Neuroimaging in alcoholism: results of a MRS-follow-up study

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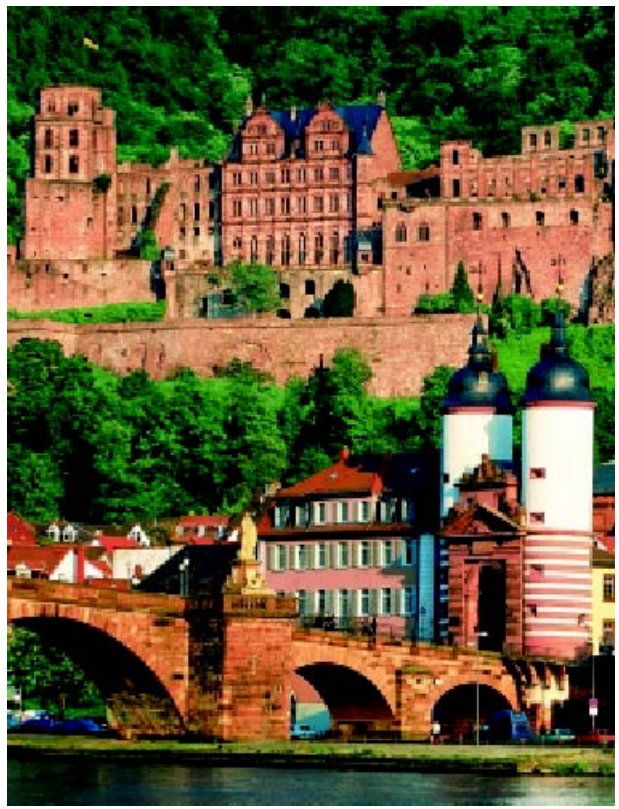
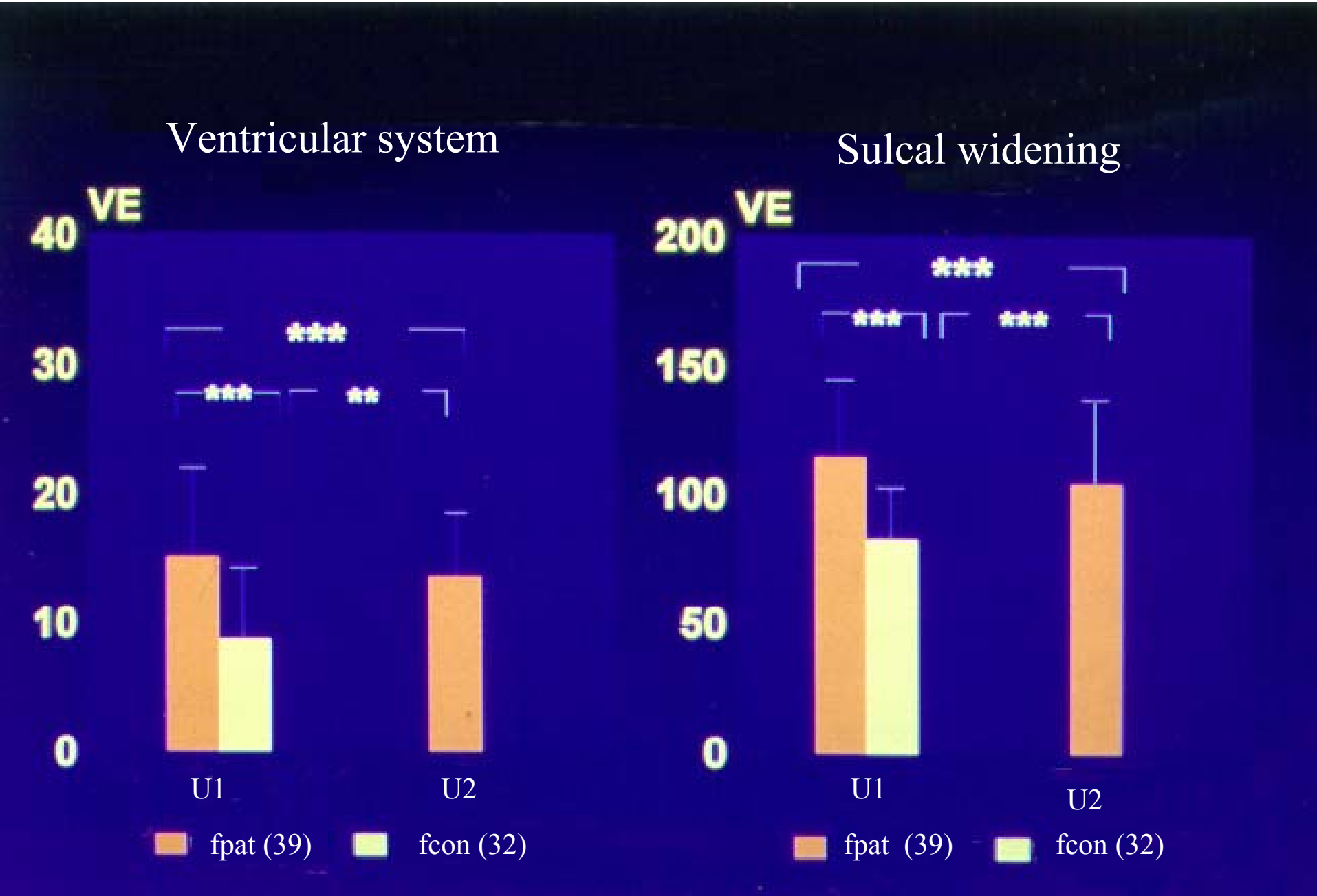


