

Evaluating the sensitivity of Centiloid quantification to pipeline design and image resolution

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Introduction

Aim

- Centiloid (CL) scale is used for improving the comparability of amyloid PET quantification
- Alternative pipelines to the Standard Centiloid one (MNI space, predefined cortical and reference

Evaluating the impact of pipeline design options on Centiloid value

Evaluating the impact of effective image resolution on global Centil

Ivietnous					
 Statistical analysis General estimation equation (GEE) for compa CL values across all pipeline combinations DPMS group 					
Centiloid~ Intercept + Space + Tracer + Target Type + region+ Reference region type+ visual read + MMSE					
PNHS group					
Centiloid~ Intercept + Space + Tracer + Target Type + region+ Reference region type+ visual read					
 Comparing CL values before/after harmonization done using <u>correlation</u> and <u>Bland-Altman</u> plot 					
Results					
Demographic	PNHS	DPMS			
Age (Mean±SD)	68.4±7.51	70.52±7.23			
Sex (Female%)	282 (85.71%)	138 (41.8%)			
MMSE (Mean±SD)	28.99±1.22	25.67±4.14			
Clinical status	Cognitively unimpaired	SCD+(110, 33%) MCI 40.6%), & Dementia			
Centiloid	14.28±24.17	46.33±48.86			
Table 1. D	emographic information o	f PNHS and DPMS grou			
Image: state sta	ari@barcelonabeta.org nrnazShekari Barcelonabeta.org				
	Statistical analy • General esti CL values ac DPMS group Centiloid~ Intercorregion+ Reference PNHS group Centiloid~ Intercorregion+ Reference • Comparing Contenting Contention Demographic Age (Mean±SD) Sex (Female%) MMSE (Mean±SD) Clinical status	Weturious Statistical analysis Statistical analysis General estimation equation (CL values across all pipeline colspan="2">Centiloid~ Intercept + Space + Trace region+ Reference region type+ visu PNHS group Centiloid~ Intercept + Space + Trace region+ Reference region type+ visu Comparing CL values before/a done using correlation and BI Version (MeantSD) Age (MeantSD) Sex (Female%) Sex (Female%) Centiloid PNHS MMSE (MeantSD) Age (MeantSD) Sex (Female%) Sex (Female%) Centiloid 14.28±24.17 Table 1. Demographic information o			

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	(Intercept)		71.6	84	1	<0.001	° entiloi		
oid	Visual read		516	25	-	<0.001	-50.0	y=1.62+0.96*x 50.0 .0 50.0	100.0
			10.0	76	1	<0.001	(C)	Centiloid (C RR: Pons Space:	Original PE Native Tar
		_	19.0	/6	L	<0.010	200.0		
	Reference region		164.1	164.191	3	<0.001			
ng the	Reference region type (GA	Reference region type (GAAIN vs		84.601		<0.001	id (Har		and the second s
	tissue-based)		_				° (entiloi	and the second s	
	Target (GAAIN vs AAL-con	nposite)	36.6	68	1	<0.001	-100.0	y=5.31+0.99*x	50.0 100.0
Reference			0.54	5/	1	0.002		Contiloid (C	Original Pl
eterence	Space (IVINI vs Native)		9.50	7 4		0.002		Centiloid (C	
eference	Tracer		0.32	21	1	0.571	 Figur	re 3. Correlatio	on betv
eference	Space (IVINI vs Native) Tracer Table 2. GEE model results for	r DPMS gro	9.50 0.32 Dup. <u>RR and</u>	21 RR type	1 had hig	0.571 ghest impact or	Figur (B,D)	re 3. Correlation) before and af	on betv fter hai
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marginal mean values (~3 CL)



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pasqual maragall foundation

Conclusion







omparing CL changes before and after harmonization as RR and AAL composite and GAAIN CTX respectively (C&D) using pons as RR and AAL composite and GAAIN CTX respectively

- ✓ Main GEE model was developed in the DPMS cohort, and it was replicated in PNHS group with different criteria
- ✓ Reference region had the strongest impact on CL values
- ✓ Pons produced significantly lower CL values (10-15 CL)
- ✓ Other factors had lower impact (2-3 CL)
- ✓ No effect of Tracer
- ✓ Low sensitivity of CL to image resolution using whole cerebellum as RR and GAAIN cortical target
- ✓ Increasing the sensitivity of CL to image resolution using AAL-composite target irrespective of selected reference region
- resolution observed using pons (~7 CL) and cerebellum grey matter (~5 CL) as RR irrespective of cortical target

Take home message

- ✓ Using whole cerebellum as reference region is recommended for Centiloid scaling
- ✓ Using whole cerebellum and GAAIN cortical target is recommended for robustness against differences in image resolution

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