

Supplementary Material

1 SUPPLEMENTARY TABLES AND FIGURES

Table S1. Summary statistics of bias in the mean uptake in PET_{AtlasAC} and PET_{ZTEAC} in all 85 anatomical VOIs averaged over all 30 static PET acquisitions. These data are also visualized in Fig. 4 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

VOI	region	bias in PET _{AtlasAC} [%]					p	bias in PET _{ZTEAC} [%]					p
		mean	sd	min	max			mean	sd	min	max		
Amygdala left	medial temporal cortex	-3.1	3.6	-17.2	2.2	<0.001	0.3	1.6	-3.3	3.2	0.44		
Amygdala right	medial temporal cortex	-2.5	2.9	-12.6	2.3	<0.001	0.4	1.6	-2.8	3.5	0.229		
Anterior orbital gyrus left	frontal cortex	-1.5	4	-14.2	5.7	0.043	-0.3	2.5	-3.9	6.4	0.245		
Anterior orbital gyrus right	frontal cortex	-2.2	3.7	-13.8	4	0.003	-0.5	2.5	-4.7	6	0.245		
Anterior temporal lobe lateral part left	temporal cortex	-4.1	3.3	-11.8	1.3	<0.001	-0.3	2.3	-4.2	4.6	0.229		
Anterior temporal lobe lateral part right	temporal cortex	-4.2	3.7	-12.3	2	<0.001	-0.3	2.1	-5	3.9	0.28		
Anterior temporal lobe medial part left	temporal cortex	-3	4.2	-12.2	5.7	<0.001	-0.5	2.6	-4.2	6	0.088		
Anterior temporal lobe medial part right	temporal cortex	-2.8	4.4	-13.9	5.4	0.001	-0.3	2.4	-4.3	4.9	0.105		
Caudate nucleus left	striatum	0.9	2.3	-3.2	5.1	0.119	1.2	1.8	-2.5	4.2	0.005		
Caudate nucleus right	striatum	1.7	2.6	-2.9	7.2	0.009	1.2	1.9	-2.2	4.2	0.015		
Cerebellar white matter	-	-4.5	2.9	-10.9	1.5	<0.001	1.1	2.7	-1.7	7.6	0.211		
Cerebellum left	cerebellum	-4.1	2.7	-10.6	0.8	<0.001	0.4	2.3	-3.1	5.7	0.859		
Cerebellum right	cerebellum	-4.2	2.8	-10.6	2	<0.001	0.7	2.4	-2.3	6.4	0.455		
Cerebral white matter left	cerebral WM	2.3	2.6	-4.5	7.6	<0.001	-0.4	1.6	-3.5	2.6	0.221		
Cerebral white matter right	cerebral WM	2.2	2.6	-4.4	7.3	<0.001	-0.3	1.6	-2.9	2.7	0.28		
Cingulate gyrus anterior part left	-	3.3	2.8	-2.2	9.4	<0.001	-0.3	1.8	-3.8	2.7	0.452		
Cingulate gyrus anterior part right	-	3.7	2.9	-1.8	10.1	<0.001	-0.3	1.8	-3.8	2.9	0.477		
Corpus callosum	-	2	2.4	-3.3	7	<0.001	0.6	1.7	-2.4	3.7	0.124		
Cuneus left	occipital cortex	1	2.8	-4.9	5.7	0.077	-1.5	1.5	-4.5	1.2	<0.001		
