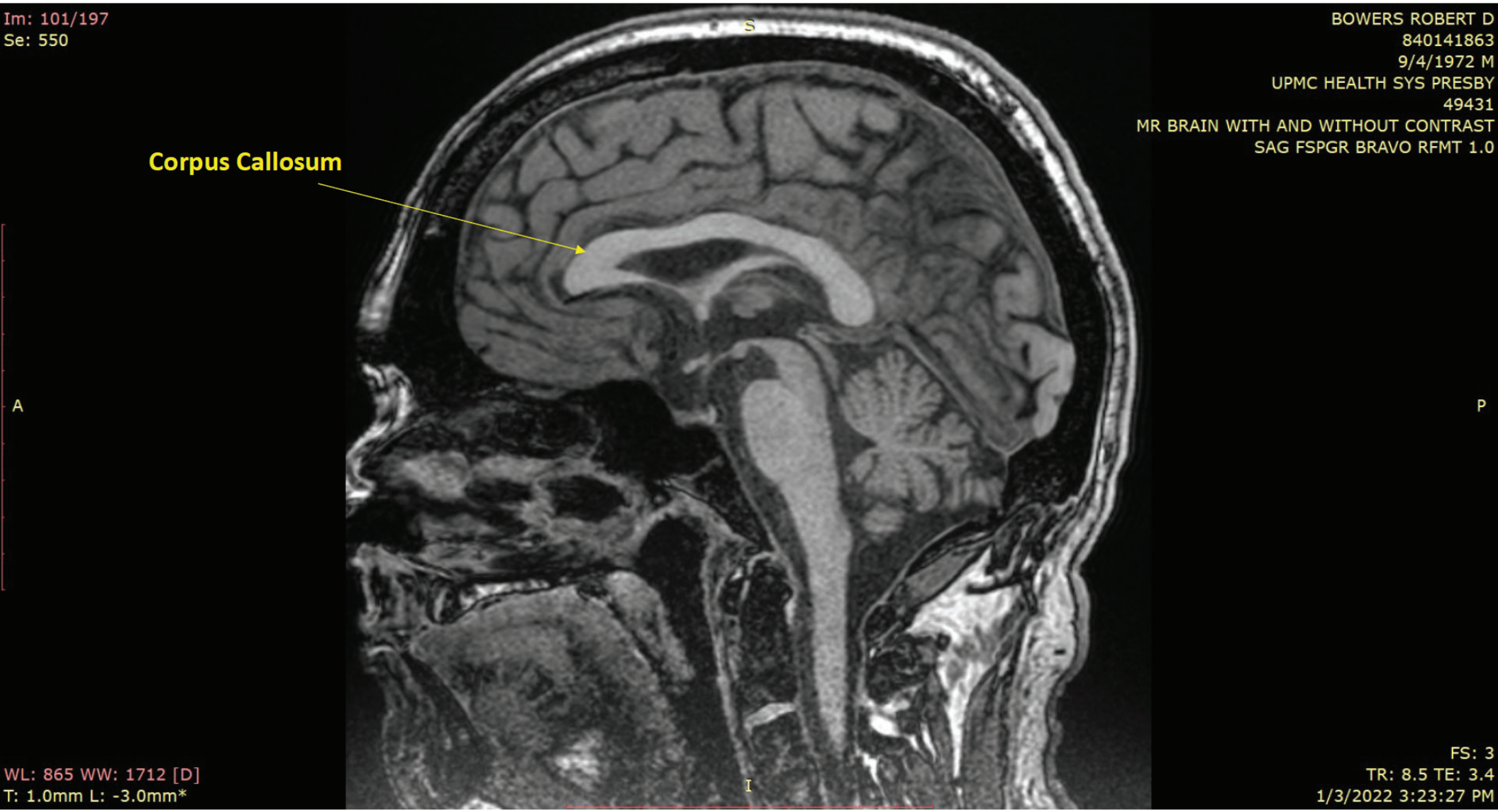
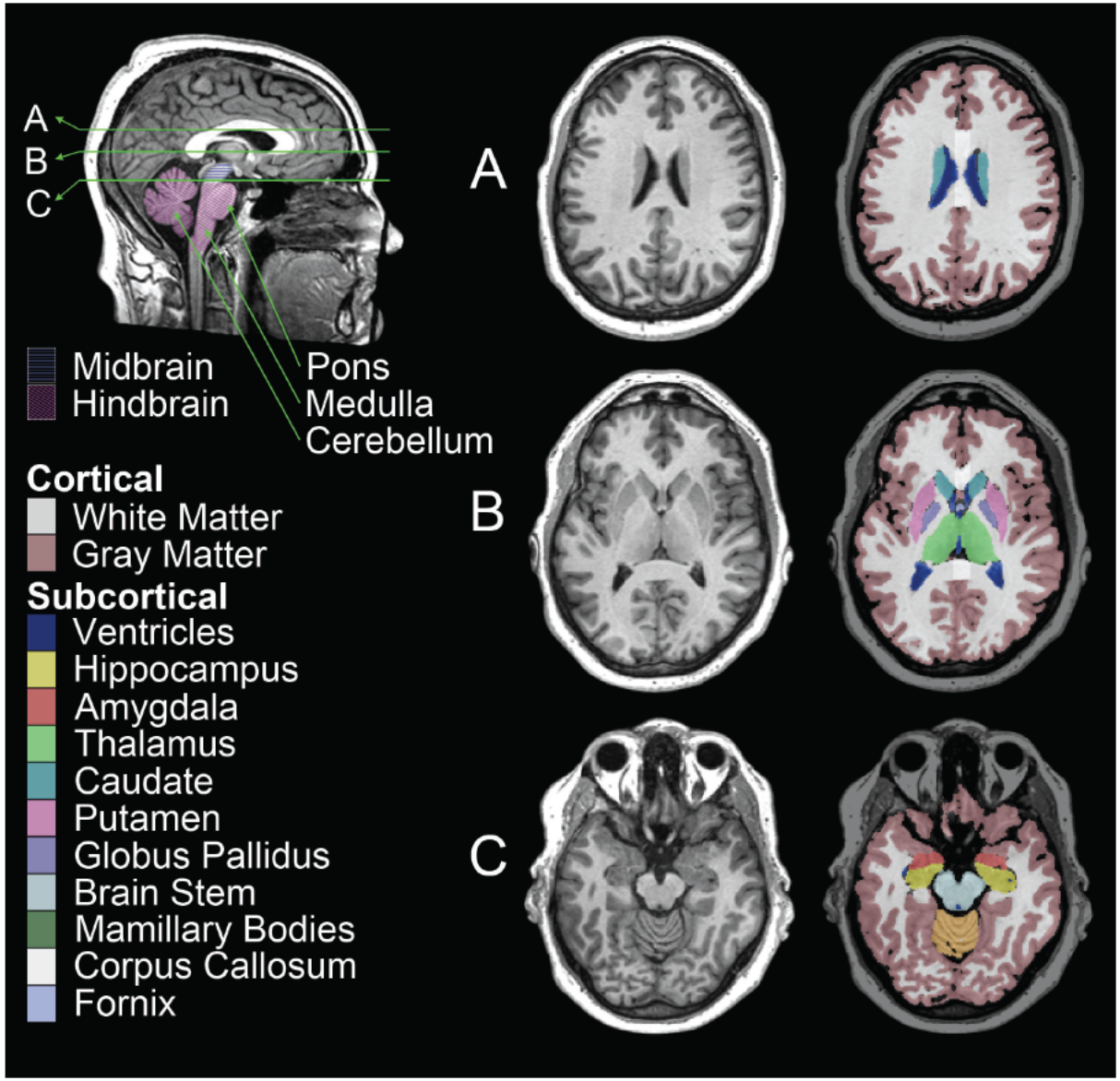
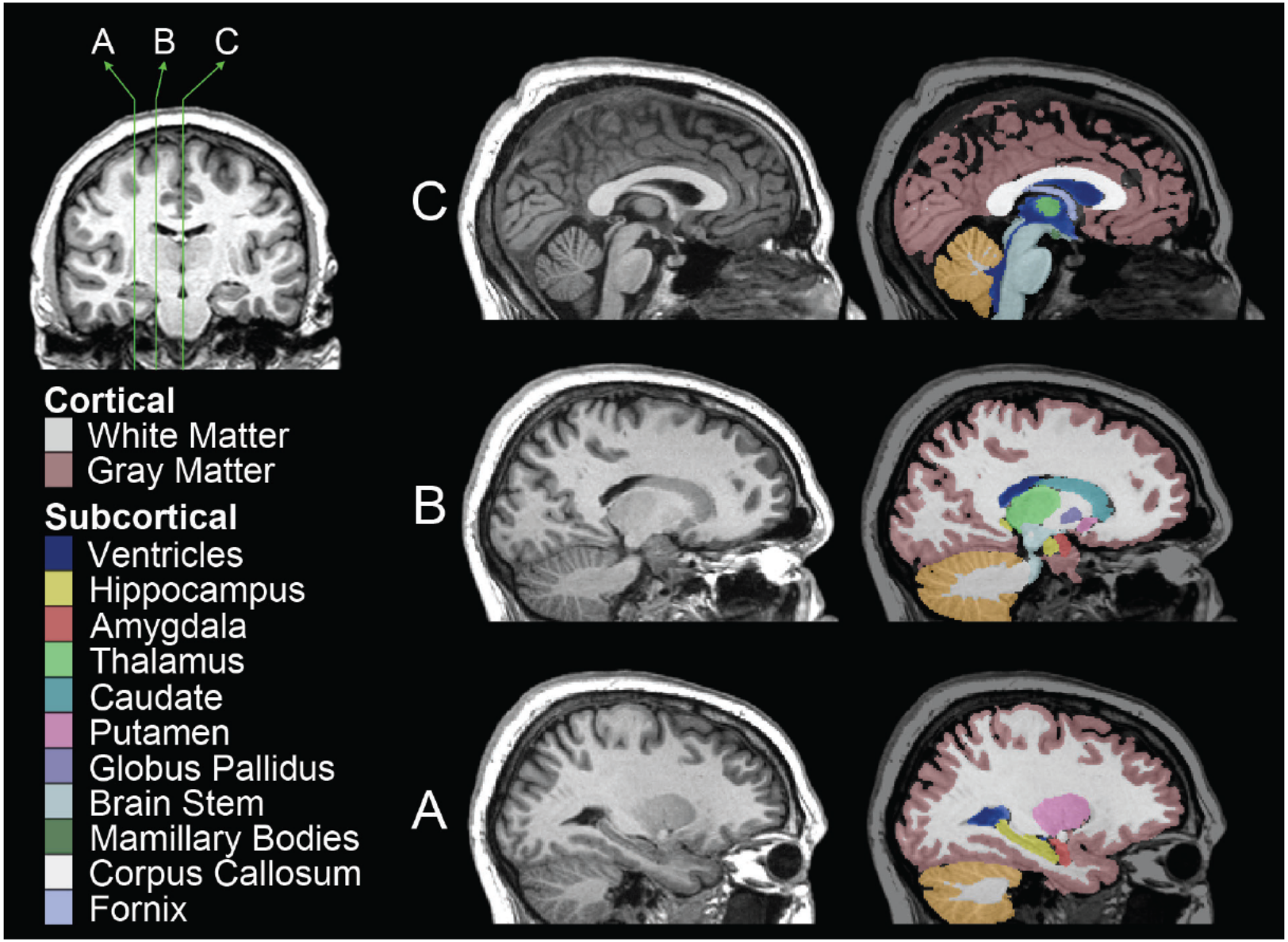
A
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
COR FSPGR BRAVO
R
L
P
WL: 1077 WW: 2064
T: 0.5mm L: -24.7mm*
1/3/2022 3:23:27 PM

