SAHLGRENSKA ACADEMY

Brain morphometry in Parkinson's disease

Master's thesis in Medical Physics

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UNIVERSITY OF GOTHENBURG
Gothenburg, Sweden 2023

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Abstract

Purpose

The purpose of this brain morphometry study was to examine the volumes of different regions of the brain by research participants with Parkinson's disease.

Method

To carry out the study, MR (magnetic resonance) images from 956 research participants from the Parkinson's Progression Markers Initiative (PPMI) were used. The research participants were divided into 6 different cohorts. Before the MR images were used in this study, they had gone through preprocessing and segmentation using MAPER, where 121 regions including background were segmented. Once the data were obtained, the segmented regions were converted to volumes. The investigation was divided into two parts, first it was studied whether ICV (intracranial volume) differed between the different cohorts. This was done with the help of a violin plot and two-sided t-tests for each cohort. In the second part of the study, the individual volumes in the brain were examined. To accomplish this, hypothesis generation was used on half of each group's subjects and then the hypotheses were tested on the other half. Two-tailed t-tests were performed to examine statistical differences and similarities between the cohorts.

Result

In the study, it was seen that the ICV differed between the different cohorts and thus on the imaged person's head. None of the tested regions in the PD (Parkinsons disease) and SWEDD (scans without evidence for dopaminergic deficit) cohort showed any significant volume difference. The other three cohorts had two to five brain regions that showed a significant volume difference

Conclusion

In this brain morphometry study, it was shown that a correction for ICV is needed to get comparable results for the different cohorts. For the individual volumes, the results obtained in this study do not agree with previously obtained results. In further studies, it would therefore have been interesting to divide the brain into fewer regions, to add together regions that belong together.

Sammanfattning

Syftet med denna hjärnmorfometri-studie var att undersöka volymen av olika regioner i hjärnan på frivilliga försöksperoner med Parkinsons sjukdom. För att göra det användes magnetresonansbilder (MR-bilder) från 956 frivilliga försökspersoner från Parkinson's Progression Markers Initiative (PPMI). De frivilliga försökspersonerna var förindelade i 6 olika kohorter. Innan MR-bilderna användes i denna studie hade de gått igenom förbearbetning och segmentering med hjälp av MAPER, där 121 regioner inklusive bakgrund segmenterades. När datan erhölls omvandlades de segmenterade regionerna till volymer. Undersökningen delades in i två delar, först studerades det om ICV (intracranial volume) skiljde mellan de olika kohorterna. Detta gjordes med hjälp av en violinplot för respektive kohort och för varje kohort gjordes även tvåsidigt t-test där p-värdet studerades. I studiens andra del undersöktes de individuella volymerna i hjärnan. För att genomföra detta användes hypotesgenerering på ena halvan av gruppen försökspersoner och sedan testades hypoteserna på andra halvan. Tvåsidigt t-test gjordes för att undersöka statistiska skillnader och likheter mellan kohorterna.

I studien sågs det att ICV skiljde sig mellan de olika kohorterna och därmed på den avbildades personens huvud. För de individuella volymerna stämde inte resultatet som erhölls i denna studie överens med tidigare erhållna resultat. I vidare studier hade det därför varit intressant att dela upp hjärnan i färre regioner, att lägga ihop regioner som hör ihop.

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1
Introduction

Parkinson's disease (PD) is the second most common degenerative disease of the central nervous system, the most common is Alzheimer's disease [1]. In many cases, the cause of the disease is unknown [1]. In 1990 2.5 million people were diagnosed with PD compared with 6.1 million people in 2016, thus PD has more than doubled in 26 years. However, the number of sufferers is believed to be even higher because many go undiagnosed [2]. Parkinson's disease affects one in 100 persons over the age of 60 years, and the risk of being affected increases with age [1]. In some rare cases, PD has affected people under 18 [3]. Parkinson's disease cannot be cured today. The most common symptoms of PD are bradykinesia, tremor and rigidity. To be diagnosed with PD, you must have bradykinesia plus tremor or rigidity. So there is thus no special way to diagnose PD, more than observing the patient's symptoms [4].

Parkinson's Progression Markers Initiative (PPMI) is a database created by Michael J. Fox Foundation scientists in 2010. The data in PPMI is open and available to all. There are approximately 4,000 research participant in PPMI today. Making these data publicly available has accelerated research and biological properties that were previously unknown in various diseases have been discovered [5]. In PPMI, the participants are divided into cohorts depending on clinical criteria presented below. A symptom of PD that can indicate a higher risk of developing PD include hyposmia which means an impaired sense of smell. About 90 % of the patients with PD suffers from hyposmia in an early stage[6]. Another potential marker of PD is rapid eye movement (REM) sleep behavior disorder and affects 25 to 40% of those who have PD [7]. The most common genetic cause of PD is mutations of the GBA-gene (glucosylceramidase beta) [8]. Two more risk factors for PD are mutations of the LRRK2 gene (leucine-rich repeat kinase 2) or SNCA gene (α-synuclein) [9].

PD is known to be caused by a lack of dopamine in the brain that arises when nerve cells in substantia nigra are broken down. The nerve cells that produce dopamine are sensitive, and dopamine is needed for the brain to be able to control the body's movements [10]. It is not completely clear why some suffer from PD, but it has been seen that PD is due to genetic risk factors in 5–10% of the cases. Various environmental factors, such as cigarette smoking, can also increase the risk of PD [1].

A previous study showed that people with PD have larger intracranial volume (ICV) than controls. The same study also showed that the volume of putamen, substantia nigra and amygdala was smaller than controls [11]. When symptoms of PD arise, 48% of the neurons in pars compacta which is a part of substantia nigra are lost [11]. In another study, putamen and caudate were 8.1% and 11% smaller respectively in patients with PD [12].

2

Theory

2.1 Multi-atlas segmentation

Segmentation is used, among other things, to extract the volume of different anatomical structures in the brain. Anatomical segmentation has made it possible to show the structural brain changes of various diseases quantitatively on MR-images [13]. Segmenting an image means that the pixels in the image are divided into different classes/areas. Each pixel is then assigned a certain label. To perform automatic segmentation, an atlas is required, an atlas is an image that contains known information about the anatomy. The atlas has been created by hand using manual segmentation. The atlas can then transfer its information to the target image, where the anatomy was previously unknown. Multi-atlas segmentation is a type of segmentation where multiple atlases are registered to the target image to make the segmentation more robust. Using multi atlas segmentation is good because different people's anatomy looks a little different. In this study, multi-atlas segmentation will be used when the brain is divided into hippocampus, cerebellum and thalamus etc. [14]. For the segmentation, tissue class information can be included in the images. By including tissue classification, the segmentation becomes more robust [13].