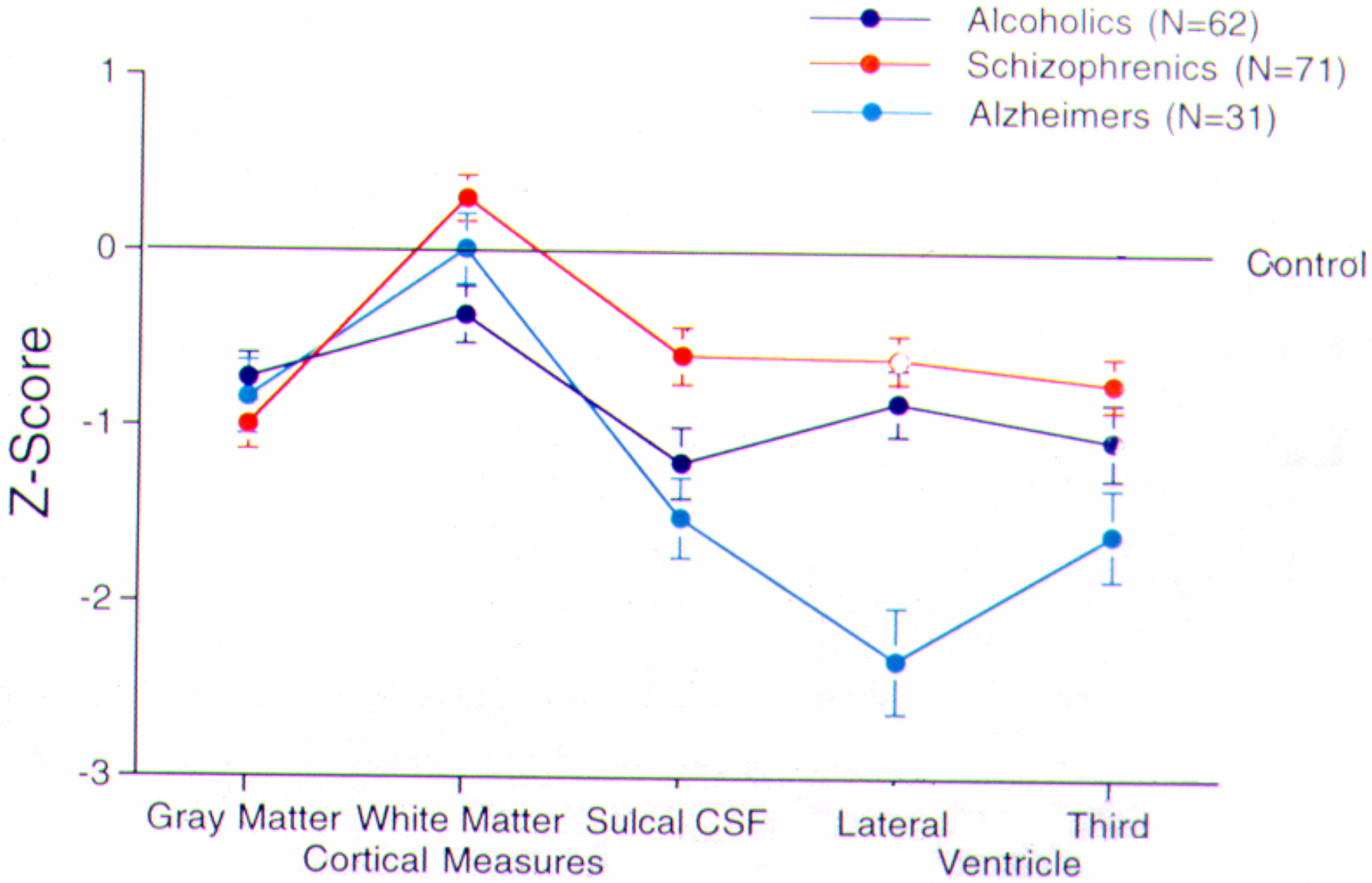
MRS-studies in alcoholism

Author and Year	Modality	N Patients	N Controls	Follow up	Main results
Martin et al. (1995)	H-MRS	10 alcoholics		3-4 weeks of abstinence	NAA↑, Ch↑
Jagannathan et al. (1996)	H-MRS	10 alcoholics	27 healthy, age-matched		NAA/Ch ↓, NAA/Cr ↓
Seitz et al. (1999)	H-MRS	11 alcoholics	10 healthy, age-matched	-	NAA/Cr ↓, Ch/Cr ↓ MI/Cr ↔
Bendszus et al. (2001)	H-MRS	17 alcoholics	12 healthy, age-matched	day 1-3 and 36-39 of abstinence	day 1-3: NAA/Cr ↓ frontal Lobe, Cerebel. Ch/Cr ↓ Cerebellum day 36-39: NAA/Cr ↑, Ch/Cr↑
O'Neill et al. (2001)	H-MRS	12 alcoholics (recovering)	8 actively heavily drink.		NAA, Ch, Cr ↔
Schweinsburg et al. (2001)	H-MRS	37 alcoholics	15 healthy		NAA ↓ (frontal WM) NAA ↔ (parietal WM)
Parks et al. (2002)	H-MRS	31 alcoholics	12 healthy	day 3-5 and week 12	day 3-5: NAA ↓, Ch ↓ (Cerebellum) week 12: NAA ↑ (Cerebellum)