Cuneus right	occipital cortex	0.9	2.7	-5.1	5.1	0.124	-1.3	1.5	-4.6	1.3	<0.001		
Fusiform gyrus left	temporal cortex	-3.9	4	-12.1	4.4	<0.001	-0.4	2.6	-3.6	6.7	0.092		
Fusiform gyrus right	temporal cortex	-3.7	4	-11.1	6.1	<0.001	0	2.5	-3.3	6.9	0.318		
Gyrus cinguli posterior part left	-	3.7	2.8	-3.4	9.9	<0.001	0	1.6	-2.8	3.1	0.903		
Gyrus cinguli posterior part right	-	3.8	3	-3.2	10.9	<0.001	0	1.7	-3.1	3.5	0.746		
Hippocampus left	medial temporal cortex	-2.4	2.6	-9.5	2.3	<0.001	0.3	1.6	-2.5	3.5	0.57		
Hippocampus right	medial temporal cortex	-1.8	2.7	-10	2.8	<0.001	0.2	1.6	-2.6	3.2	0.73		
Inferiorlateral remainder of parietal lobe left	parietal cortex	2.7	3.2	-6.3	8.4	<0.001	-0.9	1.5	-3.7	3.2	0.003		
Inferiorlateral remainder of parietal lobe right	parietal cortex	1.6	3.2	-6.8	6.4	0.011	-0.5	1.7	-3.8	3.3	0.14		
Inferior frontal gyrus left	frontal cortex	0.4	3.4	-9	7.7	0.641	-0.3	1.9	-3.1	3.5	0.349		
Inferior frontal gyrus right	frontal cortex	-0.6	3.1	-7.2	6.4	0.271	0	2.1	-3.7	3.6	0.984		
Insula left	-	-0.3	2.6	-8.4	4.3	0.543	0.1	1.5	-2.3	3.3	0.808		
Insula right	-	-0.2	2.4	-6.8	3.8	0.715	0.2	1.7	-2.5	3.8	0.746		
Lateral orbital gyrus left	frontal cortex	-1.6	3.7	-12.3	5.2	0.016	0	2.2	-2.5	5.5	0.685		
Lateral orbital gyrus right	frontal cortex	-2.7	3.4	-11.3	4.6	<0.001	0.1	2.5	-3.7	5.6	0.919		
Lateral remainder of occipital lobe left	occipital cortex	0.1	2.9	-4.5	7	0.919	-1.8	1.7	-4.9	1.5	<0.001		
Lateral remainder of occipital lobe right	occipital cortex	0.1	2.8	-5.7	5.7	0.968	-1.6	1.6	-4.8	1.6	<0.001		
Lateral ventricle (excluding temporal horn) left	-	2	2.7	-2.5	8.1	0.004	2.2	2.3	-2.8	5.7	<0.001		
Lateral ventricle (excluding temporal horn) right	-	3.2	3	-2.2	11.2	<0.001	1.7	2.3	-2.7	5.8	0.001		
Lateral ventricle temporal horn left	-	-2	2.6	-8.5	3.1	<0.001	0.3	1.6	-2.5	3.4	0.49		
Lateral ventricle temporal horn right	-	-1.1	2.7	-9.1	4	0.025	0.2	1.7	-2.5	3.5	0.839		
Lingual gyrus left	occipital cortex	-1.3	2.3	-6.3	3.9	0.002	-0.6	1.8	-3.3	3.7	0.016		
Lingual gyrus right	occipital cortex	-1.2	2.2	-5.9	2.7	0.006	-0.5	1.6	-3.3	3.4	0.058		
Medial orbital gyrus left	frontal cortex	-4	5.4	-27.7	3.6	<0.001	0.1	2.1	-3.9	5.1	0.952		