Various software packages are available that perform anatomical brain image segmentation, for example MAPER, volBrain, and Freesurfer [13], [15], [16]. MAPER is the software chosen for this project. It has been developed by the project supervisor and is available as freely downloadable and modifiable software. It segments the whole brain (cortical as well as subcortical regions) and has been designed to be robust in the presence of gross abnormalities, for example due to brain atrophy. The volBrain software is only suitable for segmenting subcortical regions. It is proprietary, meaning that it cannot be modified by the user, and it can only be accessed via a web interface. FreeSurfer is also proprietary software, but users can download it and use it on their own hardware. Its main disadvantage is that it is not particularly robust: the process yield is circa 90%, meaning that the software fails to produce a good segmentation on 10% of the processed images. For comparison, the process yield for MAPER is circa 99%.

2.2 Statistical hypothesis testing

The t-test is a statistical test for comparing two samples. When t-test is done, two hypotheses are employed, the null hypothesis (H_0), i.e. that there is no significant difference in mean value between the cohorts, and the alternative hypothese (H_1), i.e. that there is a difference in mean value between the cohorts [17]. The t-test works in such a way that the difference in mean between the two cohorts is put in relation to the standard mean error. The standard error indicates how much the mean is spread out, i.e. how much the mean can differ from the true population mean. Thus, the greater the difference in mean value for two cohorts and the smaller the standard mean error, the greater the probability that the samples will differ [18]. Before the t-test is done, a significance level must be decided. The significance level is a limit for when the null hypothesis can be rejected. Most often, a significance level of 0.05 is set, which means that if the p-value obtained from the t-test is less than 0.05, the null hypothesis can be rejected [19]. An unpaired two-sample t-test is done when the two cohorts are independent of each other. To be allowed to do an unpaired t-test there are conditions, the dependent variable must be normally distributed, the variance for the two cohorts must be equal, and the cohorts must be independent of each other [18]. For this work, a variant of the t-test called Welch test is used, which does not require the variance of the samples to be equal [20].

2.3 Aim

The aim of this region-wise morphometry study was to determine whether PD and the related conditions represented in PPMI had an impact on the brain that could be seen in the size of individual anatomical brain regions.

3
Materials and methods

In this study, I rely on publicly shared data from PPMI, as well as on image processing results generated by a previous student [14]. Section 3.1 gives a brief description of PPMI and the image processing that led to the segmentation labels which were obtained at the start of the study. In Section 3.2, the methods I chose to use to further process and analyze the data are described.

3.1 Material

This study was carried out on anatomical segmentations of the brains of participants in the PPMI study who underwent cranial MR scanning.T1-weighted MR-images from PPMI database in 3D or 2D of the brain were used. PPMI participants were recruited from the following six cohorts.

- De novo PD (PD): Research participants with untreated PD who have been diagnosed with PD no more than two years before inclusion.
- Prodromal (Pr): Research participants without PD but who have a diagnosis of hyposmia and REM-sleep disease.
- SWEDD (**s**cans **w**ithout **e**vidence for **d**opaminergic **d**eficit): Patients who have signs and symptoms of PD, but do not show abnormalities on a DaTSCAN (a special single-photon emission computed tomography scan that can show dopaminergic deficits in the substantia nigra).
- GenCohort PD (GenPD): Research participant with PD and who have a genetic mutation in LRRK2, GBA and SNCA.
- GenCohort Unaff (GenUn): Research participant without PD but who have a genetic mutation in LRRK2, GBA and SNCA.
- Control (C): Healthy research participant.

Table 3.1 shows the group sizes and the distribution between men and women.

Table 3.1: Table over how many research participants there are in each cohort, two research participants who lacked gender are excluded from the table and the study

	PD	**Pr**	**SWEDD**	**GenPD**	**GenUn**	**C**	**Total**
Women	137	10	21	50	103	66	387
Men	254	39	40	54	68	112	567
Total	391	49	61	104	171	178	954

The images were first preprocessed using Tetralith which is provided from Swedish National Infrastructure for Computing (SNIC). Tetralith is a cluster computing resource. Posnorm was then used for positional normalization, for example, to straighten up the head on MR images where the patient was lying with the head slightly tilted [21]. Finally, Pincram was used to create a brain mask, which means that the voxels containing brain tissue are separated from voxels that do not contain brain tissue and/or background [22].

On the research participants' MR images, MAPER had also been applied to segment the brain [13]. The various atlases used came from Hammers Atlas Database. The database consisted of 30 MRI-images from healthy adults which had 96 (inclusive background) manually drawn structures. Demographics and label names for each region are also provided. For this study, a prereleased version from the supervisor with 121 manually drawn structures (including background) was used. In addition to the plain anatomical segmentations into 121 regions, MAPER also provides segmentations that are further subdivided by tissue class (grey matter (GM), white matter (WM), cerebrospinal fluid (CSF) and background(BG)); these labels were used for the volumetric comparisons this study.

3.2 Method

The software that has been used to conduct the studies was R. R is a programming language used for statistical calculations and graphics. The segmentation images were processed to extract region volumes for the plain segmentation images (121 regions). For quality control, the results were checked for completeness and, if fewer than 121 region volumes had been produced, the case was followed up by visual review of the MR image and the segmentation to decide whether the case was still usable or to be excluded from the analysis. The remaining images were processed to extract region volumes from the tissue-class subdivided segmentation images.

The absolute volume of brain regions varies with the size of the imaged person's head. A well-tested quantity for correcting for this correlation is the intracranial volume [23]. For this study, a violin plot was first made to investigate whether any difference in ICV was seen between the different cohorts. Then, the unpaired two-tailed Welch two-sample t-test was performed for each cohort against the control cohort. The significance level was set at 95 % , i.e. those cohorts that had a p-value less than 0.05 showed a significant volume difference.

