

Supplementary Materials

Tables

O condition	OP condition	P condition
sweat (a)	roam (y)	prease (r)
sauce (c)	flame (i)	sonse (g)
calf (l)	grail (i)	mert (k)
ache (h)	crumb (k)	oatch (g)
sieve (c)	germ (a)	foat (f)
trough (f)	plum (n)	crove (d)
fiend (y)	state (w)	grabe (i)
learn (a)	sore (f)	fape (p)
geese (c)	spur (s)	jight (i)
taunt (u)	thrust (a)	hoak (u)
cough (k)	reef (r)	owv (a)
paste (e)	grove (v)	luve (v)
luge (j)	clump (b)	belk (a)
ruse (z)	coin (o)	binch (a)
mould (u)	brag (j)	threet (u)
hook (u)	ditch (s)	greal (c)
chef (c)	crypt (y)	triat (i)
glove (e)	chant (b)	feen (d)
mauve (u)	notch (d)	flink (i)
haunt (u)	slate (d)	citch (i)
suede (w)	slug (u)	glibe (u)
quische (k)	float (w)	heaf (i)
plague (u)	brisk (r)	lecs (e)
grey (e)	shelf (e)	liss (l)
moose (e)	slob (b)	hoorse (r)

ghoul (h)	saint (e)	pench (e)
gist (j)	coach (s)	meent (e)
sponge (g)	harp (d)	darf (e)
flood (u)	stump (t)	mook (o)
fraud (u)	shed (b)	glave (b)
ton (u)	slope (l)	welf (f)
knoll (k)	pleat (p)	prown (n)
baste (e)	plea (a)	bloss (t)
suave (u)	carve (r)	rell (l)
crook (u)	smirk (i)	rinch (o)
castle (k)	pole (w)	laught (y)
pause (z)	scribe (b)	gowl (l)
balm (l)	shack (a)	ciste (u)
feud (e)	snag (e)	fren (t)
steak (c)	mince (r)	jatch (a)
crow (k)	frown (w)	gatch (s)
shoe (u)	helm m	breek (r)
plaid (i)	graze (g)	cust (r)
seize (w)	coax (k)	norve (n)
scarce (k)	spark (e)	tronce (r)
drawer (w)	plod (u)	scranch (p)
host (d)	crawl (w)	drass (s)
isle (s)	lurk (e)	frudge (u)
monk (u)	pine (r)	glond (g)
comb (b)	glib (b)	guze (o)
scroll (k)	graft (g)	swoap (o)
mourn (u)	midst (e)	soize (s)
dough (w)	freak (c)	loive q

gross (e)	boost (o)	grev (e)
halve (l)	drake (r)	hez (y)
hearth (e)	charm (e)	breest (i)
psalm (p)	moan (a)	cime (m)
deaf (a)	mesh (e)	moive (b)
court (k)	mirth (e)	sark (a)
tomb (b)	aide (d)	bluck (p)
chord (k)	spray (i)	nass (s)
shove (c)	leaf (i)	pribe u
chic (k)	cube (u)	grov (p)
sew (e)	hall (h)	teaf (t)
soot (o)	oath (a)	gress (r)
cask (c)	merge (g)	besb (b)
veil (a)	bred (u)	honce (h)
mow (e)	cling (g)	brair (o)
pear (a)	whim m	soite (a)
brooch (w)	glee (e)	prave (n)
juice (s)	shrug (e)	flane (a)
deuce (s)	limp (l)	pape (d)
swear (i)	sparse (s)	trath (r)
pint (y)	craze (e)	Sheb (i)
waltz (s)	flirt (e)	Frant (n)

Table 1: Word stimuli and the letter probe (in bracket) for the three letter probe conditions

Regions of interest (ROIs)	MNI coordinates (x, y, z)
Reading-based resting state network (RdN) regions	
Left Inferior frontal gyrus (IFG)	-48, 16, 6
Left Fusiform gyrus (FFG)	-46, -60, -16
Left Inferior temporal gyrus (ITG)	-52, -62, -8
Left Supplementary motor area (SMA)	-6, 20, 44
Left Middle Temporal gyrus (MTG)	-58, -36, 2
Left Angular gyrus (AG)	-44, -60, 40

Left Superior Temporal gyrus (STG)	-56, -44, 14
Left Supramarginal gyrus (SMG)	-44, -42, 36
Default mode Network (DMN) regions	
Medial Prefrontal Cortex (MPFC)	1, 55, -3
Left Lateral Parietal (LP)	-39, -77, 33
Right Lateral Parietal	47, -67, 29
Posterior Cingulate Cortex (PCC)	1, -61, 38
Dorsal Attention Networks (DAN) regions	
Left Frontal Eye Field (FEF)	-27, -9, 64
Right Frontal Eye Field	30, -6, 64
Left Inferior Parietal Sulcus (IPS)	-39, -43, 52
Right Inferior Parietal Sulcus	39, -42, 54
Salience Network regions	
Left Rostral Prefrontal Cortex (RPFC)	-32, 45, 27
Right Rostral Prefrontal Cortex	32, 46, 27
Anterior Cingulate Cortex (ACC)	0, 22, 35
Left Supramarginal gyrus	-60, -39, 31
Right Supramarginal gyrus	62, -35, 32
Left Anterior Insula (AInsula)	-44, 13, 1
Right Anterior Insula	47, 14, 0