CT - Volumetry



MR-Volumes

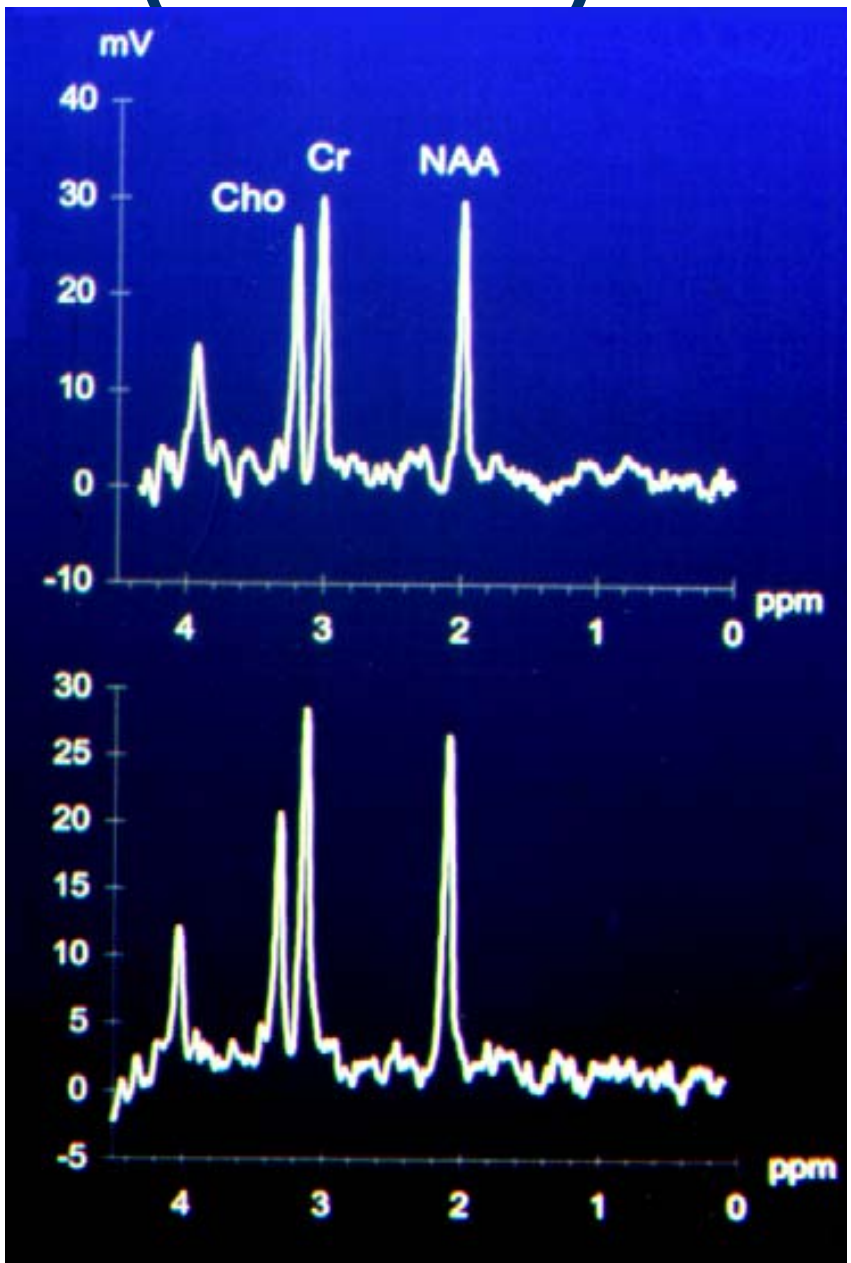


Pfefferbaum et al. 1992

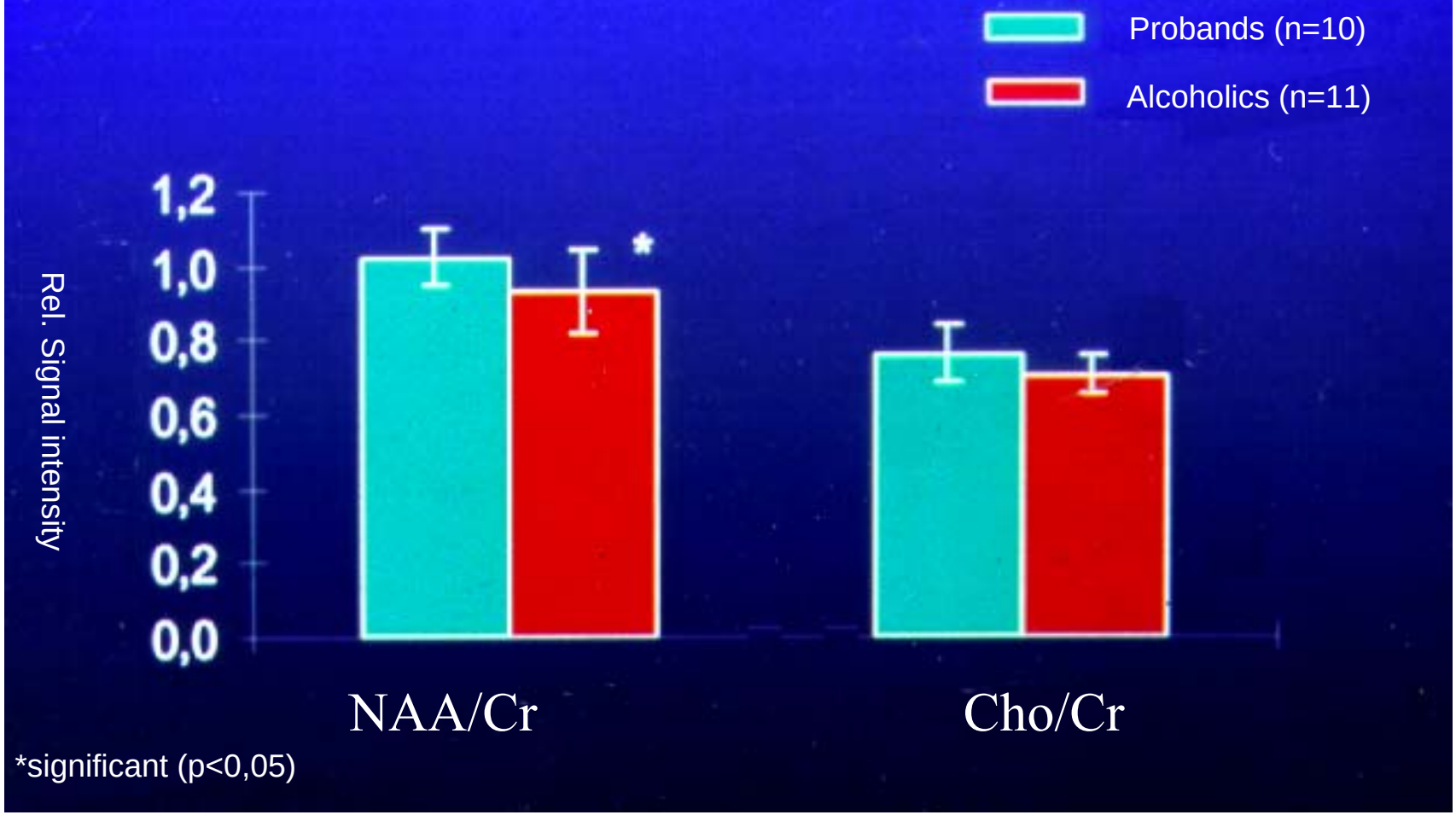
Results: spectroscopy alcohol dependence (TE 135ms)