ICV was corrected using simple linear regression, according to equation 3.1. The mean value of ICV was denoted by $icvmean$, icv_mm3 is the volume of ICV for each research participant. The volume of the region you want to correct for is vol_mm3 and k is the regression coefficient.

$$vol\_mm3\_corr = vol\_mm3 - k * (icv\_mm3 - icvmean) \tag{3.1}$$

No prior hypotheses about group differences regarding region volumes were considered. Instead, hypotheses were generated on the available data. To enable this, each group was randomly subdivided into an exploration group and a test group. To examine whether each individual region of the brain differed from the corresponding volume in the control cohort, unpaired two-tailed Welch two-sample t-tests with a 95 % significance level were used. Where each cohort was tested against the control cohort. First, a t-test was performed on the exploration group. The null hypothesis was written as "there is no significant volume difference between the control cohort and the respective cohort for the regions of the brain". The results were ranked by the p-value, and the 9 regions with the lowest p-values were selected for examination on the test group. Unpaired two-tailed Welch two-sample t-tests were then performed on the 9 regions and the data in the test group were used. Based on the p-value, conclusions were then drawn about the size of the regions in relation to the control cohort.

4
Results

The quality control revealed that some images (n=32) had fewer than the expected 121 regions in the plain segmentation, and these cases were reviewed visually. In 25 cases, only the label for the aqueduct (Region 99) was missing. In 23 of these, the remaining labels were of acceptable quality. Since it is plausible that the aqueduct can be missed by the MAPER procedure even if the image quality is normal and the segmentation is otherwise successful, these cases were kept in the study. For the remaining two, and for cases where two or more regions were missing (n=7), the visual review revealed problems with the underlying MR image (low resolution and/or incomplete field of view, examples shown in figure 4.1); these were excluded. In addition, two participants were excluded because no information on gender was available. Table 4.1 shows how many research participants there were in each cohort after the necessary exclusions of the 11 research participants had been made.

Table 4.1: Table over how many research participants there are in each cohort after exclusions

	PD	**Pr**	**SWEDD**	**GenPD**	**GenUn**	**C**	**Total**
Women	137	9	21	48	103	66	384
Men	251	37	39	54	68	112	561
Total	388	46	60	102	171	178	945

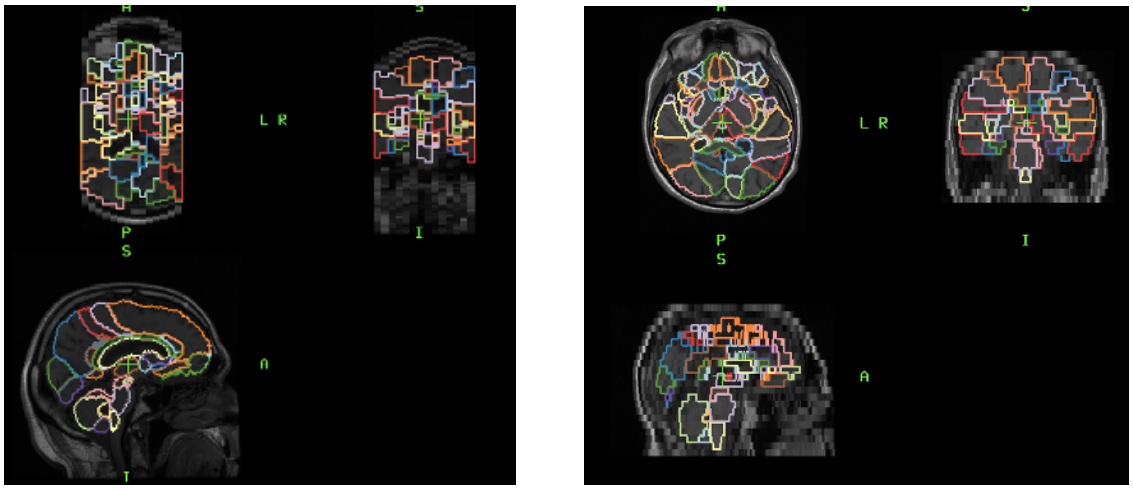
Table 4.2 shows the numbers per group after subdivision into exploration and test groups.

Table 4.2: Table over how many research participants there are in exploration and test group

	PD	**Pr**	**SWEDD**	**GenPD**	**GenUn**	**C**	**Total**
Exploration group	193	23	29	51	86	89	471
Test group	195	23	31	51	85	89	474
Total	388	46	60	102	171	178	945

4.1 ICV

Figure 4.2 shows that ICV varies between cohorts. In table 4.3 the p-values are seen after the two sample t-test has been done for each cohort that was tested against the control cohort.



(a) Small FOV (b) Poor spatial resolution

Figure 4.1: Example of two MR images with too small FOV and too poor spatial resolution

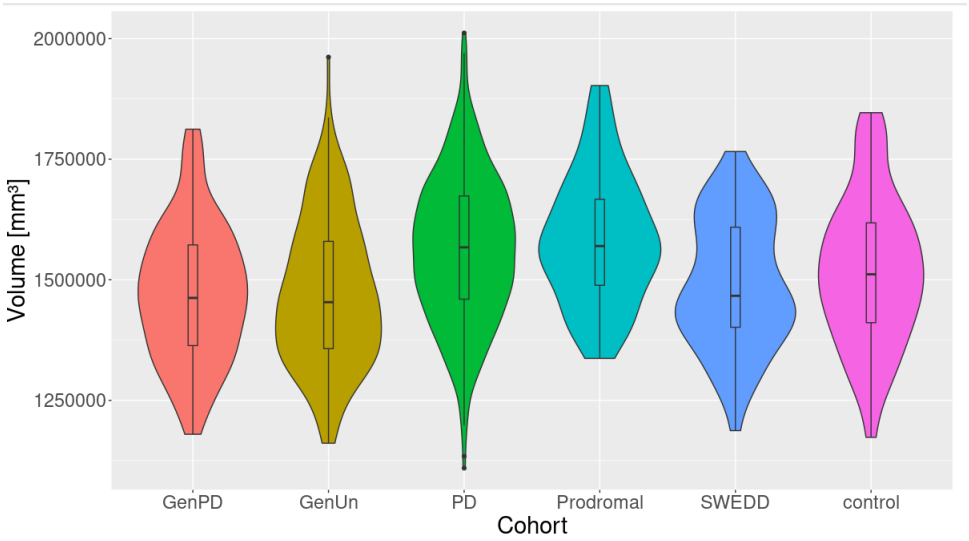


Figure 4.2: Violin plots for each cohort

Table 4.3: p-values for ICV and for the different cohorts compared with the control group

Cohort	p-value
PD	0.00098
Pr	0.00404
SWEDD	0.221
GenPD	0.01338
GenUn	0.00623

4.2 Individual volume

4.2.1 Exploration group

Tables 4.4, 4.5, 4.6, 4.7 and 4.8 show for each group the 9 regions that had the lowest p-values in the exploration set. For these, hypotheses of the form "Region R differs in volume between Group G and controls" were formulated.