Table S2. Continuation of Tab. S1

VOI	region	bias in PET _{AtlasAC} [%]					p	bias in PET _{ZTEAC} [%]					p
		mean	sd	min	max			mean	sd	min	max		
Medial orbital gyrus right	frontal cortex	-3.8	4.8	-23.5	3.3	<0.001	-0.2	2	-4	4.9	0.516		
Middle and inferior temporal gyrus left	temporal cortex	-3.1	3.1	-9.7	4	<0.001	-0.1	2	-3.1	4.3	0.339		
Middle and inferior temporal gyrus right	temporal cortex	-3.7	3.1	-9.7	2.4	<0.001	-0.2	1.9	-4	4.5	0.245		
Middle frontal gyrus left	frontal cortex	4.9	4.4	-4.8	16.1	<0.001	-0.7	2.4	-8	3.1	0.339		
Middle frontal gyrus right	frontal cortex	3.6	4	-4.3	12.9	<0.001	-0.5	2.3	-5.4	3.3	0.49		
Nucleus accumbens left	striatum	-1.8	2.8	-12.3	2.3	0.001	0.4	1.4	-2.6	3	0.129		
Nucleus accumbens right	striatum	-1.1	2.4	-8	3.5	0.021	0.5	1.5	-3.1	3.2	0.067		
Pallidum left	-	-1.1	2.2	-5.9	3	0.01	0.3	1.4	-2.3	2.7	0.349		
Pallidum right	-	-0.7	2.1	-5.4	3.4	0.1	0.3	1.6	-2.6	3.6	0.393		
Parahippocampal and ambient gyri left	-	-3.3	3.2	-10	3.3	<0.001	0.1	1.9	-2.7	4.2	0.67		
Parahippocampal and ambient gyri right	-	-2.8	3.1	-10.5	3.9	<0.001	0.1	2	-3.1	4.5	0.685		
Postcentral gyrus left	parietal cortex	5.2	3.9	-4.1	14.3	<0.001	-0.1	1.8	-4.6	3.9	0.7		
Postcentral gyrus right	parietal cortex	4.5	3.6	-3.5	11.9	<0.001	0	1.9	-3.5	3.8	0.903		
Posterior orbital gyrus left	frontal cortex	-2	3.3	-14.3	3.1	<0.001	0.5	1.7	-2.3	5.3	0.109		
Posterior orbital gyrus right	frontal cortex	-2.1	2.8	-11.4	1.5	<0.001	0.3	1.7	-2.7	4.2	0.556		
Posterior temporal lobe left	temporal cortex	-1.8	2.3	-5.9	3	<0.001	-0.5	1.6	-3	2.6	0.07		
Posterior temporal lobe right	temporal cortex	-2.5	2.5	-7.5	2.1	<0.001	-0.4	1.7	-3.6	3.4	0.129		
Precentral gyrus left	frontal cortex	6.2	4.1	-2.9	16.3	<0.001	-0.2	2.1	-6.4	4	0.7		
Precentral gyrus right	frontal cortex	5.3	3.8	-2	13.5	<0.001	-0.1	2.1	-5.1	4	0.761		
Pre-subgenual frontal cortex left	-	-1	2.2	-5.3	3.6	0.015	0.6	1.8	-2.5	4.2	0.141		
Pre-subgenual frontal cortex right	-	-0.7	2	-4.1	3.1	0.077	0.7	1.7	-2.3	3.9	0.047		
Putamen left	striatum	-0.8	2.4	-7.7	3.5	0.05	0.2	1.4	-2.4	2.5	0.503		
Putamen right	striatum	-0.5	2.2	-6.1	3.7	0.245	0.3	1.6	-2.4	3.1	0.404		
Straight gyrus left	frontal cortex	-4.2	5.7	-31.6	1.4	<0.001	0.7	1.5	-2.9	3.2	0.012		
Straight gyrus right	frontal cortex	-3.7	4.6	-24.6	1.4	<0.001	0.6	1.4	-2.8	3.3	0.023		
Subcallosal area left	-	-1.4	2.4	-7.8	2.6	0.002	0.9	1.5	-2.6	3.9	0.009		
Subcallosal area right	-	-0.6	2.2	-5	2.9	0.164	0.9	1.5	-2.6	4.2	0.006		
Subgenual frontal cortex left	-	-1.7	2.1	-6.4	2	<0.001	0.9	1.5	-2.5	3.6	0.006		
Subgenual frontal cortex right	-	-1.2	1.9	-4.5	2.5	0.002	1	1.5	-2.1	3.3	0.004		
Substantia nigra left	-	-1.9	1.9	-5.7	1.3	<0.001	0.1	1.6	-3.4	3.2	0.761		
Substantia nigra right	-	-1.5	2.2	-7.8	2.5	<0.001	0.3	1.5	-2.5	3.5	0.67		
Superior frontal gyrus left	frontal cortex	6.6	4	-1.7	16.5	<0.001	-0.5	2.4	-7.6	3.6	0.416		
Superior frontal gyrus right	frontal cortex	6.2	3.8	-1.2	15.2	<0.001	-0.5	2.4	-7.3	3.8	0.44		
Superior parietal gyrus left	parietal cortex	5.2	3.4	-3.6	11.9	<0.001	-0.7	1.5	-3	3.2	0.008		
Superior parietal gyrus right	parietal cortex	5	3.3	-2.9	11.7	<0.001	-0.5	1.6	-3.2	3.4	0.035		
Superior temporal gyrus anterior part left	temporal cortex	-3	3.5	-13.2	2.7	<0.001	0.2	2.2	-4.2	6.2	0.855		
Superior temporal gyrus anterior part right	temporal cortex	-3.1	3.3	-12.4	3.3	<0.001	0.3	2.4	-4.3	7	0.984		
Superior temporal gyrus posterior part left	temporal cortex	-0.9	2.9	-9.1	4.9	0.052	-0.1	1.5	-2.9	2.9	0.598		
Superior temporal gyrus posterior part right	temporal cortex	-1.8	2.6	-8.9	3.2	<0.001	0.1	1.8	-3.1	3.5	0.919		
Thalamus left	thalamus	-0.2	2.1	-4.6	3.3	0.685	0.4	1.6	-2.3	3.4	0.271		
Thalamus right	thalamus	0.1	2.2	-5.1	3.4	0.746	0.4	1.7	-2.4	3.5	0.44		
Third ventricle	-	-0.4	2.3	-5.3	4	0.152	1	1.8	-2	5.4	0.009		