Table 2: MNI coordinates of the regions of interests employed for the functional connectivity analyses

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
MTG	0.16	6.44	0.000032	SMA	0.21	6.57	0.000125
SMA	0.2	5.58	0.000094	SMG	0.14	5.15	0.000656
FFG	0.11	4.97	0.000232	MTG	0.18	4.46	0.001499
STG	0.1	3.22	0.006987	STG	0.15	4.12	0.002109
SMG	0.12	3.2	0.006987	FFG	0.09	3.05	0.012922
AG	0.11	3.09	0.007438				

Table 3: Correlation/beta values, t-values and p-values for functional connectivity between the inferior frontal gyrus and spelling network (SpN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
ITG	0.36	8.51	0.000001	ITG	0.36	10.27	0.000001

SMA	0.15	5.11	0.000232	STG	0.13	4.95	0.000933
IFG	0.11	4.97	0.000232	MTG	0.11	3.41	0.010915
MTG	0.11	3.58	0.003705	IFG	0.09	3.05	0.016153
SMG	0.12	3.39	0.004553	SMA	0.13	2.8	0.021206
				SMG	0.12	2.67	0.022573

Table 4: Correlation/beta values, t-values and p-values for functional connectivity between the fusiform gyrus and spelling network (SpN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
SMA	0.16	4.66	0.001358	IFG	0.14	5.15	0.001313
ITG	0.12	3.55	0.007271	SMA	0.14	4.11	0.004325
FFG	0.12	3.39	0.007271	ITG	0.17	3.6	0.007577
IFG	0.12	3.2	0.007271				
MTG	0.1	3.18	0.007271				
AG	0.09	3.06	0.007927				

Table 5: Correlation/beta values, t-values and p-values for functional connectivity between the supramarginal gyrus and spelling network (SpN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
SMA	0.2	6.70	0.000019	SMA	0.2	8.73	0.000006
SMG	0.14	5.10	0.000263	SMG	0.22	4.89	0.001037
STG	0.14	4.01	0.001899	FFG	0.11	4.58	0.001215
MTG	0.14	3.69	0.002944	MTG	0.17	4.18	0.001898
AG	0.13	3.21	0.006817	STG	0.12	3.08	0.012207
FFG	0.04	2.42	0.030916	ITG	0.07	2.94	0.013432
				AG	0.13	2.65	0.019844

Table 6: Correlation/beta values, t-values and p-values for functional connectivity between the inferior frontal gyrus and spelling network (SpN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
ITG	0.37	8.2	0.000001	ITG	0.35	6.87	0.00008
MTG	0.15	4.96	0.000354	IFG	0.11	4.58	0.001822
SMA	0.14	4.29	0.000897	SMA	0.16	3.99	0.003619
SMG	0.13	4.22	0.000897	MTG	0.1	3.46	0.007368
STG	0.09	3.07	0.009211	STG	0.11	2.92	0.016705
IFG	0.04	2.42	0.030916	SMG	0.13	2.58	0.026875

Table 7: Correlation/beta values, t-values and p-values for functional connectivity between the fusiform gyrus and spelling network (SpN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
SMA	0.15	5.58	0.000188	SMA	0.2	5.7	0.000508
IFG	0.14	5.1	0.000263	IFG	0.22	4.89	0.001037
FFG	0.13	4.22	0.001196	ITG	0.16	3.85	0.00405
MTG	0.09	2.87	0.017771	MTG	0.13	3.78	0.00405
ITG	0.09	2.63	0.023858	STG	0.09	3.09	0.011941
				FFG	0.13	2.58	0.026875
				AG	0.09	2.38	0.033409

Table 8: Correlation/beta values, t-values and p-values for functional connectivity between the supramarginal gyrus and spelling network (SpN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Right AInsula	0.16	4.01	0.011574	Left SMG	0.22	5.08	0.002929
ACC	0.14	3.09	0.044448	Right AInsula	0.26	4.25	0.006635
				ACC	0.19	3.47	0.019173

Table 9: Correlation/beta values, t-values and p-values for functional connectivity between the inferior frontal gyrus and resting-state networks (RSN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Left IPS	0.28	9.25	0	Left IPS	0.28	6.9	0.000162
Left AInsula	0.14	4.8	0.00107	Right IPS	0.26	5.43	0.000869
Right IPS	0.12	3.33	0.016489	Right FEF	0.13	4.65	0.002289
Left FEF	0.1	3.25	0.016489	ACC	0.11	4.13	0.004414
MPFC	-0.08	-3.14	0.016832	Left FEF	0.15	3.82	0.006326
				Left AInsula	0.1	3.54	0.009079
				PCC	0.11	3.31	0.011573
				Right AInsula	0.07	3.26	0.011573
				Right LP	0.14	2.89	0.021271
				Left LP	0.11	2.66	0.029584