4.2.1.1 PD

The table 4.4 shows the nine regions that had a p-value less than 0.05. All the regions and p-values for the PD cohort are seen in appendix, table A.1.

Table 4.4: p.value for the 9 regions for the PD-cohort

Region	p.value
Amygdala L GM	0.00400
Medulla oblongata GM	0.00486
Mamillary body R GM	0.00743
Piriform cortex R GM	0.02474
Subcallosal area R CSF	0.02692
Remainder of cerebral white matter generated L CSF	0.03406
Fusiform gyrus R GM	0.04203
Superior temporal gyrus middle part R GM	0.04360
Angular gyrus R CSF	0.04615

4.2.1.2 Pr

Table 4.5 shows the selected regions for the Pr cohort and p-values for these. p-values for all regions can be seen in table A.2.

Table 4.5: p.values for the 9 regions who were chosen for the Pr cohort

Region	p.value
Cerebellum superior posterior lobe R GM	0.00012
Cuneus R GM	0.00012
Cerebellum flocculonodular lobe L GM	0.00066
Cerebellum flocculonodular lobe R GM	0.00082
Lateral remainder occipital lobe R GM	0.00093
Cerebellum superior posterior lobe L GM	0.00098
Amygdala L GM	0.00111
Putamen L GM	0.00135
Lingual gyrus R GM	0.00141

4.2.1.3 SWEDD

p.values for the selected regions in the SWEDD cohort can be seen in table 4.6. Table A.3 shows the p-values for all regions.

Table 4.6: p.values for the 9 regions who were chosen for the SWEDD cohort

Region	p.value
Amygdala L GM	0.00041
Lingual gyrus R WM	0.00295
Thalamus R CSF	0.00306
Midbrain CSF	0.00335
Remainder of cerebral white matter generated R CSF	0.00453
Piriform cortex L GM	0.00457
Thalamus L CSF	0.00481
Insula anterior long gyrus L GM	0.00590
Parahippocampal & ambient gyri R CSF	0.00642

4.2.1.4 GenPD

The selected regions and their p-values for the GenPD cohort are seen in table 4.7. In table A.4 all regions and their p-values can be seen.

Table 4.7: p.values for the 9 regions who were chosen for the GenPD cohort

Region	p.value
Cerebellum inferior posterior lobe L WM	0.00105
Lingual gyrus L CSF	0.00574
Medulla oblongata GM	0.00700
Cerebellum superior posterior lobe L WM	0.00739
Middle & inferior temporal gyrus R WM	0.00809
Straight gyrus R WM	0.00982
Insula anterior long gyrus R GM	0.01124
Superior temporal gyrus anterior part R WM	0.01137
Substantia nigra L WM	0.01340

4.2.1.5 GenUn

Table 4.8 shows the p-values for the GenUn cohort. p-values for all regions are seen in table A.5.

Table 4.8: p-values for the 9 regions who were chosen for the GenUn cohort

Region	p.value
Middle & inferior temporal gyrus R WM	0.00000
Straight gyrus R WM	0.00002
Middle & inferior temporal gyrus L WM	0.00002
Superior temporal gyrus middle part R WM	0.00046
Lateral ventricle temporal horn R GM	0.00094
Lingual gyrus R GM	0.00095
Superior temporal gyrus middle part R CSF	0.00097
Mamillary body R GM	0.00102
Posterior orbital gyrus L WM	0.00114

4.2.2 Test group

The hypotheses created from the exploration group, section 4.2.1 are tested on the test group and the result is seen below.

4.2.2.1 PD

Table 4.9 shows the results for the PD cohort. Two of the regions had a p-value smaller than 0.05.

Table 4.9: p-value for the 9 volumes selected for the PD cohort

Region	p.value	Volume difference
Fusiform gyrus R GM	0.13090	-
Superior temporal gyrus middle part R GM	0.18993	-
Amygdala L GM	0.25371	-
Medulla oblongata GM	0.33877	-
Angular gyrus R CSF	0.41077	-
Piriform cortex R GM	0.57362	-
Remainder of cerebral white matter generated L CSF	0.73758	-
Subcallosal area R CSF	0.92410	-
Mamillary body R GM	0.97612	-

4.2.2.2 Pr

Table 4.10 shows the result obtained for the Pr cohort. Two regions, substantia nigra L GM and medulla oblongata had a p-value smaller than 0.05.

Table 4.10: p-value for the 9 volumes selected for the Pr cohort

Region	p.value	Volume difference
Putamen L GM	0.00060	Larger
Cerebellum superior posterior lobe L GM	0.02001	Larger
Cerebellum superior posterior lobe R GM	0.03515	Larger
Lateral remainder occipital lobe R GM	0.08273	-
Cuneus R GM	0.10167	-
Cerebellum flocculonodular lobe L GM	0.24128	-
Amygdala L GM	0.58050	-
Lingual gyrus R GM	0.61588	-
Cerebellum flocculonodular lobe R GM	0.70279	-

4.2.2.3 SWEDD

Table 4.11 shows the p-values for 9 regions, where non of the regions had a lower p-value than 0.05.

Table 4.11: p-value for the 9 volumes selected for the SWEDD cohort

Region	p.value	Volume difference
Piriform cortex L GM	0.12458	-
Parahippocampal & ambient gyri R CSF	0.36403	-
Amygdala L GM	0.39175	-
Thalamus R CSF	0.59679	-
Insula anterior long gyrus L GM	0.62908	-
Lingual gyrus R WM	0.63753	-
Midbrain CSF	0.69583	-
Remainder of cerebral white matter generated R CSF	0.86040	-
Thalamus L CSF	0.99139	-

4.2.2.4 GenPD

The result for the GenPD cohort is seen in table 4.12, middle & inferior temporal gyrus R WM and straight gyrus R WM had a p-value less than 0.05.

Table 4.12: p-value for the 9 volumes selected for the GenPD cohort

Region	p.value	Volume difference
Middle & inferior temporal gyrus R WM	0.00051	Larger
Straight gyrus R WM	0.01480	Larger
Insula anterior long gyrus R GM	0.11196	-
Substantia nigra L WM	0.11792	-
Medulla oblongata GM	0.18479	-
Lingual gyrus L CSF	0.42834	-
Cerebellum inferior posterior lobe L WM	0.89298	-
Superior temporal gyrus anterior part R WM	0.96453	-
Cerebellum superior posterior lobe L WM	0.97631	-

4.2.2.5 GenUn

Table 4.13 shows the p-values for the nine selected regions from GenPD cohort. All the regions without mamillary body R GM and cerebellum flocculonodularlobe L WM had a p-value smaller than 0.05.