Table S3. Summary statistics of bias in the mean uptake in PET_{AtlasAC} and PET_{ZTEAC} in all 30 static PET acquisitions averaged over all VOIs. These data are also visualized in Fig. 2 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

subject	bias in PET _{AtlasAC} [%]					p	bias in PET _{ZTEAC} [%]					p
	mean	sd	min	max			mean	sd	min	max		
1	-0.7	3	-7	4.9	0.056		1.7	1	-0.8	3.5	<0.001	
2	0	2.5	-7.3	6.6	0.835		2.9	1.8	-1	7.6	<0.001	
3	-0.8	3.1	-6	6.5	0.014		-0.3	1.1	-2.7	2.5	0.02	
4	0.7	2.8	-4.1	7.1	0.273		-1.7	1.2	-4.3	1.9	<0.001	
5	-0.4	2.7	-4.8	7.6	0.02		-0.9	1.2	-3.6	2.3	<0.001	
6	0.6	2.7	-3.7	8	0.601		0	1.5	-3.4	3.2	0.952	
7	1.6	2.3	-3	7.2	<0.001		-0.7	1.4	-3.7	3	<0.001	
8	-0.7	2.7	-6.6	5.7	0.045		-1.1	1.1	-4.7	1	<0.001	
9	0.1	3.2	-4.6	7.5	0.602		-1.6	1.8	-8	0.4	<0.001	
10	-2.9	1.8	-6.5	2.5	<0.001		-2.4	0.7	-4.2	-0.9	<0.001	
11	-4	2.8	-9.9	2.1	<0.001		-1.5	1	-3.6	0.8	<0.001	
12	0.8	3.3	-5.2	9.5	0.27		0.6	1.1	-2.3	2.5	<0.001	
13	-0.2	2.5	-4.7	5.2	0.318		-0.4	1.1	-3.5	3.3	<0.001	
14	-1.6	3.1	-6.3	6.5	<0.001		0.6	0.7	-1.3	3.4	<0.001	
15	1	3	-3.7	8.1	0.095		2.1	1.3	-0.7	5.9	<0.001	
16	-1.6	2.7	-7.9	3.8	<0.001		0	0.9	-2	2.9	0.733	
17	0.2	2.6	-4.4	6.8	0.813		0.6	0.9	-2	3.6	<0.001	
18	2.7	3.1	-1.8	10.2	<0.001		2.6	1.1	0.6	6.8	<0.001	
19	4	4.2	-3.3	13.9	<0.001		0.5	1.3	-1.8	5.7	<0.001	
20	2.4	2.6	-3.3	8.7	<0.001		1.1	1	-1.7	4.5	<0.001	
21	3	4.3	-2.4	16.3	<0.001		1	1.8	-2.8	6.9	<0.001	
22	4.5	3.9	-1	16.5	<0.001		2.7	1.6	-1.9	7	<0.001	
23	-0.6	3.7	-6.8	7.7	0.054		-0.9	1.1	-3.2	3.3	<0.001	
24	-7.8	5.6	-31.6	-1.2	<0.001		0.1	1.2	-2.6	2.5	0.878	
25	-2.5	4	-9.3	7.4	<0.001		-1.6	1.1	-4.7	0.9	<0.001	
26	-3.2	3.6	-9.6	7.6	<0.001		-2.2	1.4	-5	1.5	<0.001	
27	1.6	3.5	-3.3	9.7	0.001		1.2	0.9	-0.4	4.4	<0.001	
28	-3.8	4.6	-12.2	4.6	<0.001		-0.9	1.2	-3.7	2	<0.001	
29	-4.8	3	-11.6	1.5	<0.001		-2.5	0.7	-4.9	-1.2	<0.001	
30	1.3	4.6	-7.5	9.9	0.02		2.8	1	0.6	5.8	<0.001	