Control

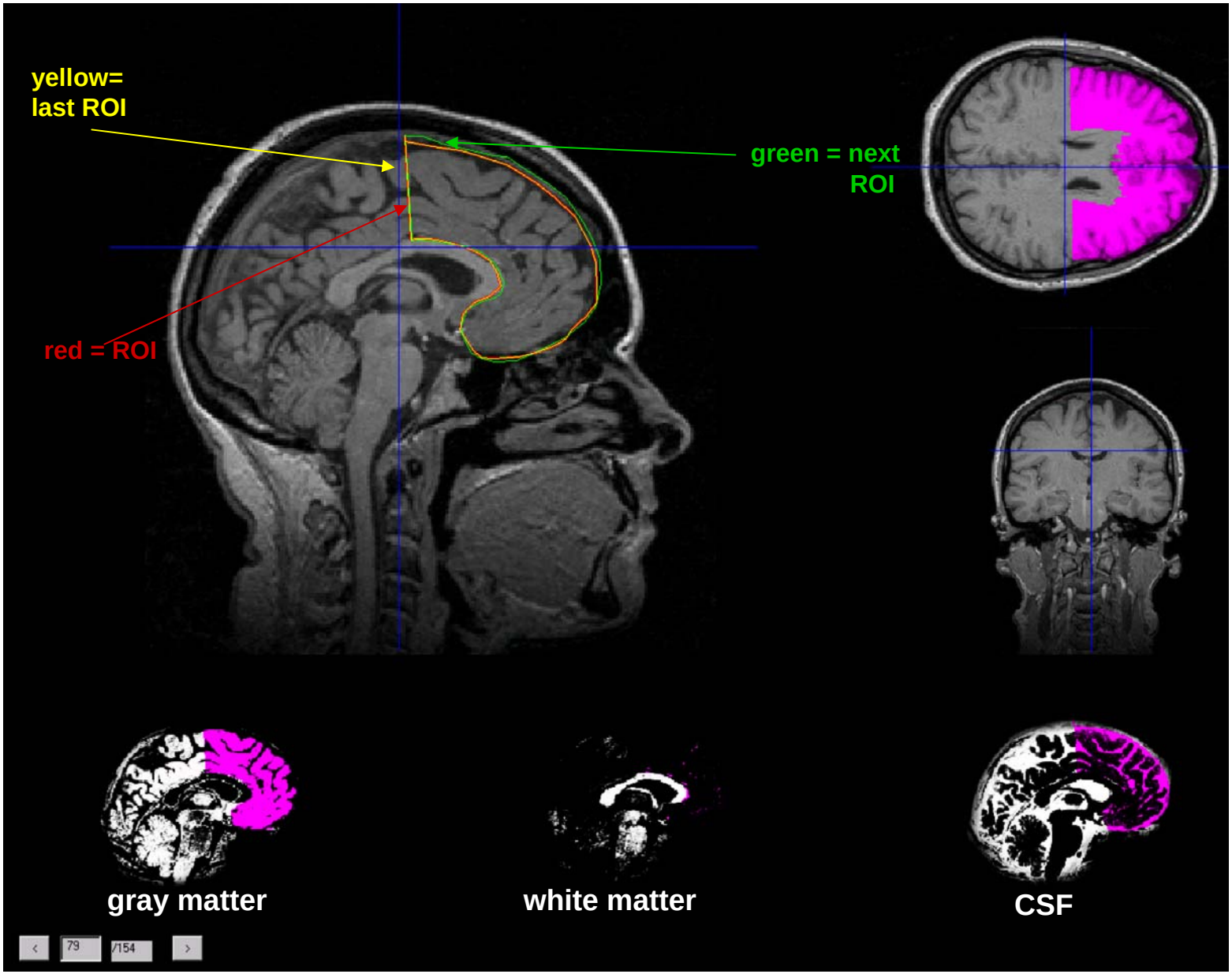
Alcohol dependence



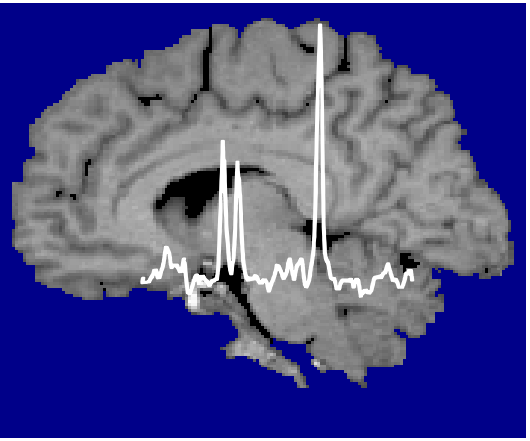
LH-Spectroscopy cerebellum (TE 135ms)

