

Social and Emotional Functioning Following Unilateral and Bilateral Neurosurgical Prefrontal Cortex Lesions



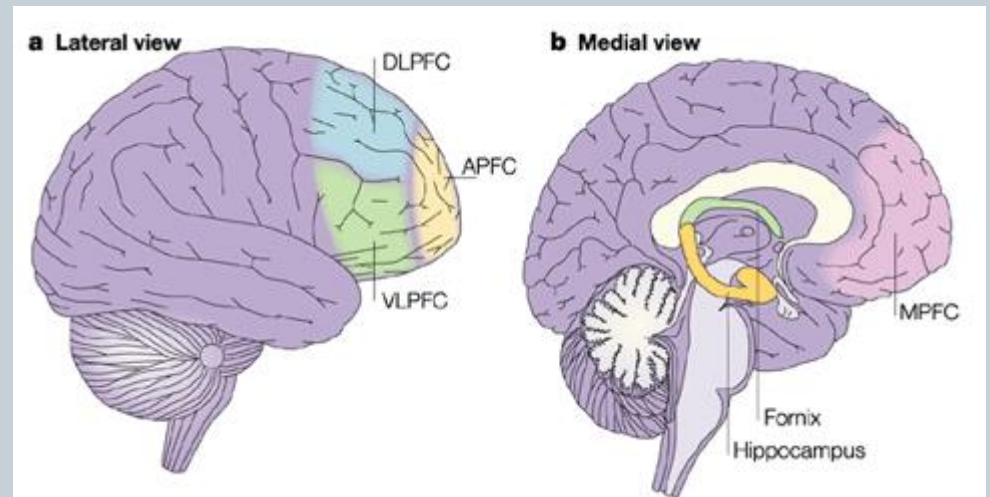
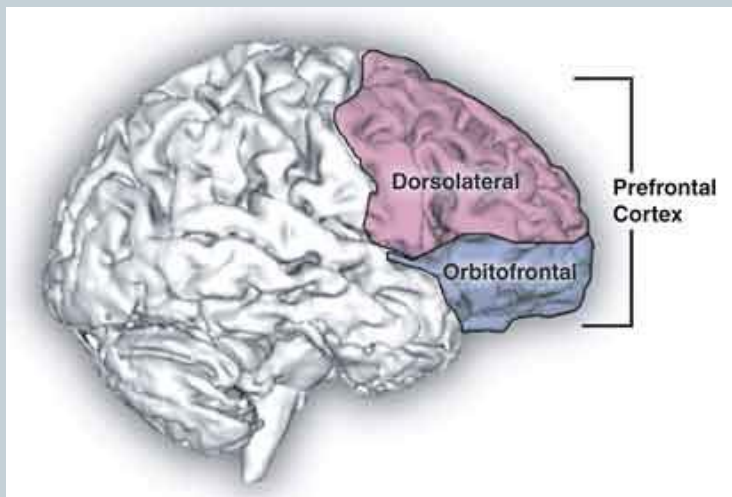
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Intro



- Independent of Executive Functions
- General Knowledge of Frontal Lobe Damage
- 34 patients
 - Unilateral + Bilateral
 - ✦ Orbitofrontal + Medial + Dorsolateral



Method



- 34 patients
control group – matched for sex, age, job, education
informant group – personality + behavior
- SEQ
 - Happy, sad, fear, anger, disgust
 - 84 individuals



Table I. Summary of laterality and location of lesions

Code	Sex	Age (years)	Orbitofrontal	Medial	Dorsolateral
R1	F	53	✓		
R2	M	71	✓		
R3	F	48	✓		
R4	M	26	✓	✓	
R5	M	62	✓	✓	
R6	F	32	✓	✓	
R7	M	34			✓
R8	M	29			✓
R9	F	28		✓	✓
R10	F	21		✓	✓
R11	F	47		✓	✓
R12	M	30		✓	✓
R13	M	56	✓	✓	✓
R14	F	54	✓	✓	✓
R15	M	31	✓	✓	✓
L1	M	42		✓	
L2	M	67			✓
L3	F	53	✓		
L4	M	33	✓	✓	
L5	F	21	✓	✓	
L6	F	56			✓
L7	M	28			✓
L8	F	36		✓	✓
L9	M	33	✓	✓	✓
L10	M	65	✓	✓	✓
L11	F	32	✓	✓	✓
L12	M	34	✓	✓	✓
L13	F	52	✓	✓	✓
B1	M	48	✓	✓	
B2	M	72	✓	✓	
B3	M	48	✓	✓	
B4	F	61	✓	✓	
B5	F	60	✓	✓	
B6	F	56	✓		

SEQ



Social Emotional Questionnaire – Participant Version

Please say how much you agree or disagree with the following statements. You can strongly agree, slightly agree, be in between, slightly disagree or strongly disagree. Please ring the number to the right of the question.