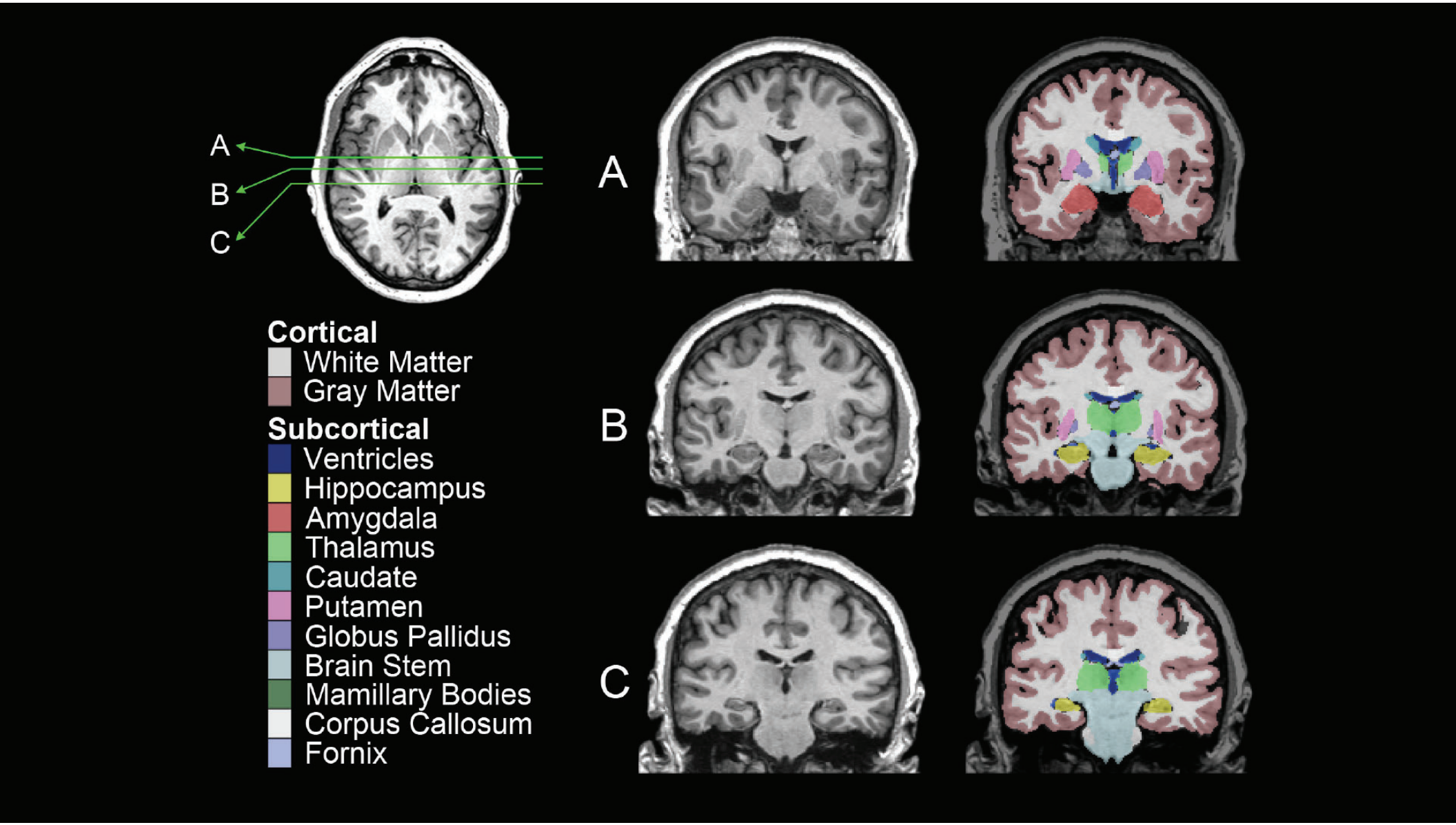

Im: 101/197
Se: 550
Corpus Callosum
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
SAG FSPGR BRAVO RFMT 1.0
S
A
P
I
WL: 865 WW: 1712 [D]
T: 1.0mm L: -3.0mm*
FS: 3
TR: 8.5 TE: 3.4
1/3/2022 3:23:27 PM



Normal Anatomy