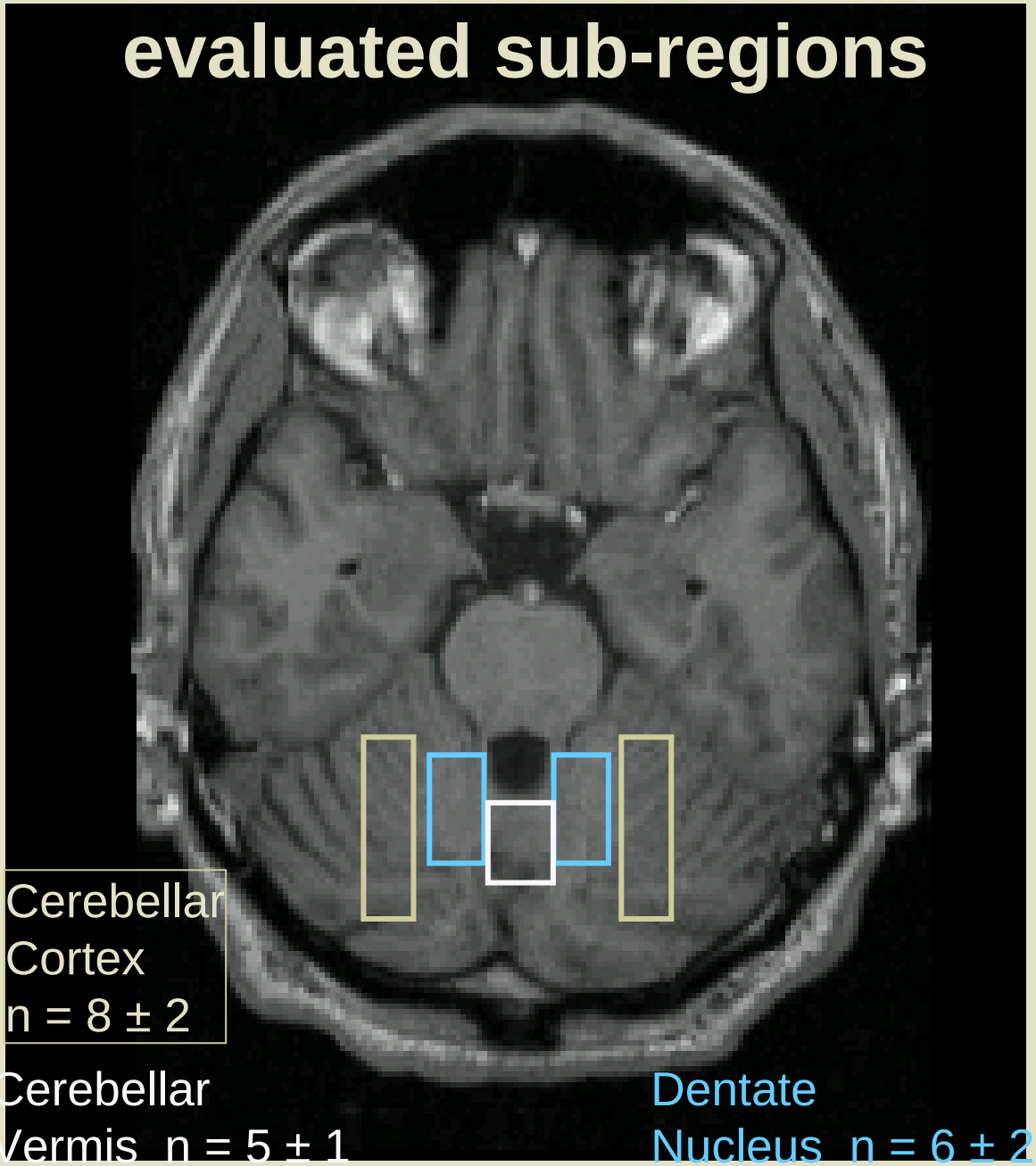


Seitz et al. 1999

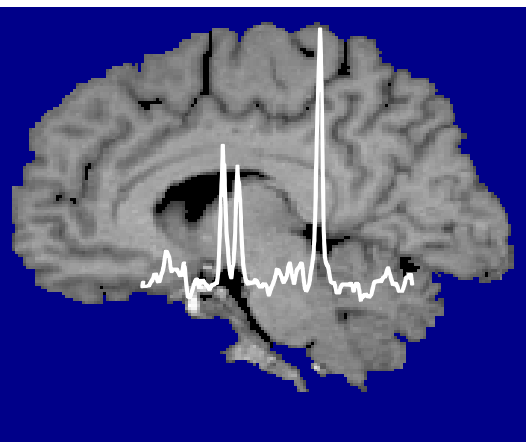

yellow=
last ROI
green = next
ROI
red = ROI
gray matter
white matter
CSF
79
/154

Cerebellum

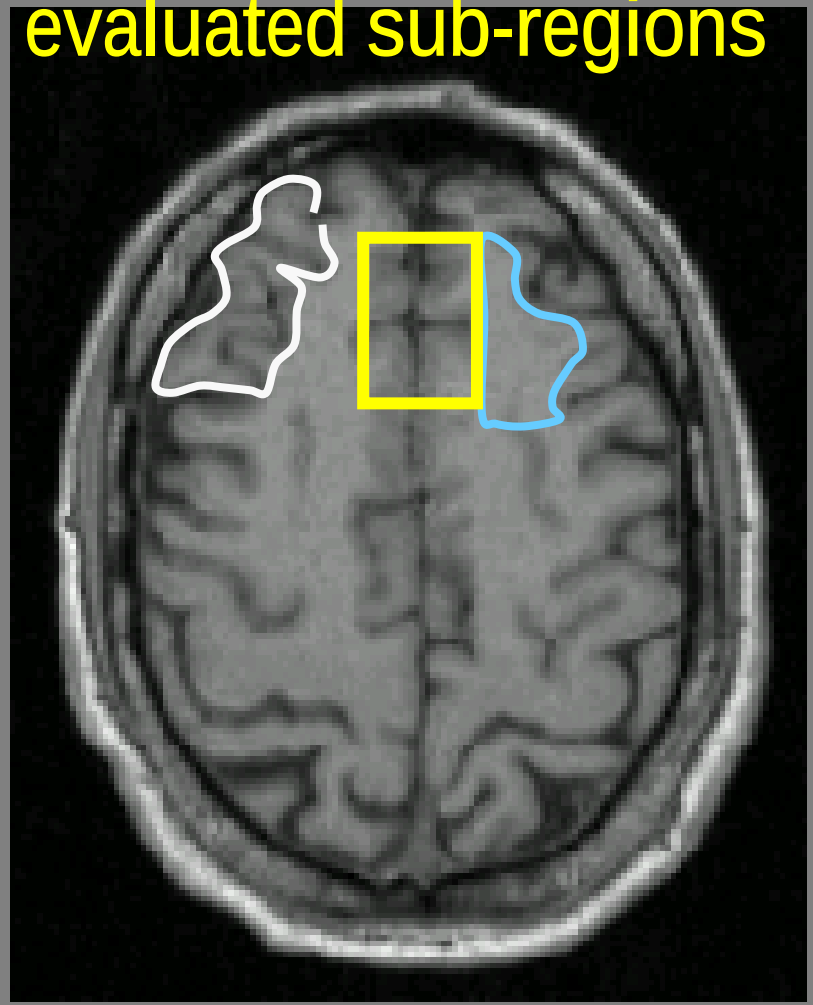



evaluated sub-regions
Cerebellar Cortex n = 8 ± 2
Cerebellar Vermis n = 5 ± 1
Dentate Nucleus n = 6 ± 2

Frontal Lobe



evaluated sub-regions



gray matter	cingulate	white matter
n = 5 ± 2	n = 3 ± 2	n = 10 ± 3
gm > 50%	gm > 50%	wm > 60%

Socio-demographic data of complete sample

variable	alcohol dependent patients N=55		control group N=36	
Age	46,69 ±	8,07	44,39±	9,91
Gender: m/f	32 / 23	-	23 / 13	-

2 weeks

12 weeks

N=34/16

24 weeks

N=27

Medical history

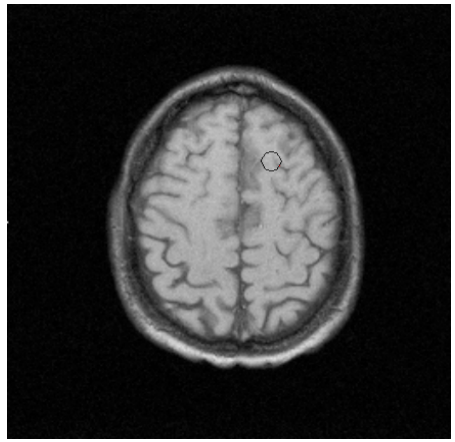
Variable	alcohol dependent patients N=55		control group N=36	
Duration of dependence	13,18±	8,7	-	-
LDH (Life Time Drinking History)				
Total alcohol consumption in g **	897312,3±	985465,62	49675,53±	67552,15
Total alcohol consumption in g / weight **	11735,27±	10774,25	748,90±	1003,8
GGT **	176,54±	431,73	14,73±	11,26
Number of abstinent days before T1	14,62±	6,95 (3-37)		
TLFB (last 90 days before T1)				
Amount of drinks (g) **	10722,15±	8186,69	318,7±	306
Amount of drinks /weight *	146,1±	112,58	4,59±	4,8
Drinks per day (12 g)**	12,2±	9,38	0,38±	0,4
Number of inpatient detoxifications	3,2±	1,09	-	-
Patients with seizures	N= 13	23,6%		