Table 4.13: p-value for the 9 volumes selected for the GenUn cohort

Region	p.value	Volume difference
Middle & inferior temporal gyrus R WM	0.00000	Larger
Superior temporal gyrus middle part R WM	0.00009	Larger
Straight gyrus R WM	0.00046	Larger
Middle & inferior temporal gyrus L WM	0.00359	Larger
Superior temporal gyrus middle part R CSF	0.00726	Larger
Lateral ventricle temporal horn R GM	0.12112	-
Posterior orbital gyrus L WM	0.21540	-
Mamillary body R GM	0.40802	-
Lingual gyrus R GM	0.41677	-

5
Discussion

5.1 ICV

In figure 4.2 it was seen that ICV varied between the different cohorts. This was confirmed in table 4.3 where all cohorts except SWEDD had a p-value less than 0.05 and thus showed a significant volume difference. After this result was obtained, it was decided that volume measurements in this work should be corrected with ICV based on regionwise simple linear regression.

5.2 Individual volume

In this study, I attempted to show how Parkinson's disease and related conditions affect the brain. The hypothesis was that volumetric differences between diagnostic groups would become evident when measuring many automatically segmented anatomical regions (n=120) that were further subdivided by tissue class components. No attempts have previously been made to study brain anatomy at this high level of granularity. The statistical analysis of the results failed to show any group differences, meaning that no evidence to support the original hypothesis was found.

In a previous study, it had been seen that the volume of the amygdala, substantia nigra and putamen was smaller in people with PD. In the present study, no significant volume difference was seen for the tissue-class components of these three regions in subjects affected with Parkinson's. In the Pr group where the research participants have prodromal symptoms (hyposmia and REM sleep problems), but no actual PD, the results showed that the putamen L GM had a significantly larger volume compared to the control group. This finding contradicts the literature, which suggests that it may be spurious.

As increasing the granularity of volumetric brain image analysis leads to insignificant results, or results that appear to contradict existing literature, the logical next step would be to reduce the granularity by calculating sum volumes of regions that belong together, either anatomically (adjacent regions forming, for example, the striatum), or functionally (for example regions that are known to have correlated activity).
In a further study, it would also have been desirable to have more research participants as in both the SWEDD and Pr cohorts there are only around 20 to 30 research participants when the subjects are divided into exploration and test groups.

6
Conclusion

In this study, it has been shown that the absolute volume of brain regions differed between the different cohorts. For the individual regions, the results were surprising, none of the regions that have been shown to differ in volume in previous studies showed any significant volume difference in this study. The method used proved not to be sensitive enough and in further studies it would therefore have been interesting to do an analysis of connected regions.

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A

Appendix 1

A.1 PD

Table A.1: p-values for exploration group for all regions in the PD cohort

Label_No	Region	p.value
246	Amygdala L GM	0.00400
338	Medulla oblongata GM	0.00486
345	Mamillary body R GM	0.00743
361	Piriform cortex R GM	0.02474
200	Subcallosal area R CSF	0.02692
221	Remainder of cerebral white matter generated L CSF	0.03406
257	Fusiform gyrus R GM	0.04203
253	Superior temporal gyrus middle part R GM	0.04360
154	Angular gyrus R CSF	0.04615
478	Cerebellum inferior posterior lobe R WM	0.05217
245	Amygdala R GM	0.06769
261	Pons GM	0.07251
446	Superior temporal gyrus anterior part R WM	0.07261
250	Anterior temporal lobe lateral part L GM	0.07332
185	Lingual gyrus L CSF	0.08279
243	Hippocampus R GM	0.08520
186	Lingual gyrus R CSF	0.08625
263	Insula posterior long gyrus R GM	0.08780
482	Piriform cortex R WM	0.08973
115	Cerebellum inferior posterior lobe R Background	0.10316
56	Inferior frontal gyrus pars orbitalis L Background	0.10341
362	Piriform cortex L GM	0.11135
337	Insula anterior long gyrus R GM	0.11336
460	Midbrain WM	0.11766
331	Insula middle short gyrus R GM	0.12329
199	Subcallosal area L CSF	0.12428
278	Nucleus accumbens L GM	0.12919
262	Insula posterior long gyrus L GM	0.13205
210	Insula middle short gyrus R CSF	0.13446
251	Parahippocampal ambient gyri R GM	0.13871
222	Remainder of cerebral white matter generated R CSF	0.13918

256	Middle inferior temporal gyrus L GM	0.14397
326	Supramarginal gyrus L GM	0.15948
252	Parahippocampal ambient gyri L GM	0.15980
267	Anterior cingulate gyrus R GM	0.16085
258	Fusiform gyrus L GM	0.16237
465	Cerebellum vermis WM	0.17255
320	Subcallosal area L GM	0.17754
289	Lateral ventricle temporal horn R GM	0.18029
455	Insula anterior pole L WM	0.18224
241	Piriform cortex L CSF	0.19271
162	Thalamus R CSF	0.19894
481	Subthalamic nucleus L WM	0.20121
479	Cerebellum inferior posterior lobe L WM	0.20311
13	Middle inferior temporal gyrus R Background	0.20538
161	Thalamus L CSF	0.20550
232	Cerebellum anterior lobe R CSF	0.20642
244	Hippocampus L GM	0.21259
170	Third ventricle CSF	0.21512
351	Cerebellum flocculonodular lobe R GM	0.21626
385	Lateral remainder occipital lobe L WM	0.22319
437	Substantia nigra L WM	0.23019
308	Cuneus L GM	0.23201
476	Cerebellum superior posterior lobe R WM	0.23408
28	Middle frontal gyrus L Background	0.23633
191	Lateral orbital gyrus L CSF	0.23758
454	Insula posterior short gyrus R WM	0.24088
207	Insula anterior short gyrus L CSF	0.24250
473	Cerebellum flocculonodular lobe L WM	0.24380
254	Superior temporal gyrus middle part L GM	0.24856
70	Lateral orbital gyrus L Background	0.24930
121	Background CSF	0.25310
7	Anterior temporal lobe lateral part R Background	0.25624
474	Cerebellum anterior lobe R WM	0.25797
208	Insula anterior short gyrus R CSF	0.26452
438	Substantia nigra R WM	0.27209
114	Cerebellum superior posterior lobe L Background	0.27489
109	Cerebellum flocculonodular lobe R Background	0.27761
110	Cerebellum flocculonodular lobe L Background	0.28023
169	Lateral ventricle temporal horn L CSF	0.28542
175	Anterior orbital gyrus L CSF	0.28561
240	Piriform cortex R CSF	0.28652
247	Anterior temporal lobe medial part R GM	0.28666
218	Midbrain CSF	0.28742
382	Pons WM	0.29052
477	Cerebellum superior posterior lobe L WM	0.29064
475	Cerebellum anterior lobe L WM	0.29274