Table S4. Summary statistics of bias in the mean uptake in PET_{AtlasAC} and PET_{ZTEAC} in different anatomical regions averaged over all 30 static PET acquisitions. These data are also visualized in Fig. 3 in the main manuscript. Please note that the VOIs in the cerebellum had to be excluded in 3 subjects (6,7,21).

region	bias in PET _{AtlasAC} [%]					p	bias in PET _{ZTEAC} [%]					p
	mean	sd	min	max			mean	sd	min	max		
frontal cortex	0.3	5.6	-31.6	16.5	0.777		-0.1	2.1	-8	6.4	0.408	
temporal cortex	-3	3.5	-13.9	6.1	<0.001		-0.2	2.1	-5	7	<0.001	
parietal cortex	4	3.7	-6.8	14.3	<0.001		-0.4	1.7	-4.6	3.9	<0.001	
occipital cortex	0	2.7	-6.3	7	0.461		-1.2	1.7	-4.9	3.7	<0.001	
medial temporal cortex	-2.4	3	-17.2	2.8	<0.001		0.3	1.6	-3.3	3.5	0.151	
striatum	-0.3	2.7	-12.3	7.2	0.032		0.6	1.6	-3.1	4.2	<0.001	
thalamus	-0.1	2.2	-5.1	3.4	0.956		0.4	1.6	-2.4	3.5	0.177	
cerebellum	-4.2	2.7	-10.6	2	<0.001		0.6	2.4	-3.1	6.4	0.541	
cerebral WM	2.3	2.6	-4.5	7.6	<0.001		-0.3	1.6	-3.5	2.7	0.103	

Table S5. BP_{nd} derived from PET_{CTAC} and bias of BP_{nd} in PET_{AtlasAC} and PET_{ZTEAC} for the eight [¹⁸F]PE2I acquisitions in the striatum using PET_{CTAC} as the ground truth.

region	BP _{nd,CTAC}		bias in BP _{nd,AtlasAC} [%]					p	bias in BP _{nd,ZTEAC} [%]					p
	mean	sd	mean	sd	min	max		mean	sd	min	max			
left caudate nucleus	3.3	0.5	5.0	2.6	1.0	9.4	0.003	2.0	1.5	-0.1	4.6	0.008		
left putamen	4.3	0.5	3.7	2.7	-0.4	8.7	0.008	1.0	1.1	-0.6	2.7	0.026		
right caudate nucleus	3.3	0.6	5.1	2.6	1.1	9.3	0.003	2.0	1.5	-0.3	4.8	0.006		
right putamen	4.3	0.4	3.0	2.5	-0.6	7.8	0.008	1.1	1.3	-0.8	3.1	0.033		
all combined	3.8	0.7	4.2	2.6	-0.6	9.4	<0.001	1.5	1.4	-0.8	4.8	<0.001		