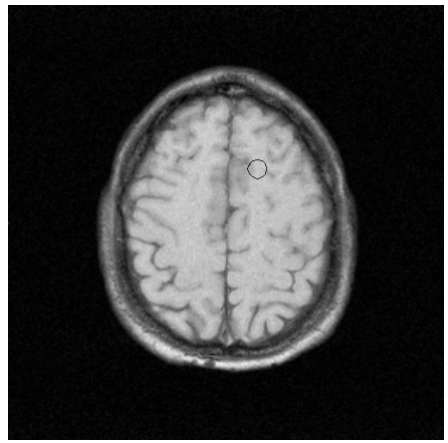
**p<0,001 signifikant

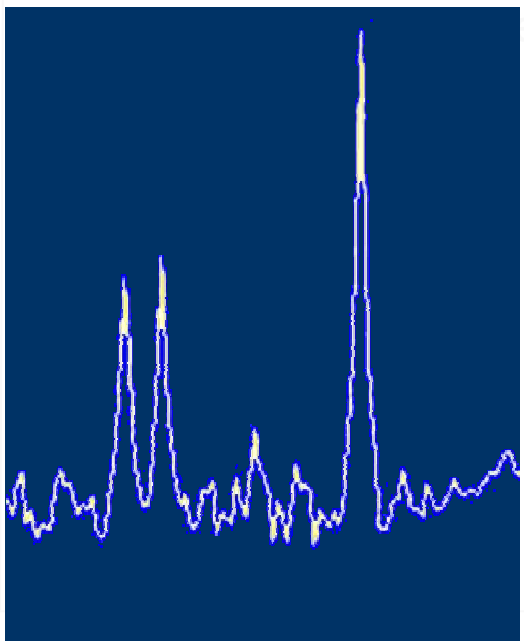
*p<0,05 signifikant

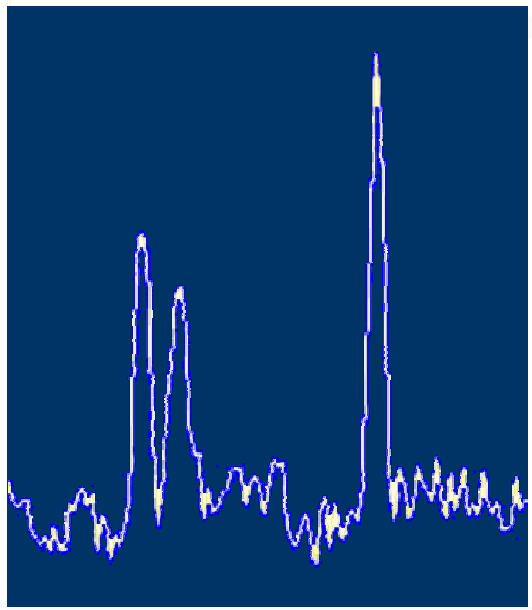
Results

Longitudinal MSSI: choline changes in frontal WM









male patient

36 years

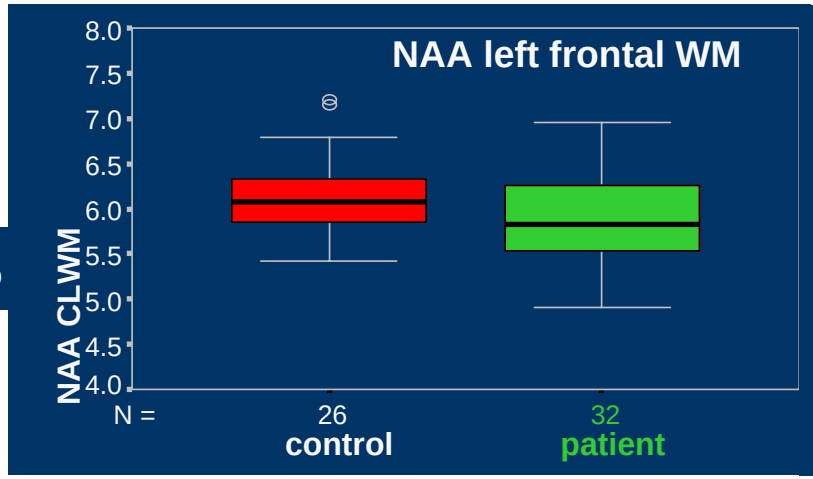
3 2 ppm

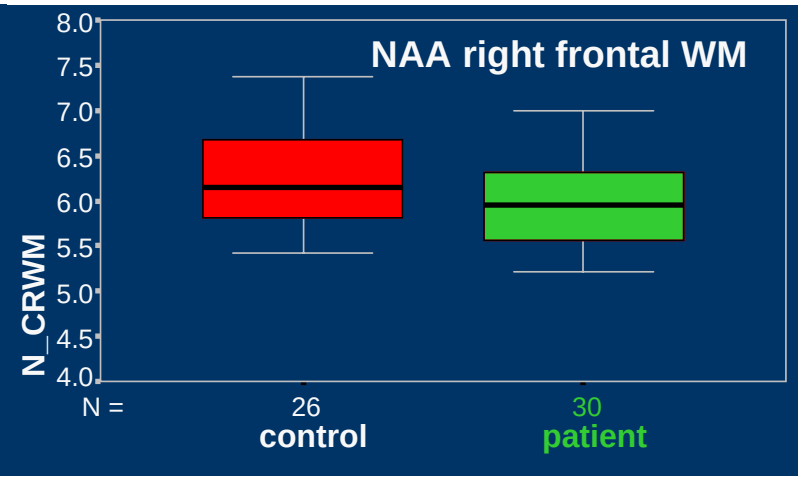
3 2 ppm

Results

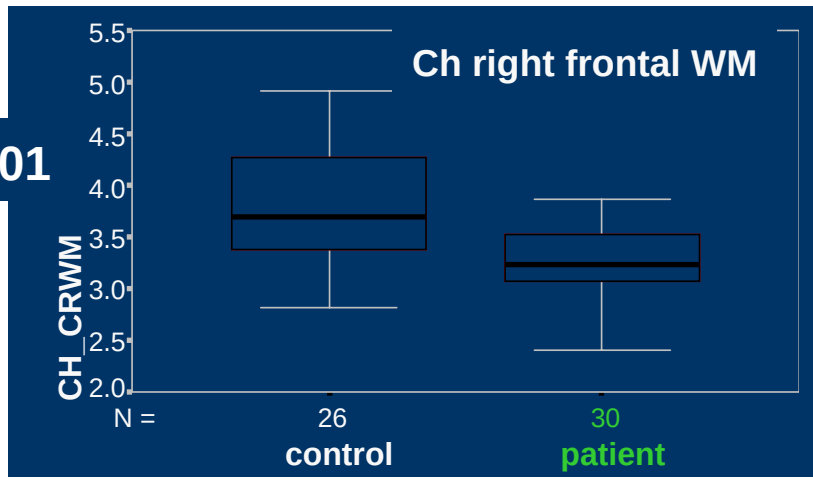
first MSSI: frontal WM differences between patients and controls