Table 10: Correlation/beta values, t-values and p-values for functional connectivity between the fusiform gyrus and resting-state networks (RSN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Left IPS	0.24	6.59	0.000048	Left IPS	0.3	6.34	0.000361
Left AInsula	0.15	5.97	0.000083	Right IPS	0.19	3.9	0.0095
MPFC	-0.13	-3.31	0.018115	Left AInsula	0.19	3.84	0.0095
				Right AInsula	0.14	3.28	0.01522
				ACC	0.15	3.25	0.01522
				Right FEF	0.1	3.23	0.01522

				Left FEF	0.1	2.97	0.021506
				Right SMG	0.16	2.76	0.028311

Table 11: Correlation/beta values, t-values and p-values for functional connectivity between the supramarginal gyrus and resting-state networks (RSN) for OP condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Right AInsula	0.22	7.28	0.000013	Left SMG	0.23	5.02	0.002117
ACC	0.16	3.64	0.013037	ACC	0.21	4.73	0.002117
				Right AInsula	0.3	4.65	0.002117
				Right IPS	0.13	3.58	0.011702
				Left IPS	0.13	3.11	0.020026
				Left RPFC	0.17	3.09	0.020026
				Right RPFC	0.15	2.71	0.035806
				Right SMG	0.14	2.62	0.036795

Table 12: Correlation/beta values, t-values and p-values for functional connectivity between the inferior frontal gyrus and resting-state networks (RSN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Left IPS	0.28	7.65	0.000007	Left IPS	0.23	5.15	0.002824
Right IPS	0.17	5.47	0.000257	Right IPS	0.19	3.77	0.017544
Left FEF	0.12	3.97	0.004472	Left AInsula	0.13	3.41	0.023427
Left AInsula	0.09	3.6	0.007685				

Left SMG	0.09	3.4	0.009603				
MPFC	-0.1	-2.74	0.03346				

Table 13: Correlation/beta values, t-values and p-values for functional connectivity between the fusiform gyrus and resting-state networks (RSN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

Skilled Group				Impaired Group			
Targets	Beta	t(18)	p-FDR	Targets	Beta	t(13)	p-FDR
Left IPS	0.25	5.42	0.000528	Left IPS	0.29	6.84	0.000166
Left AInsula	0.14	4.11	0.00457	Right IPS	0.21	5.94	0.000341
MPFC	-0.14	-3.47	0.010685	Left Ainsula	0.27	5.56	0.000432
Right IPS	0.14	3.42	0.010685	Left RPFC	0.22	5.15	0.000654
ACC	0.11	2.86	0.029103	ACC	0.18	4.41	0.001963
Left RPFC	0.13	2.78	0.029103	Right AInsula	0.2	4.18	0.002521
Left IPS	0.25	5.42	0.000528	Right SMG	0.14	3	0.020584
Left AInsula	0.14	4.11	0.00457	Right RPFC	0.12	2.79	0.02657

Table 14: Correlation/beta values, t-values and p-values for functional connectivity between the supramarginal gyrus and resting-state networks (RSN) for P condition for skilled and impaired group, FDR-correction ($p < 0.05$)

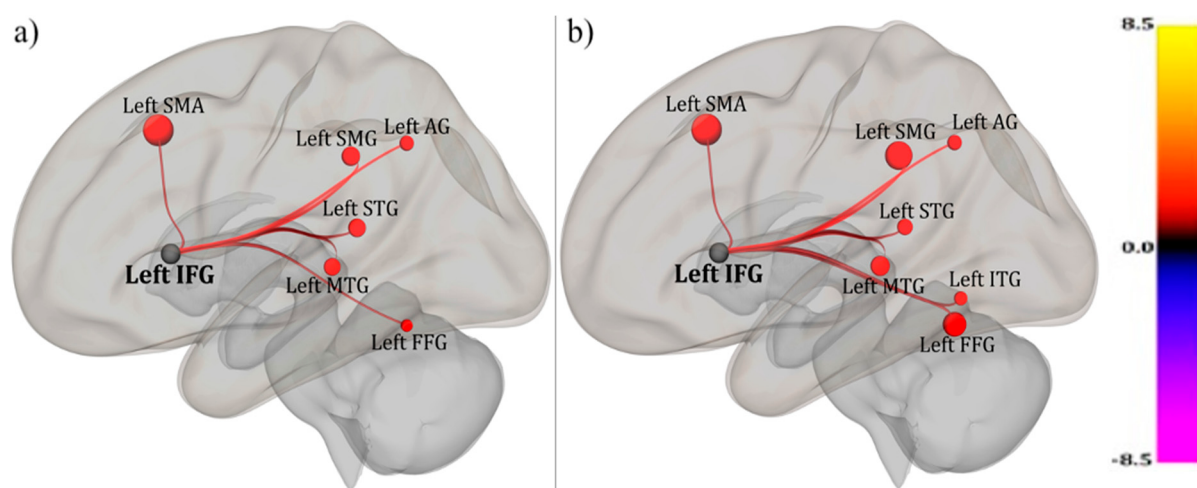


Figure 1: Functional connectivity of inferior frontal gyrus within the SpN for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength.