1	2	3	4	5
Strongly disagree	Slightly disagree	In between	Slightly Agree	Strongly Agree

1. I express my feelings appropriately in public	1	2	3	4	5
2. I avoid arguments	1	2	3	4	5
3. When others are afraid, I reassure them	1	2	3	4	5
4. I speak my mind	1	2	3	4	5
5. I notice when other people are happy	1	2	3	4	5
6. I am critical of others	1	2	3	4	5
7. I am amusing	1	2	3	4	5
8. I notice when other people are frightened	1	2	3	4	5
9. When others are happy, I am pleased for them	1	2	3	4	5
10. I am not aggressive	1	2	3	4	5

Social-Emotional Questionnaire – Informant Version

Please say how much you agree or disagree with the following statements. You can strongly agree, slightly agree, be in between, slightly disagree or strongly disagree. Please ring the number to the right of the question.

1	2	3	4	5
Strongly disagree	Slightly disagree	In between	Slightly Agree	Strongly Agree

1. He/she expresses their feelings appropriately in public	1	2	3	4	5
2. He/she avoids arguments	1	2	3	4	5
3. When others are afraid, he/she reassures them	1	2	3	4	5
4. He/she speaks their mind	1	2	3	4	5
5. He/she notices when other people are happy	1	2	3	4	5
6. He/she is critical of others	1	2	3	4	5
7. He/she is amusing	1	2	3	4	5
8. He/she notices when other people are frightened	1	2	3	4	5
9. When others are happy, he/she is pleased for them	1	2	3	4	5
10. He/she is not aggressive	1	2	3	4	5

SEQ



Factor 1: emotion recognition		
5	I notice when other people are happy	.689
8	I notice when other people are frightened	.828
12	I notice when other people are disgusted	.745
18	I notice when other people are sad	.818
23	I notice when other people are angry	.830
Factor 2: empathy		
3	When others are afraid, I reassure them	.638
9	When others are happy, I am pleased for them	.501
15	When others are angry, I calm them down	.816
20	When others are disgusted, I am appalled for them	.531
30	When others are sad, I comfort them	.745
Factor 3: social conformity		
11	I co-operate with others	.543
14	I am apologetic	.725
25	I have good manners	.574
Factor 4: antisocial behaviour		
2	I avoid arguments	.530
6(R)	I am critical of others	.553
13	I am individual with other people	.601
24	I do things without thinking	.633
Factor 5: sociability		
4 (R)	I speak my mind	-.574
16	I am confident meeting new people	.731
17(R)	I have difficulties making and keeping close relationships	.633
19	I am sociable	.614
21	I take a long time to make decisions	-.607
27(R)	I let someone know if I find them attractive	-.531
29	I prefer being alone than with others	.567

Data



	SEQ total	Emotion recognition	Empathy	Social conformity	Antisocial behaviour	Sociability
Controls						
Self	112.50 (9.58)	22.09 (3.19)	20.24 (2.98)	12.15 (1.54)	12.85 (2.49)	23.50 (4.97)
Informant	113.58 (15.21)	21.32 (3.98)	20.62 (3.09)	12.09 (2.44)	13.06 ^{ab} (3.29)	26.00 (4.22)
Discrepancy	-1.09 (16.08)	0.76 (4.27)	-0.38 (4.21)	0.059 (2.84)	-0.21 (3.54)	-2.50 (5.51)
Individuals						
Self	113.53 (11.01)	22.18 (2.88)	20.65 (3.33)	13.21 (1.79)	11.79 (3.07)	24.15 (4.74)
Informant	107.94 (20.48)	20.24 (3.89)	19.26 (4.75)	11.88 (2.84)	11.44 (3.68)	25.65 (4.63)
Discrepancy	5.59 (21.20)	1.94 (4.61)	1.38 (5.53)	1.32 (3.24)	0.35 (4.77)	-1.50 (4.90)
Orbitofrontal						
Self	113.24 (10.60)	22.10 (2.91)	20.29 (3.66)	13.05 (1.75)	11.67 (2.88)	24.38 (4.15)
Informant	104.14 (21.54)	19.86 (4.03)	18.38 (5.26)	11.52 (1.54)	10.33 ^a (3.18)	25.86 (4.60)
Discrepancy	9.10 (23.72)	2.24 (1.46)	1.90 (0.54)	1.52 (3.50)	1.33 (4.25)	-1.48 (5.00)
Non-orbitofrontal						
Self	114.00 (12.08)	22.31 (2.93)	21.23 (2.74)	13.46 (1.90)	12.00 (3.46)	23.76 (5.72)
Informant	114.08 (17.72)	20.85 (3.74)	20.69 (3.52)	12.46 (2.90)	13.23 ^a (3.83)	25.31 (4.85)
Discrepancy	-0.08 (15.56)	1.46 (3.33)	0.54 (3.02)	1.00 (2.89)	1.23 (5.31)	-1.54 (4.94)
Mesial						
Self	112.46 (11.24)	22.08 (3.02)	20.46 (3.20)	13.25 (3.33)	11.54 (3.01)	22.42 (3.23)
Informant	109.50 (21.46)	20.83 (4.10)	19.75 (4.87)	12.21 (2.72)	11.21 (3.61)	22.92 (4.28)
Discrepancy	2.96 (18.77)	1.25 (4.81)	0.71 (4.64)	1.04 (3.07)	0.33 (4.12)	-0.92 (4.92)
Non-mesial						
Self	116.10 (10.55)	22.40 (2.63)	20.46 (3.20)	13.10 (1.79)	12.40 (3.31)	23.39 (2.83)
Informant	104.20 (18.40)	18.80 (3.05)	18.10 (4.46)	11.10 (3.12)	12.00 (3.97)	21.40 (4.03)
Discrepancy	11.90 (26.17)	3.60 (3.78)	3.00 (7.27)	2.00 (3.71)	0.40 (6.33)	-2.90 (4.79)
Dorsolateral						
Self	114.58 (8.64)	22.05 (2.86)	20.89 (2.60)	23.11 (3.03)	13.37 (1.86)	11.68 (2.83)
Informant	112.68 (17.79)	20.94 (3.69)	20.47 (3.78)	22.84 (4.22)	12.16 ^b (2.71)	12.32 (3.83)
Discrepancy	1.89 (14.79)	1.10 (4.38)	0.42 (3.17)	1.21 (2.30)	-0.63 (4.80)	-2.79 (4.37)
Non-dorsolateral						
Self	112.20 (13.65)	22.33 (2.99)	20.33 (4.15)	22.13 (3.20)	13.00 (1.73)	11.93 (3.45)
Informant	101.93 (22.64)	19.33 (4.08)	17.73 (5.51)	22.00 (4.29)	11.53 ^b (3.04)	10.33 (3.27)
Discrepancy	10.27 (27.13)	3.00 (4.81)	2.60 (7.50)	1.46 (4.24)	1.60 (4.60)	0.13 (5.19)