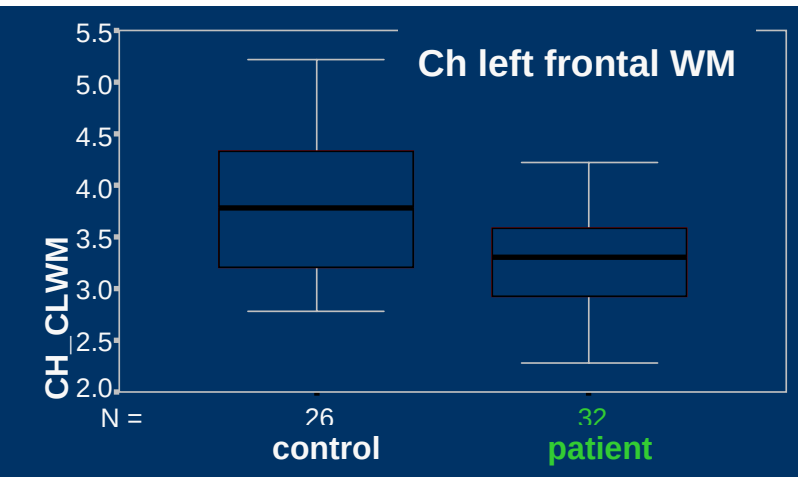
p < 0.05





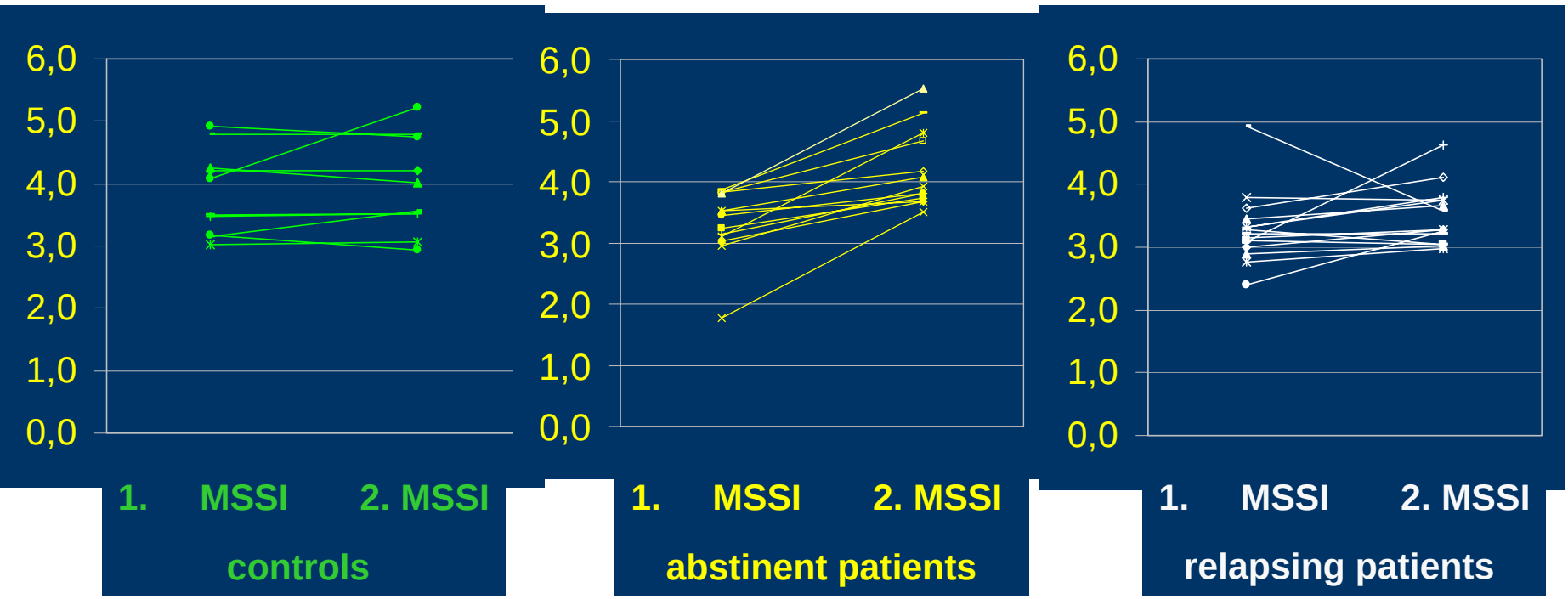
p = 0.001





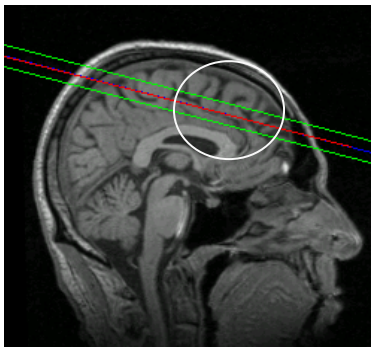
Results

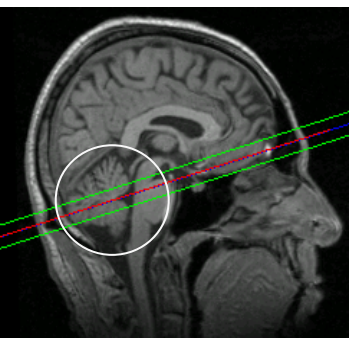
Longitudinal MSSI: choline changes in frontal WM



Results

T2 : longitudinal intra-individual choline increase in abstinent patients





14 of 30 patients examined after three months had remained abstinent. In a paired t-test the choline signal increased significantly only in the abstinent patients in:

fontal lobe WM

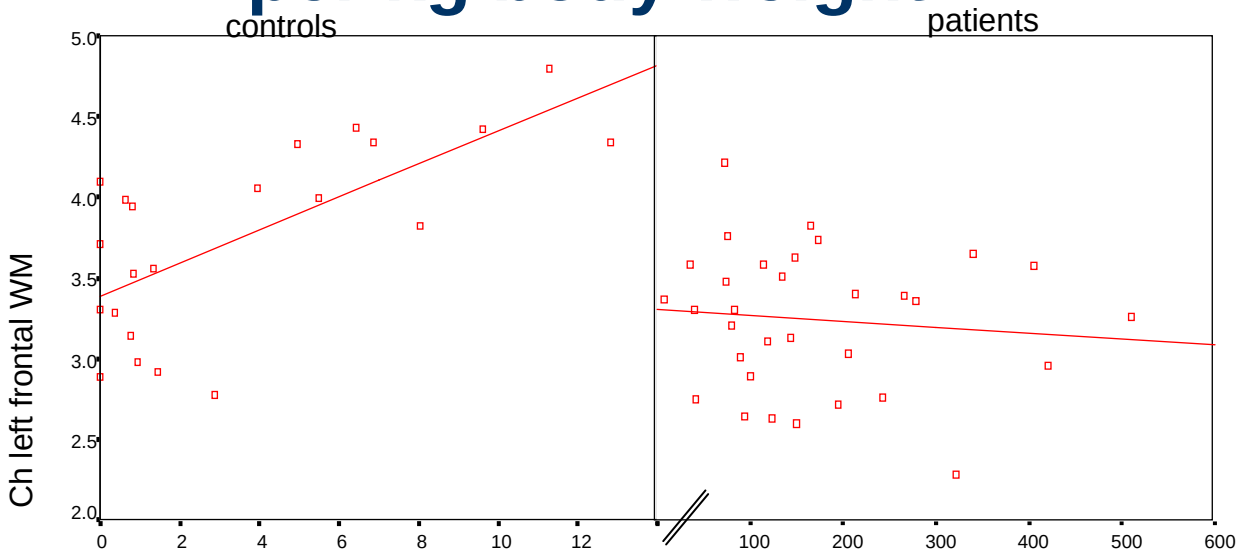
cingulate region

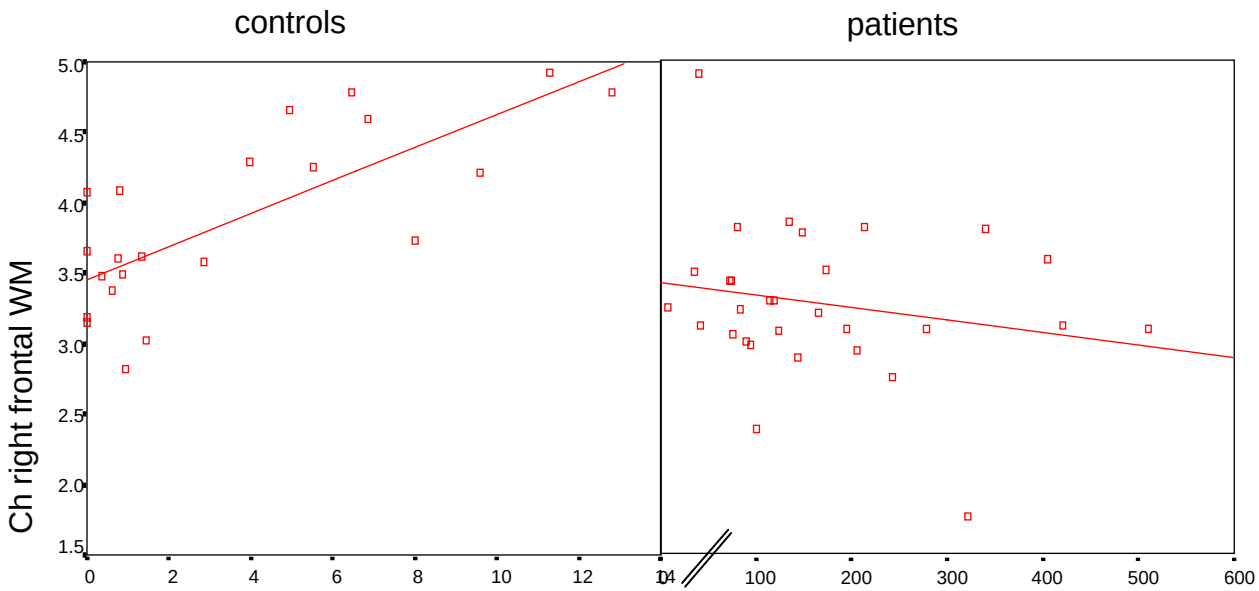
cerebellar cortex

cerebellar vermis

dentate nucleus

Number of drinks within the last 90 days per kg body weight





Co-workers

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Alexander Diehl, Hans Herre, Helga Welzel, Sabine Klein,
Gaby Ende, Mira Bühler, Herta Flor