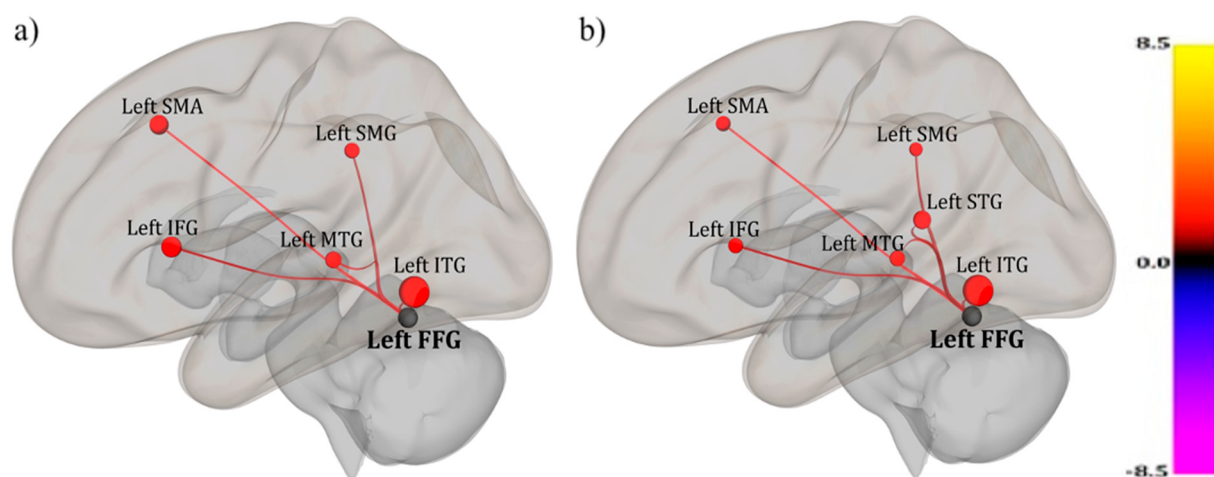


Figure 2: Functional connectivity of fusiform gyrus within the SpN for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength.

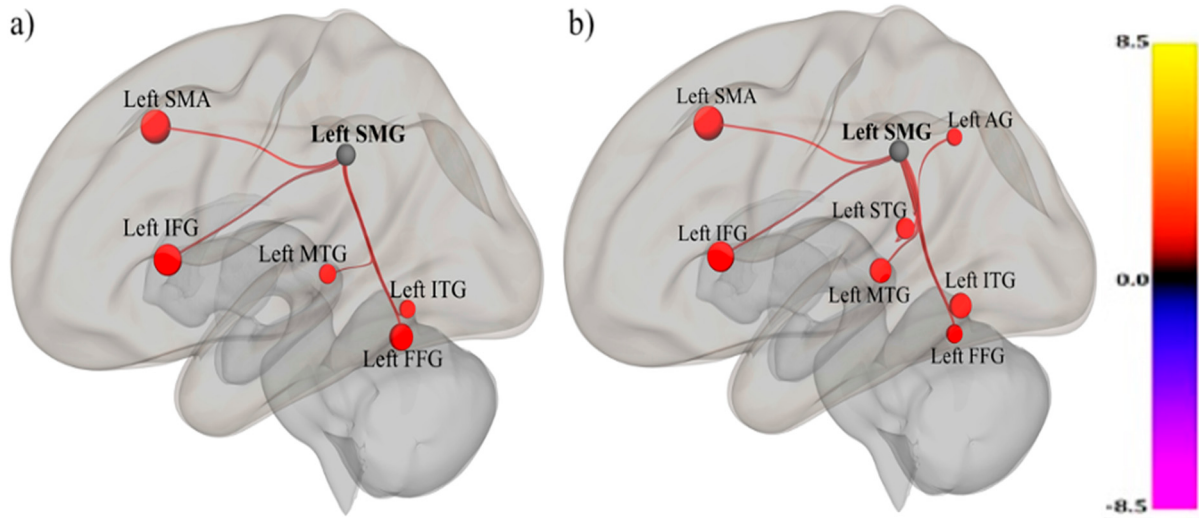


Figure 3: Functional connectivity of supramarginal gyrus within the SpN for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength.