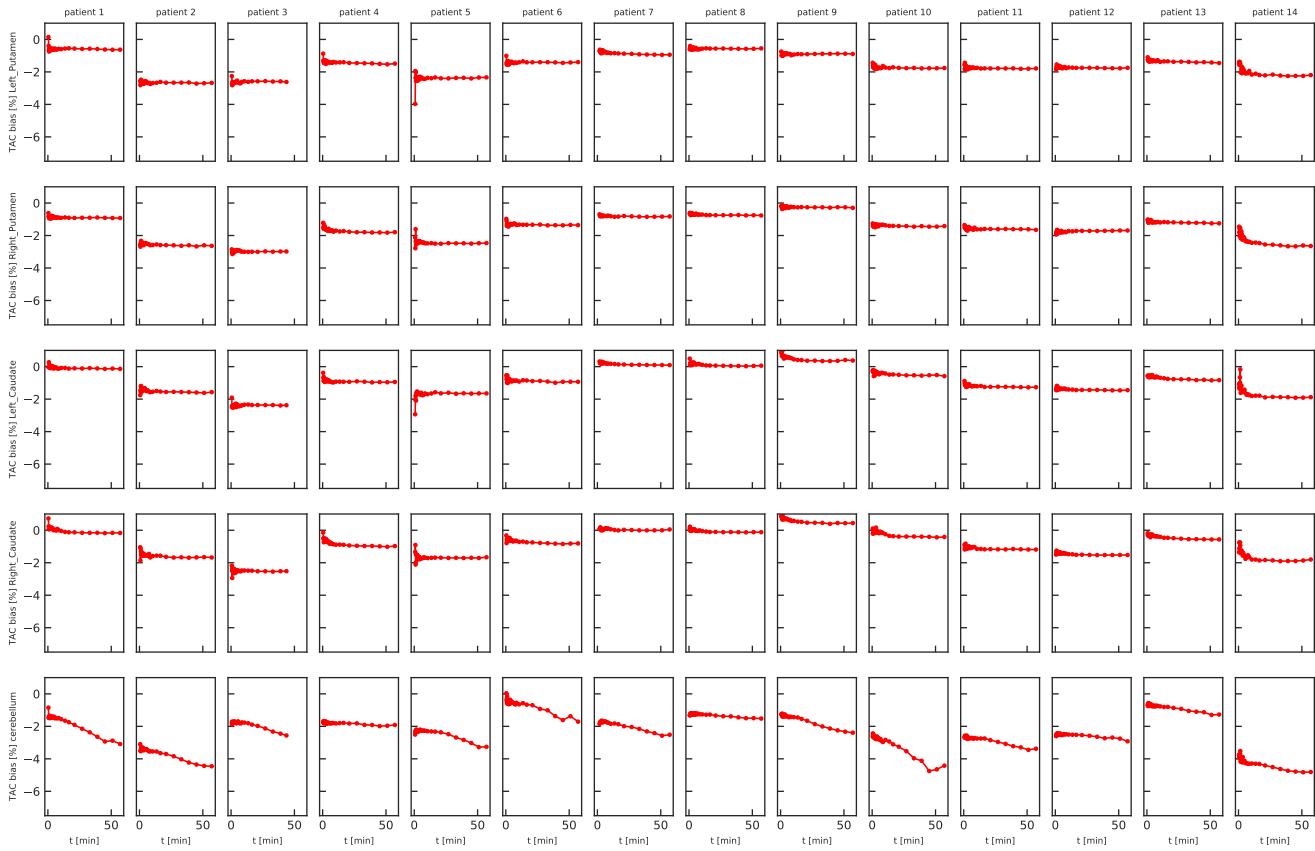


Figure S1. Bias in time activity curves of PET_{AtlasAC} (blue), and PET_{ZTEAC} (red) with respect to PET_{CTAC} in different regions for the 11 [¹⁸F]PE2I subjects.