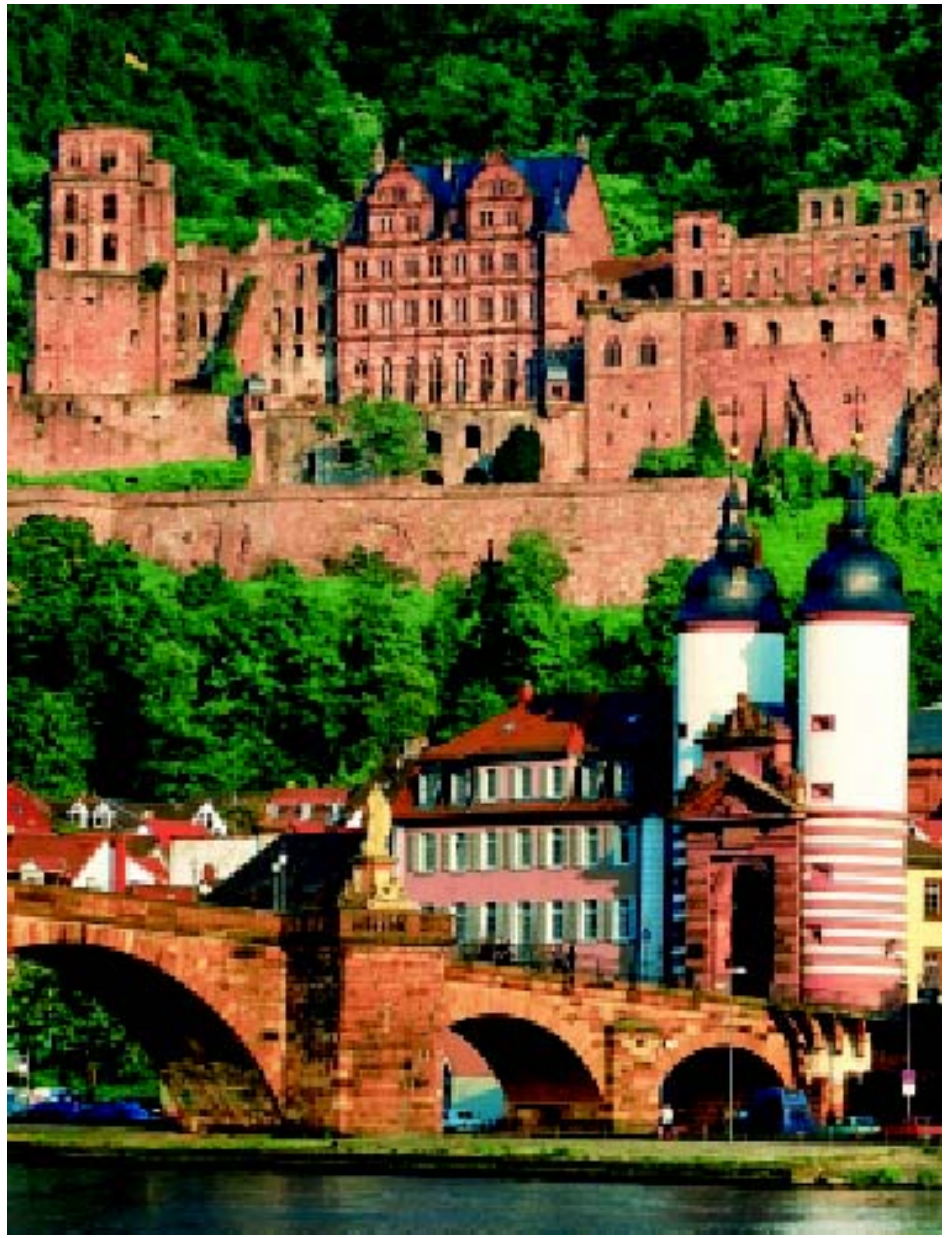
Charité Berlin:

Andreas Heinz

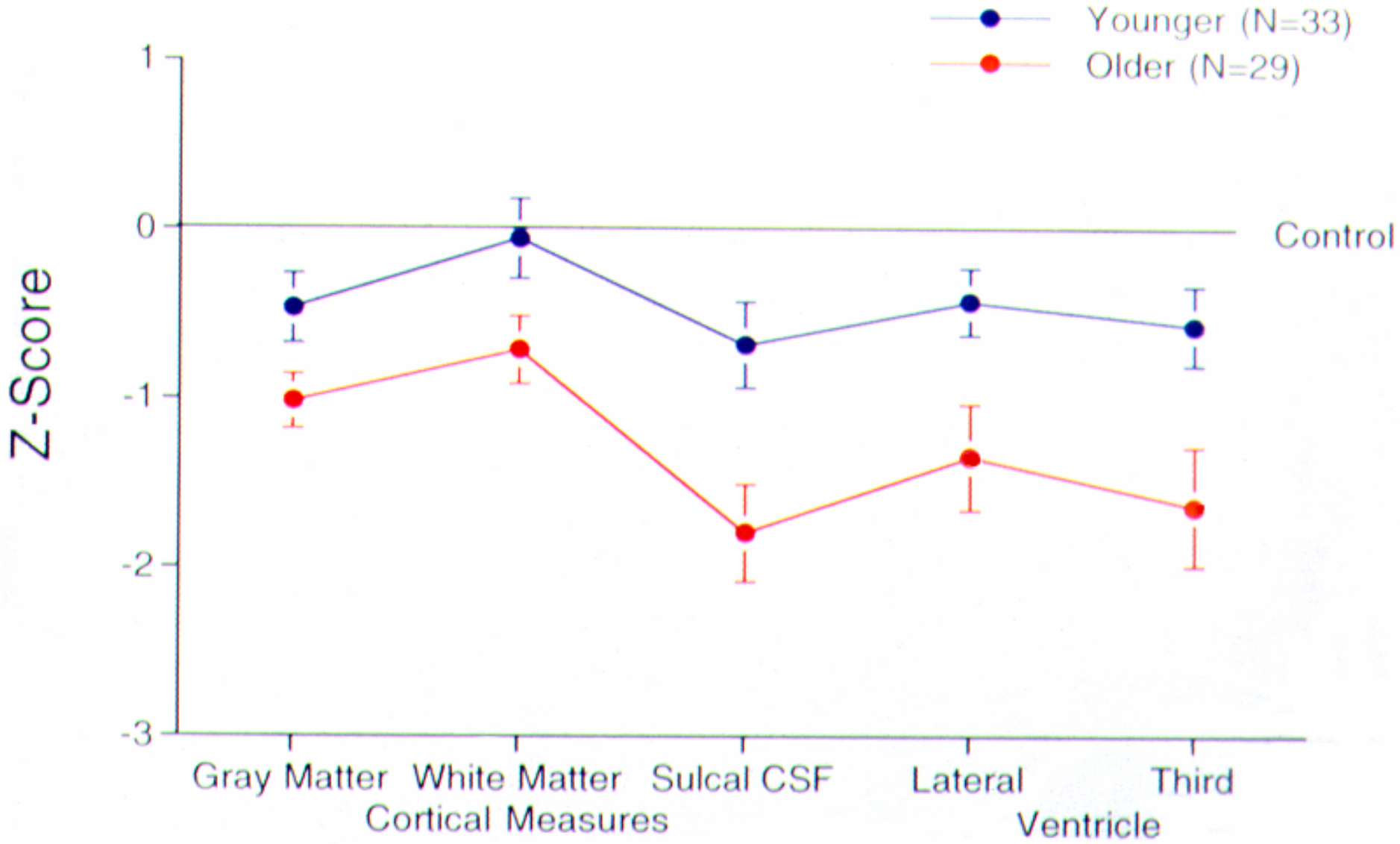
12th World Congress on Biomedical Alcohol Research

ISBRA

29/09 – 2/10/2004
Heidelberg/Mannheim



Age effects in alcoholism



Pfefferbaum et al. 1992

Number of drinks within the last 90 days per kg body weight