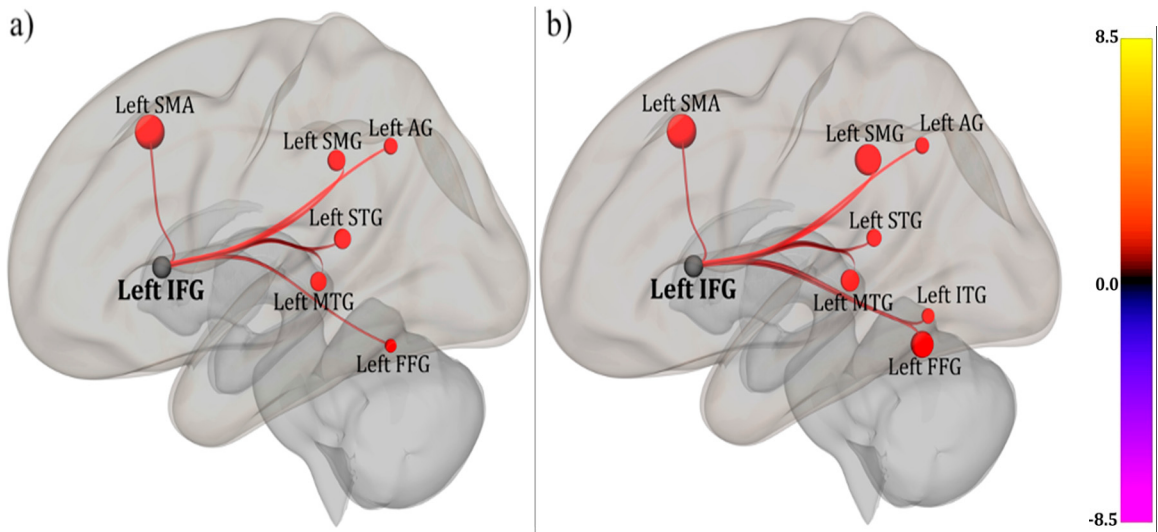


Figure 4: Functional connectivity of inferior frontal gyrus within the SpN for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

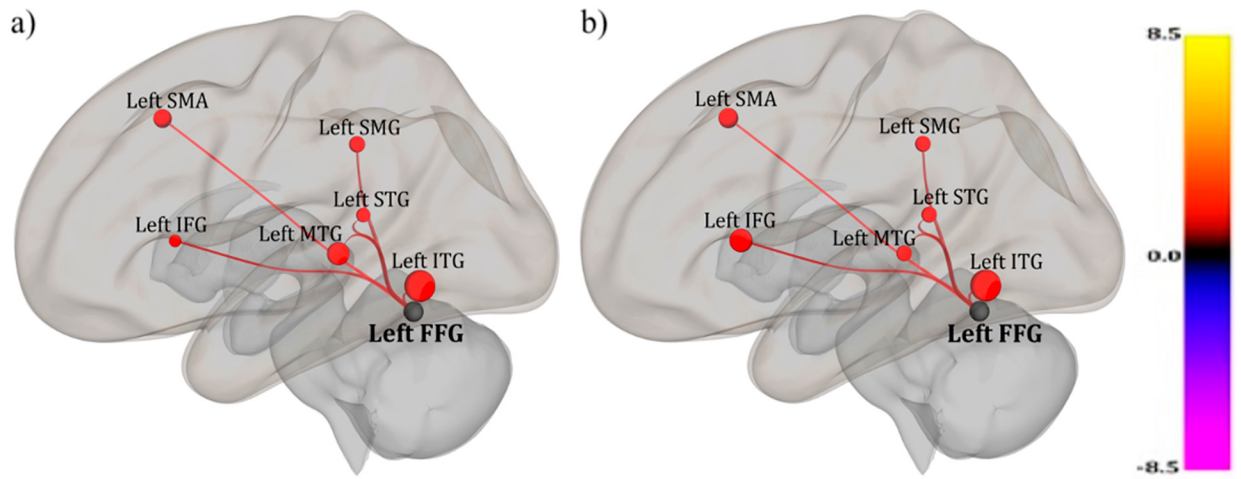


Figure 5: Functional connectivity of fusiform gyrus within the SpN for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength.

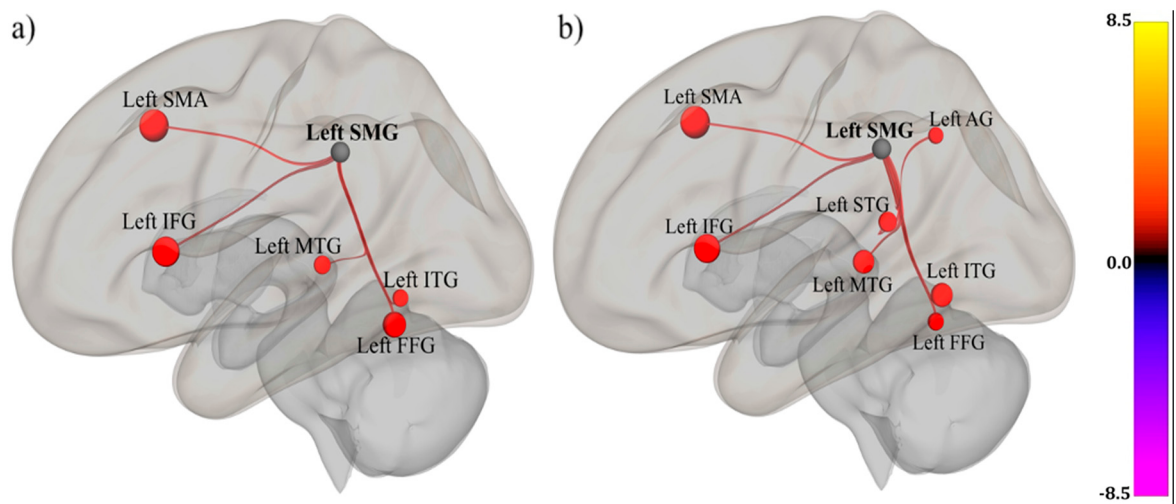


Figure 6: Functional connectivity of supramarginal gyrus within the SpN for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