201	Pre-subgenual frontal cortex L CSF	0.29327
321	Subcallosal area R GM	0.29740
57	Inferior frontal gyrus pars orbitalis R Background	0.29806
32	Angular gyrus L Background	0.31218
160	Putamen R CSF	0.31230
346	Mamillary body L GM	0.31403
66	Cuneus L Background	0.32200
290	Lateral ventricle temporal horn L GM	0.32379
139	Cerebellum corpus medullare L CSF	0.32574
233	Cerebellum anterior lobe L CSF	0.32636
23	Lateral remainder occipital lobe R Background	0.33046
29	Middle frontal gyrus R Background	0.33155
209	Insula middle short gyrus L CSF	0.33392
273	Posterior temporal lobe R GM	0.33553
292	Precentral gyrus L GM	0.33578
51	Precentral gyrus R Background	0.33826
375	Superior temporal gyrus middle part L WM	0.34160
336	Insula anterior long gyrus L GM	0.34213
413	Precentral gyrus L WM	0.34672
281	Putamen R GM	0.35126
453	Insula posterior short gyrus L WM	0.35256
380	Cerebellum corpus medullare R WM	0.35311
184	Superior parietal gyrus R CSF	0.35629
166	Lateral ventricle excluding temporal horn R CSF	0.35926
58	Superior frontal gyrus L Background	0.36265
472	Cerebellum flocculonodular lobe R WM	0.36648
55	Anterior orbital gyrus R Background	0.36926
414	Precentral gyrus R WM	0.36953
393	Posterior temporal lobe L WM	0.36996
406	Pallidum R WM	0.37087
69	Medial orbital gyrus R Background	0.37270
16	Fusiform gyrus L Background	0.37350
22	Lateral remainder occipital lobe L Background	0.37431
374	Superior temporal gyrus middle part R WM	0.37573
177	Inferior frontal gyrus pars orbitalis L CSF	0.38141
260	Cerebellum corpus medullare L GM	0.38148
314	Posterior orbital gyrus L GM	0.38222
284	Pallidum L GM	0.38334
145	Anterior cingulate gyrus L CSF	0.38464
203	Superior temporal gyrus anterior part L CSF	0.38476
418	Anterior orbital gyrus R WM	0.38685
188	Cuneus R CSF	0.39145
430	Cuneus R WM	0.39226
15	Fusiform gyrus R Background	0.40573
180	Superior frontal gyrus R CSF	0.41154
470	Inferior frontal gyrus pars triangularis R WM	0.41212

31	Posterior temporal lobe R Background	0.41375
179	Superior frontal gyrus L CSF	0.41554
220	Cerebral aqueduct CSF	0.41724
353	Cerebellum anterior lobe R GM	0.41858
451	Insula middle short gyrus L WM	0.43173
14	Middle inferior temporal gyrus L Background	0.43265
106	Inferior frontal gyrus pars opercularis L Background	0.44092
165	Corpus callosum CSF	0.44447
405	Pallidum L WM	0.44546
355	Cerebellum superior posterior lobe R GM	0.44667
223	Cerebellum vermis CSF	0.44831
156	Caudate nucleus R CSF	0.45012
285	Pallidum R GM	0.45044
480	Subthalamic nucleus R WM	0.45426
381	Cerebellum corpus medullare L WM	0.45592
303	Postcentral gyrus R GM	0.46357
5	Anterior temporal lobe medial part R Background	0.46560
108	Inferior frontal gyrus pars triangularis L Background	0.46614
249	Anterior temporal lobe lateral part R GM	0.46738
306	Lingual gyrus L GM	0.46808
71	Lateral orbital gyrus R Background	0.46877
146	Anterior cingulate gyrus R CSF	0.47147
113	Cerebellum superior posterior lobe R Background	0.47904
248	Anterior temporal lobe medial part L GM	0.47947
73	Posterior orbital gyrus R Background	0.48176
226	Inferior frontal gyrus pars opercularis R CSF	0.48213
388	Anterior cingulate gyrus R WM	0.48244
237	Cerebellum inferior posterior lobe L CSF	0.48339
212	Insula posterior short gyrus R CSF	0.48416
235	Cerebellum superior posterior lobe L CSF	0.49473
68	Medial orbital gyrus L Background	0.50409
82	Superior temporal gyrus anterior part L Background	0.50482
53	Straight gyrus R Background	0.50691
144	Lateral remainder occipital lobe R CSF	0.50725
365	Hippocampus L WM	0.50783
392	Middle frontal gyrus R WM	0.50887
234	Cerebellum superior posterior lobe R CSF	0.51990
325	Superior temporal gyrus anterior part R GM	0.52045
316	Substantia nigra L GM	0.52234
30	Posterior temporal lobe L Background	0.52243
266	Anterior cingulate gyrus L GM	0.52407
265	Lateral remainder occipital lobe R GM	0.52532
427	Lingual gyrus L WM	0.52545
138	Cerebellum corpus medullare R CSF	0.52627
242	Background GM	0.52727
276	Caudate nucleus L GM	0.52911