Results



- **Orbitofrontal vs Non-Orbitofrontal**
 - O ~ Anti-social behaviors
 - ✦ NO < O
 - Bilateral = more 'acquired sociopathy'
- **Medial**
 - No sig diff
- **Dorsolateral**
 - ND ~ anti-social
 - D < ND, control

Data



Table 6. SEQ mean (SD) total and subscale scores according to lateralization

	SEQ total	Emotion recognition	Empathy	Social conformity	Antisocial behaviour	Sociability
Controls						
Self	112.50 (9.58)	22.09 (3.19)	20.24 (2.98)	12.15 (1.54)	12.85 (2.49)	23.50 (4.97)
Informant	113.58 ^a (15.21)	21.32 ^b (3.98)	20.62 ^c (3.09)	12.09 (2.44)	13.06 (3.29)	26.00 (4.22)
Discrepancy	-1.09 ^d (16.08)	0.76 ^e (4.27)	-0.38 (4.21)	0.059 (2.84)	-0.21 ^f (3.54)	-2.50 (5.51)
Left						
Self	113.54 (11.98)	21.62 (3.18)	20.69 (2.75)	12.69 (2.18)	11.54 (2.70)	23.85 (4.12)
Informant	118.00 ^a (18.53)	22.38 ^b (3.33)	21.38 ^c (3.78)	12.92 (2.29)	13.06 (3.29)	26.08 (4.46)
Discrepancy	-4.46 ^d (3.93)	-0.77 ^e (4.28)	-0.69 (0.87)	-0.23 (1.67)	-1.38 ^f (4.09)	-2.23 (4.24)
Right						
Self	110.67 (9.47)	22.00 (2.90)	20.13 (3.78)	13.27 (1.53)	11.13 (3.38)	23.80 (5.51)
Informant	106.73 ^a (13.85)	19.53 ^b (2.97)	19.27 ^c (3.20)	11.60 (2.77)	11.20 (3.90)	25.67 (4.95)
Discrepancy	3.93 ^d (14.21)	2.47 ^e (3.07)	0.87 (5.01)	1.67 (2.89)	-0.07 ^f (4.08)	-1.87 (5.63)
Bilateral						
Self	120.76 (10.91)	23.83 (1.60)	21.83 (3.54)	14.17 (1.17)	14.00 (2.37)	25.67 (4.37)
Informant	89.17 ^a (26.75)	17.33 ^b (5.01)	14.67 ^c (7.00)	10.33 (3.61)	8.83 (3.49)	24.67 (4.84)
Discrepancy	31.50 ^d (29.98)	6.50 ^e (4.97)	7.17 (7.39)	3.83 (4.54)	5.17 ^f (5.23)	1.00 (4.15)

Results



- **Bilateral**
 - Overall social + emotional
- **Unilateral**
 - Right
 - ✦ Emotion recognition
 - ✦ Right hemi = performance emotional processing, (-)

Conclusion



- **Discrepancies**
 - Control -> friends
 - Clinical -> parents
- **Loss of insight vs level of insight**
- **Localization**