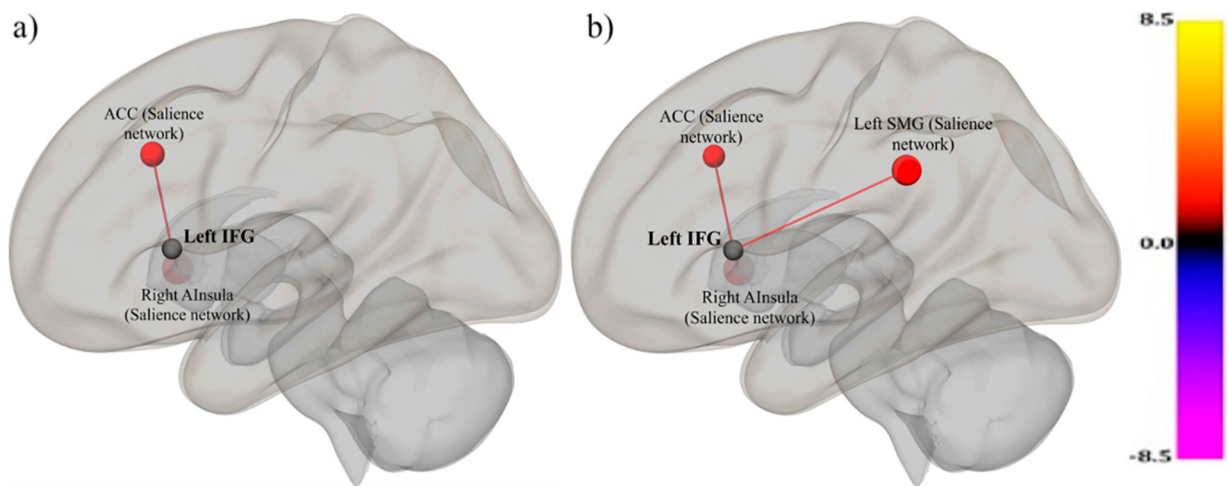


Figure 7:: Functional connectivity of left inferior frontal gyrus with the RSNs for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength.

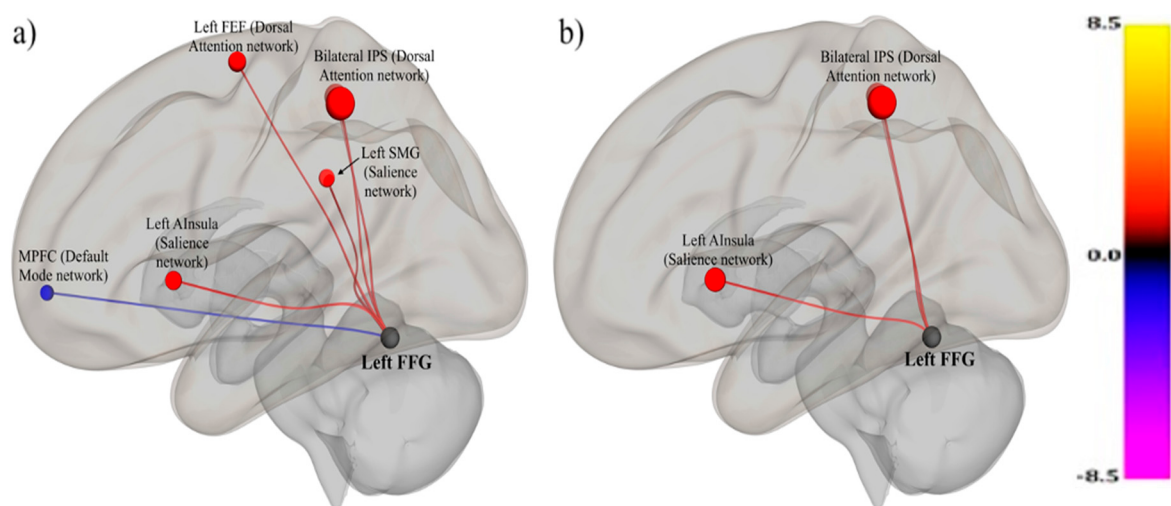


Figure 8: Functional connectivity of fusiform gyrus with the RSNs for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

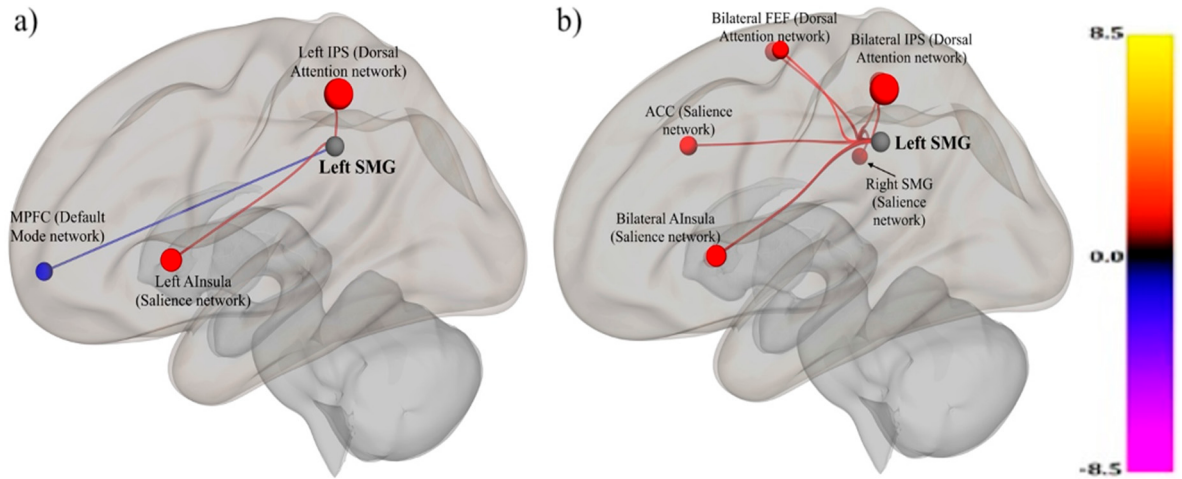


Figure 9: Functional connectivity of supramarginal gyrus with the RSNs for the OP condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