272	Posterior temporal lobe L GM	0.53310
50	Precentral gyrus L Background	0.53399
301	Superior frontal gyrus R GM	0.53407
12	Superior temporal gyrus middle part L Background	0.53709
142	Insula posterior long gyrus R CSF	0.53723
395	Angular gyrus L WM	0.53733
140	Pons CSF	0.54313
206	Supramarginal gyrus R CSF	0.54607
286	Corpus callosum GM	0.54819
463	Remainder of cerebral white matter generated L WM	0.54846
132	Superior temporal gyrus middle part R CSF	0.54901
202	Pre-subgenual frontal cortex R CSF	0.55084
133	Superior temporal gyrus middle part L CSF	0.55085
459	Medulla oblongata WM	0.55200
310	Medial orbital gyrus L GM	0.55441
442	Subcallosal area R WM	0.55560
318	Subgenual frontal cortex L GM	0.55738
159	Putamen L CSF	0.55979
116	Cerebellum inferior posterior lobe L Background	0.55987
332	Insula posterior short gyrus L GM	0.56203
216	Insula anterior long gyrus R CSF	0.56206
137	Fusiform gyrus L CSF	0.56227
271	Middle frontal gyrus R GM	0.56352
176	Anterior orbital gyrus R CSF	0.56436
291	Third ventricle GM	0.56563
6	Anterior temporal lobe medial part L Background	0.56629
420	Inferior frontal gyrus pars orbitalis R WM	0.56759
416	Straight gyrus R WM	0.56771
401	Putamen L WM	0.56830
340	Fourth ventricle GM	0.57448
302	Postcentral gyrus L GM	0.57522
293	Precentral gyrus R GM	0.57638
217	Medulla oblongata CSF	0.58382
105	Inferior frontal gyrus pars opercularis R Background	0.58388
8	Anterior temporal lobe lateral part L Background	0.59073
33	Angular gyrus R Background	0.59336
304	Sup parietal gyrus L GM	0.59517
368	Anterior temporal lobe medial part R WM	0.59715
364	Hippocampus R WM	0.59719
255	Middle inferior temporal gyrus R GM	0.60411
122	Hippocampus R CSF	0.60498
443	Pre-subgenual frontal cortex L WM	0.60592
432	Medial orbital gyrus R WM	0.60674
83	Superior temporal gyrus anterior part R Background	0.61045
181	Postcentral gyrus L CSF	0.61387
456	Insula anterior pole R WM	0.61435

391	Middle frontal gyrus L WM	0.61479
313	Lateral orbital gyrus R GM	0.61520
444	Pre-subgenual frontal cortex R WM	0.61615
408	Lateral ventricle excluding temporal horn R WM	0.62596
468	Inferior frontal gyrus pars opercularis R WM	0.63150
429	Cuneus L WM	0.63183
59	Superior frontal gyrus R Background	0.63356
440	Subgenual frontal cortex R WM	0.63374
449	Insula anterior short gyrus L WM	0.63485
417	Anterior orbital gyrus L WM	0.63489
279	Nucleus accumbens R GM	0.63645
54	Anterior orbital gyrus L Background	0.63775
182	Postcentral gyrus R CSF	0.63972
422	Superior frontal gyrus R WM	0.64026
213	Insula anterior pole L CSF	0.64458
129	Anterior temporal lobe lateral part L CSF	0.64776
471	Inferior frontal gyrus pars triangularis L WM	0.65023
311	Medial orbital gyrus R GM	0.65303
334	Insula anterior pole L GM	0.65901
464	Remainder of cerebral white matter generated R WM	0.65926
396	Angular gyrus R WM	0.66239
436	Posterior orbital gyrus R WM	0.66928
127	Anterior temporal lobe medial part L CSF	0.67148
125	Amygdala L CSF	0.67377
128	Anterior temporal lobe lateral part R CSF	0.67474
183	Sup parietal gyrus L CSF	0.67621
126	Anterior temporal lobe medial part R CSF	0.67727
402	Putamen R WM	0.67837
300	Superior frontal gyrus L GM	0.67943
457	Insula anterior long gyrus L WM	0.68110
52	Straight gyrus L Background	0.68760
339	Midbrain GM	0.68897
155	Caudate nucleus L CSF	0.68929
60	Postcentral gyrus L Background	0.69011
342	Remainder of cerebral white matter generated L GM	0.69017
394	Posterior temporal lobe R WM	0.69101
282	Thalamus L GM	0.69170
317	Substantia nigra R GM	0.69507
153	Angular gyrus L CSF	0.69807
330	Insula middle short gyrus L GM	0.70042
448	Supramarginal gyrus R WM	0.70789
193	Posterior orbital gyrus L CSF	0.71062
107	Inferior frontal gyrus pars triangularis R Background	0.71621
72	Posterior orbital gyrus L Background	0.71658
229	Inferior frontal gyrus pars triangularis L CSF	0.71762
328	Insula anterior short gyrus L GM	0.71937

398	Caudate nucleus R WM	0.72088
283	Thalamus R GM	0.72273
349	Inferior frontal gyrus pars triangularis R GM	0.73290
377	Middle inferior temporal gyrus L WM	0.73613
194	Posterior orbital gyrus R CSF	0.73683
168	Lateral ventricle temporal horn R CSF	0.74106
354	Cerebellum anterior lobe L GM	0.74359
379	Fusiform gyrus L WM	0.74886
264	Lateral remainder occipital lobe L GM	0.74919
270	Middle frontal gyrus L GM	0.75432
335	Insula anterior pole R GM	0.75643
84	Supramarginal gyrus L Background	0.75777
219	Fourth ventricle CSF	0.76315
373	Parahippocampal ambient gyri L WM	0.76390
197	Subgenual frontal cortex L CSF	0.76514
423	Postcentral gyrus L WM	0.76556
343	Remainder of cerebral white matter generated R GM	0.76620
369	Anterior temporal lobe medial part L WM	0.76703
167	Lateral ventricle excluding temporal horn l CSF	0.76767
344	Cerebellum vermis GM	0.77147
450	Insula anterior short gyrus R WM	0.77309
421	Superior frontal gyrus L WM	0.77826
131	Parahippocampal ambient gyri L CSF	0.78102
419	Inferior frontal gyrus pars orbitalis L WM	0.78366
143	Lateral remainder occipital lobe L CSF	0.78626
299	Inferior frontal gyrus pars orbitalis R GM	0.78672
11	Superior temporal gyrus middle part R Background	0.79268
324	Superior temporal gyrus anterior part L GM	0.79387
309	Cuneus R GM	0.79388
288	Lateral ventricle excluding temporal horn l GM	0.79421
407	Corpus callosum WM	0.79441
403	Thalamus L WM	0.79753
357	Cerebellum inferior posterior lobe R GM	0.79851
187	Cuneus L CSF	0.80496
280	Putamen L GM	0.80514
174	Straight gyrus R CSF	0.80580
441	Subcallosal area L WM	0.80930
295	Straight gyrus R GM	0.81015
275	Angular gyrus R GM	0.81327
386	Lateral remainder occipital lobe R WM	0.81413
452	Insula middle short gyrus R WM	0.81470
327	Supramarginal gyrus R GM	0.81774
63	Superior parietal gyrus R Background	0.81786
356	Cerebellum superior posterior lobe L GM	0.82164
404	Thalamus R WM	0.82244
434	Lateral orbital gyrus R WM	0.82269