(from Lezak, M.D., Howieson, D. B., Bigler, E.D. & Tranel, D. 2012. *Neuropsychological Assessment*. N.Y.: Oxford University Press


A
B
C
C
B
A
Cortical
White Matter
Gray Matter
Subcortical
Ventricles
Hippocampus
Amygdala
Thalamus
Caudate
Putamen
Globus Pallidus
Brain Stem
Mamillary Bodies
Corpus Callosum
Fornix


A
B
C
Cortical
White Matter
Gray Matter
Subcortical
Ventricles
Hippocampus
Amygdala
Thalamus
Caudate
Putamen
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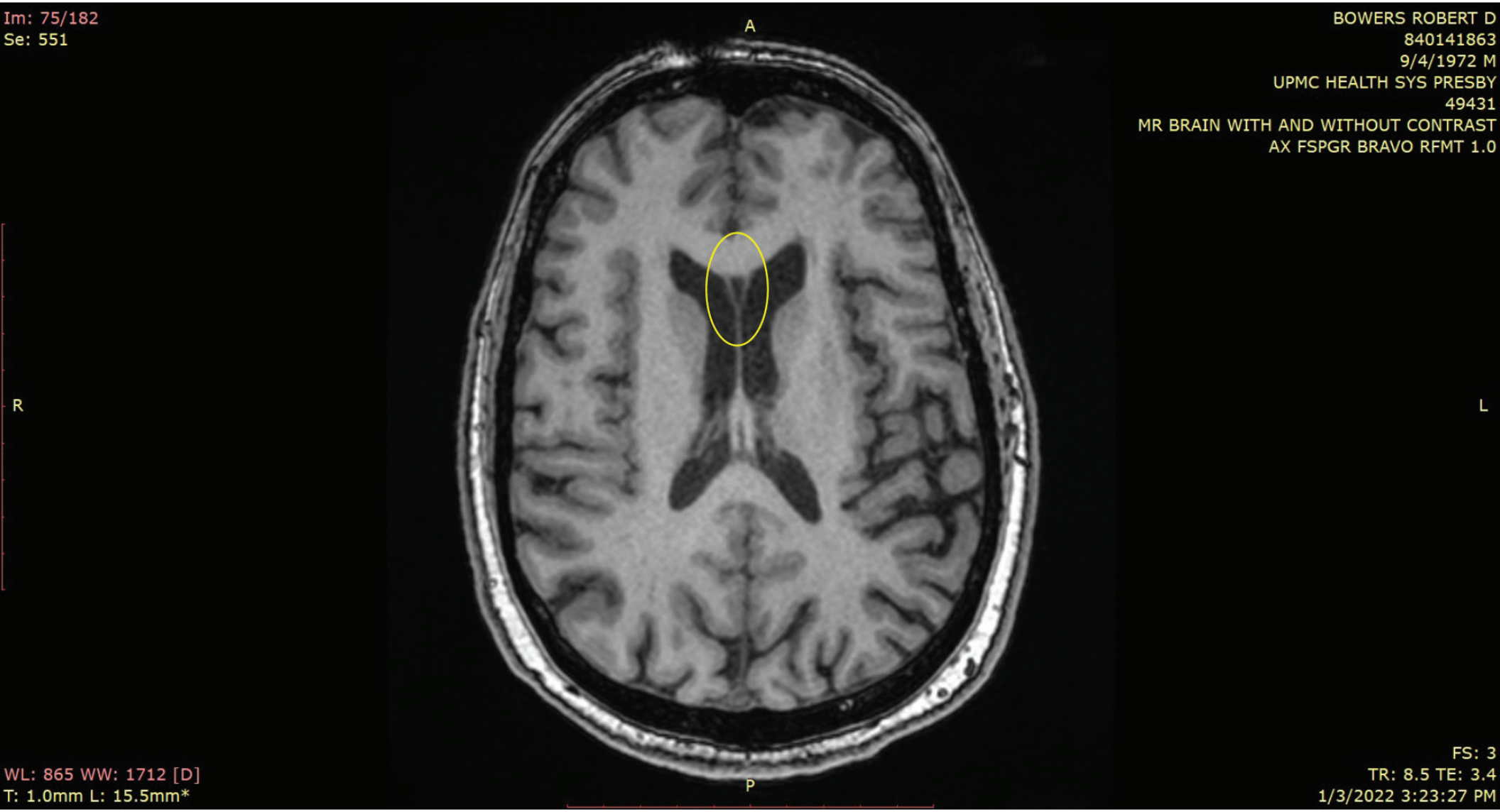