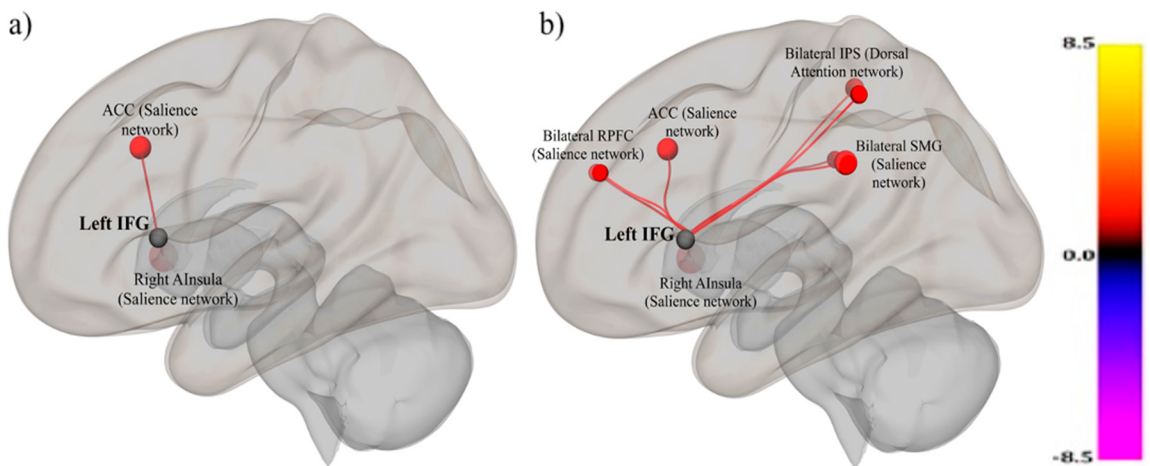


Figure 10: Functional connectivity of left inferior frontal gyrus with the RSNs for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

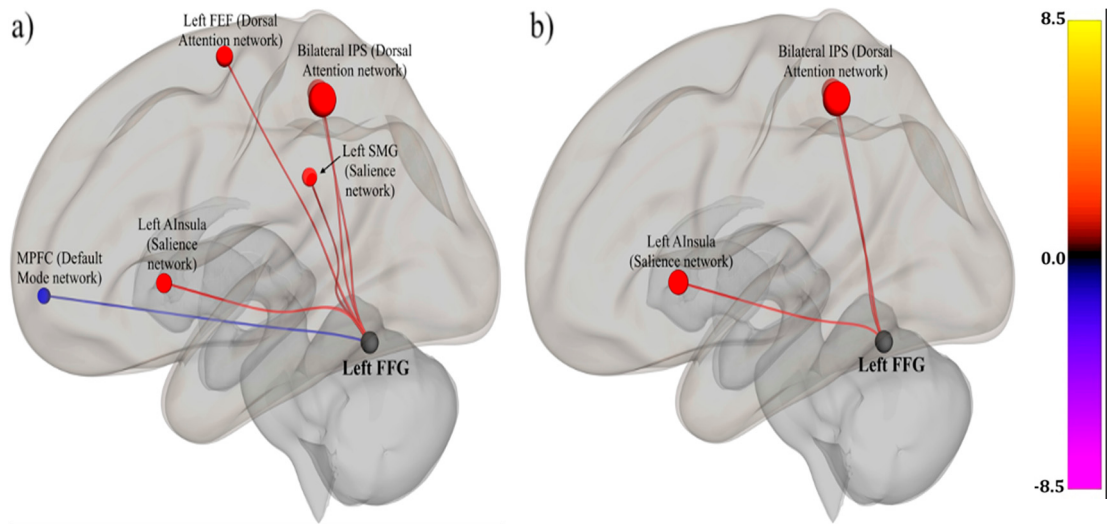


Figure 11: Functional connectivity of fusiform gyrus with the RSNs for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