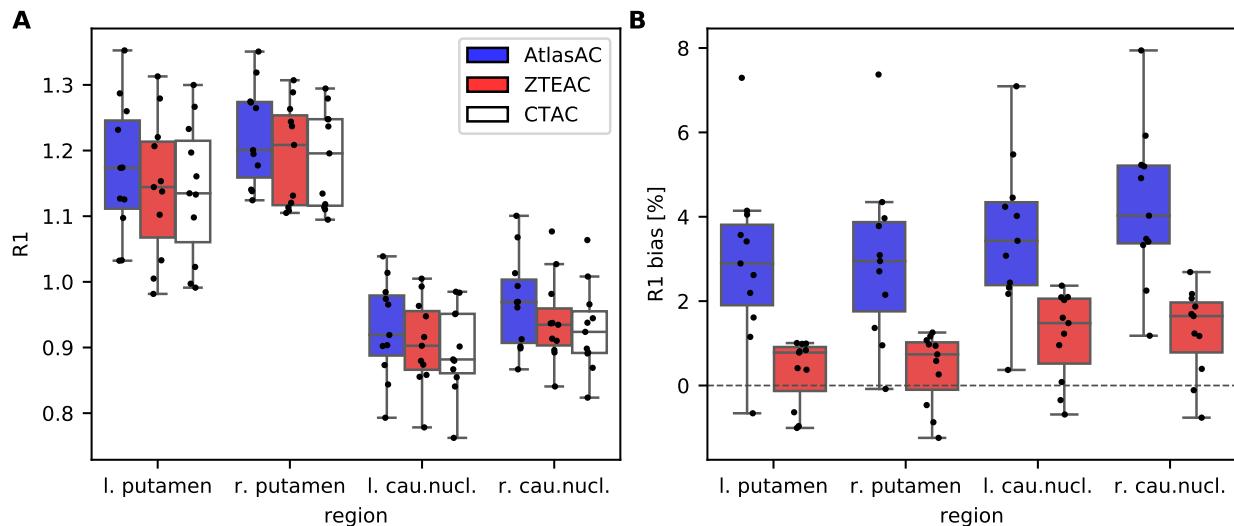


Figure S2. (A) Boxplot of R_1 values in four striatal regions of the 11 [¹⁸F]PE2I subjects obtained from PET_{AtlasAC}, PET_{ZTEAC}, and PET_{CTAC}. (B) Bias in R_1 estimation in PET_{AtlasAC}, PET_{ZTEAC} compared to PET_{CTAC}.

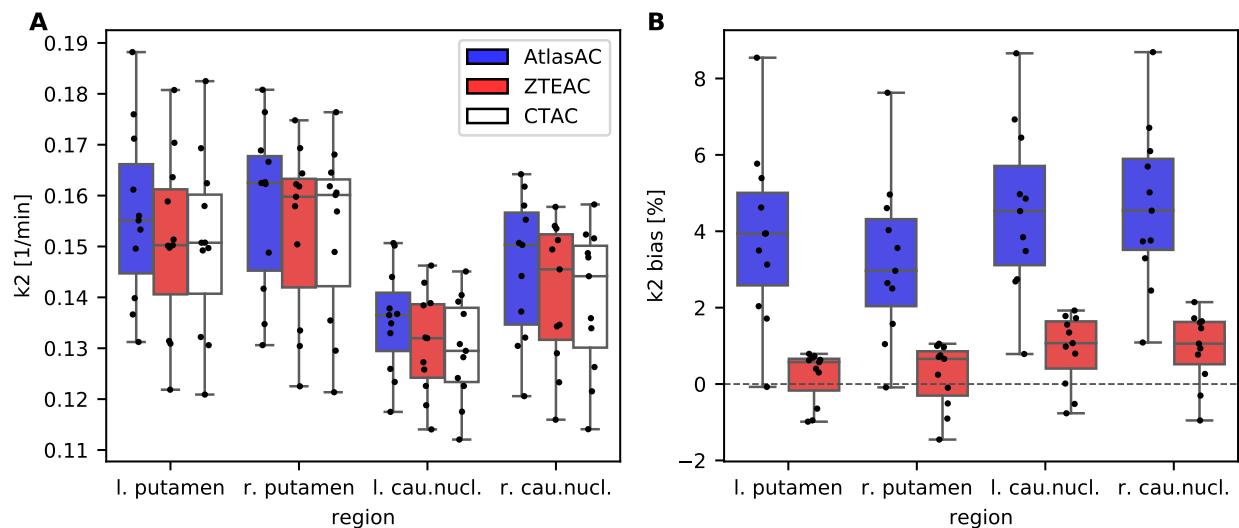


Figure S3. (A) Boxplot of k_2 values in four striatal regions of the 11 [^{18}F]PE2I subjects obtained from PET_{AtlasAC}, PET_{ZTEAC}, and PET_{CTAC}. (B) Bias in k_2 estimation in PET_{AtlasAC}, PET_{ZTEAC} compared to PET_{CTAC}.