Brain Stem
Mamillary Bodies
Corpus Callosum
Fornix
A
B
C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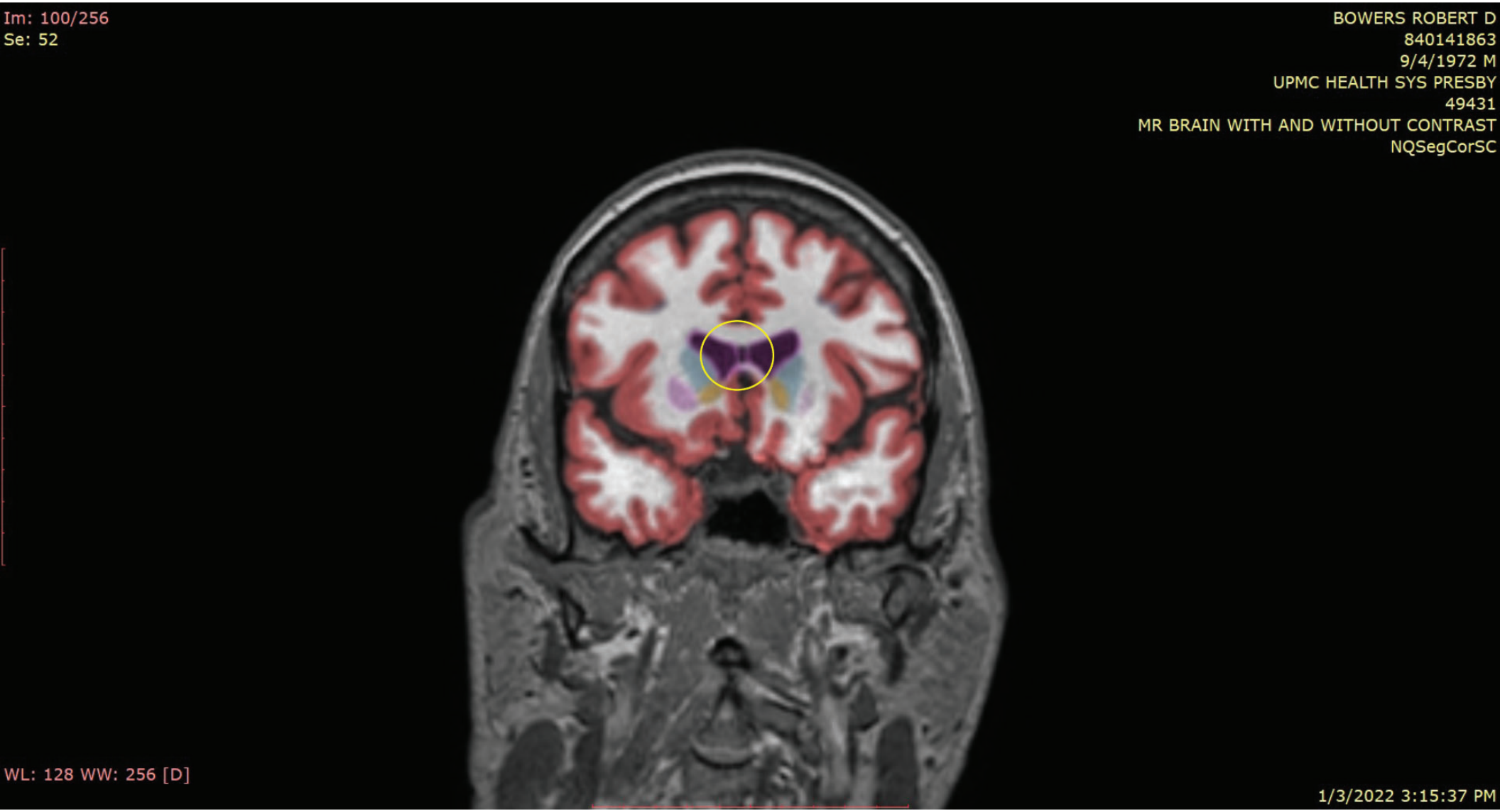
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
AX FSPGR BRAVO RFMT 1.0
R
L
WL: 865 WW: 1712 [D]
T: 1.0mm L: 15.5mm*
P
FS: 3
TR: 8.5 TE: 3.4
1/3/2022 3:23:27 PM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Se: 52
BOWERS ROBERT D
840141863
9/4/1972 M
UPMC HEALTH SYS PRESBY
49431
MR BRAIN WITH AND WITHOUT CONTRAST
NQSegCorSC
WL: 128 WW: 256 [D]
1/3/2022 3:15:37 PM