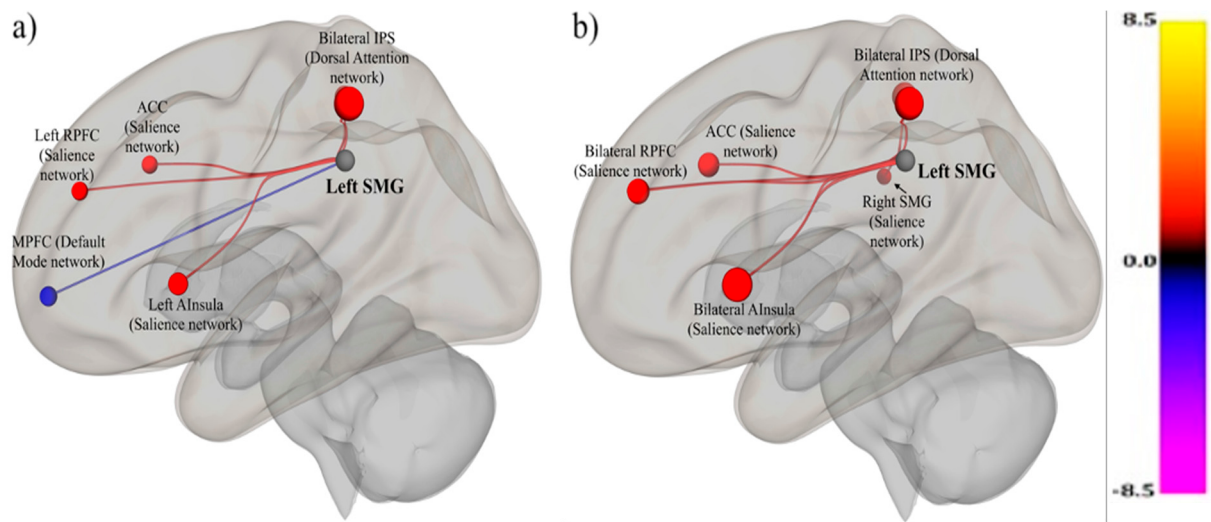


Figure 12: Functional connectivity of left supramarginal gyrus with the RSNs for the P condition in the a) skilled and b) impaired group, FDR-correction ($p < 0.05$). The seed region is indicated in black, the color-bar indicates the t -values. The size and the color of the target brain areas also indicate the t -values associated with the connectivity strength

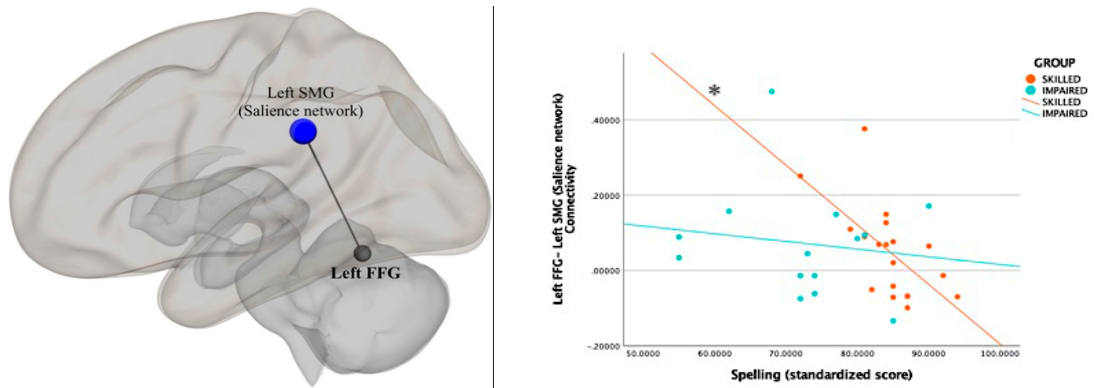


Figure 13: Scatterplot to show the relationship between left FFG-left SMG (of the salience RSN) connectivity and spelling accuracy scores (standardized) for the skilled and impaired groups. Significant relationships for the skilled group is indicated with an asterisk.

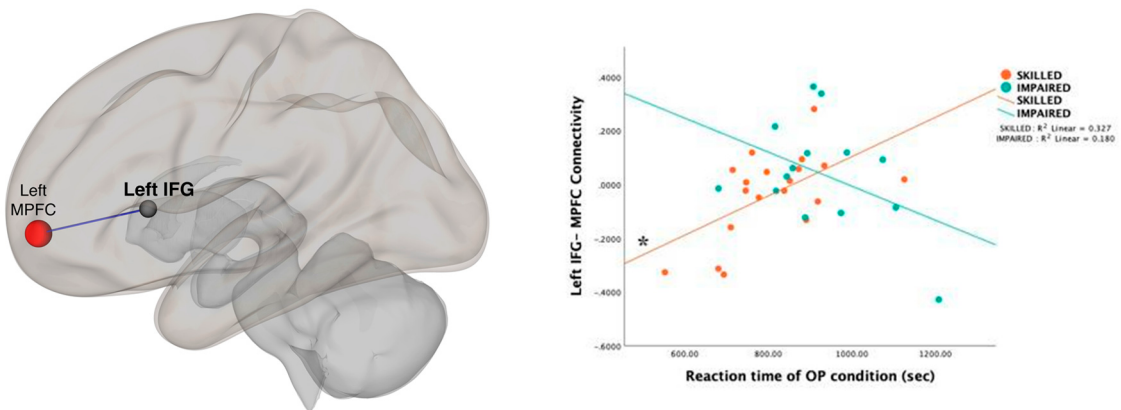


Figure 14: Scatterplot to show the relationship between left IFG-MPFC (of the default model network RSN) connectivity and reaction time (OP condition) for the skilled and impaired groups. Significant relationship for the skilled group is indicated with an asterisk.