348	Inferior frontal gyrus pars opercularis L GM	0.82359
147	Posterior cingulate gyrus L CSF	0.83094
307	Lingual gyrus R GM	0.83351
151	Posterior temporal lobe L CSF	0.83749
259	Cerebellum corpus medullare R GM	0.83912
228	Inferior frontal gyrus pars triangularis R CSF	0.84188
294	Straight gyrus L GM	0.84440
424	Postcentral gyrus R WM	0.84496
297	Anterior orbital gyrus R GM	0.84613
445	Superior temporal gyrus anterior part L WM	0.85089
296	Anterior orbital gyrus L GM	0.85442
189	Medial orbital gyrus L CSF	0.85487
323	Pre-subgenual frontal cortex R GM	0.85714
198	Subgenual frontal cortex R CSF	0.85995
134	Middle inferior temporal gyrus R CSF	0.86232
130	Parahippocampal ambient gyri R CSF	0.86465
171	Precentral gyrus L CSF	0.86696
205	Supramarginal gyrus L CSF	0.87058
214	Insula anterior pole R CSF	0.87297
384	Insula posterior long gyrus R WM	0.87372
322	Pre-subgenual frontal cortex L GM	0.87399
204	Superior temporal gyrus anterior part R CSF	0.87593
415	Straight gyrus L WM	0.88094
315	Posterior orbital gyrus R GM	0.88386
211	Insula posterior short gyrus L CSF	0.88397
333	Insula posterior short gyrus R GM	0.88661
236	Cerebellum inferior posterior lobe R CSF	0.89217
350	Inferior frontal gyrus pars triangularis L GM	0.89433
409	Lateral ventricle excluding temporal horn l WM	0.89625
378	Fusiform gyrus R WM	0.89629
383	Insula posterior long gyrus L WM	0.89703
358	Cerebellum inferior posterior lobe L GM	0.90002
0	Background Background	0.90236
215	Insula anterior long gyrus L CSF	0.90715
231	Cerebellum flocculonodular lobe L CSF	0.90920
376	Middle inferior temporal gyrus R WM	0.91290
469	Inferior frontal gyrus pars opercularis L WM	0.91304
312	Lateral orbital gyrus L GM	0.91360
268	Posterior cingulate gyrus L GM	0.91482
439	Subgenual frontal cortex L WM	0.91537
372	Parahippocampal ambient gyri R WM	0.91739
387	Anterior cingulate gyrus L WM	0.91781
85	Supramarginal gyrus R Background	0.91976
319	Subgenual frontal cortex R GM	0.92134
371	Anterior temporal lobe lateral part L WM	0.92196
178	Inferior frontal gyrus pars orbitalis R CSF	0.92300

141	Insula posterior long gyrus L CSF	0.92515
123	Hippocampus L CSF	0.92553
352	Cerebellum flocculonodular lobe L GM	0.92622
274	Angular gyrus L GM	0.93024
135	Middle inferior temporal gyrus L CSF	0.93174
329	Insula anterior short gyrus R GM	0.93282
287	Lateral ventricle excluding temporal horn R GM	0.93756
433	Lateral orbital gyrus L WM	0.93886
435	Posterior orbital gyrus L WM	0.93949
447	Supramarginal gyrus L WM	0.93952
230	Cerebellum flocculonodular lobe R CSF	0.94072
389	Posterior cingulate gyrus L WM	0.94319
277	Caudate nucleus R GM	0.94616
9	Parahippocampal ambient gyri R Background	0.94849
428	Lingual gyrus R WM	0.94958
426	Superior parietal gyrus R WM	0.94980
269	Posterior cingulate gyrus R GM	0.95126
431	Medial orbital gyrus L WM	0.95277
227	Inferior frontal gyrus pars opercularis L CSF	0.95435
124	Amygdala R CSF	0.96356
305	Superior parietal gyrus R GM	0.96535
370	Anterior temporal lobe lateral part R WM	0.96623
347	Inferior frontal gyrus pars opercularis R GM	0.96693
390	Posterior cingulate gyrus R WM	0.96825
148	Posterior cingulate gyrus R CSF	0.96919
173	Straight gyrus L CSF	0.96966
425	Sup parietal gyrus L WM	0.97035
172	Precentral gyrus R CSF	0.97398
61	Postcentral gyrus R Background	0.97512
152	Posterior temporal lobe R CSF	0.97601
149	Middle frontal gyrus L CSF	0.98004
363	Background WM	0.98074
136	Fusiform gyrus R CSF	0.98232
298	Inferior frontal gyrus pars orbitalis L GM	0.98512
192	Lateral orbital gyrus R CSF	0.98683
62	Sup parietal gyrus L Background	0.98821
150	Middle frontal gyrus R CSF	0.99049
96	Medulla oblongata Background	0.99087
397	Caudate nucleus L WM	0.99172
190	Medial orbital gyrus R CSF	0.99442
458	Insula anterior long gyrus R WM	0.99583

A.2 Pr

Table A.2: p-values for exploration group for all regions in the Pr cohort

Label_No	Region	p.value
355	Cerebellum superior posterior lobe R GM	0.00012
309	Cuneus R GM	0.00012
352	Cerebellum flocculonodular lobe L GM	0.00066
351	Cerebellum flocculonodular lobe R GM	0.00082
265	Lateral remainder occipital lobe R GM	0.00093
356	Cerebellum superior posterior lobe L GM	0.00098
246	Amygdala L GM	0.00111
280	Putamen L GM	0.00135
307	Lingual gyrus R GM	0.00141
391	Middle frontal gyrus L WM	0.00146
278	Nucleus accumbens L GM	0.00166
471	Inferior frontal gyrus pars triangularis L WM	0.00166
281	Putamen R GM	0.00354
185	Lingual gyrus L CSF	0.00457
308	Cuneus L GM	0.00527
264	Lateral remainder occipital lobe L GM	0.00543
386	Lateral remainder occipital lobe R WM	0.00604
186	Lingual gyrus R CSF	0.00638
416	Straight gyrus R WM	0.00639
254	Superior temporal gyrus middle part L GM	0.00719
290	Lateral ventricle temporal horn L GM	0.00737
350	Inferior frontal gyrus pars triangularis L GM	0.00779
306	Lingual gyrus L GM	0.00797
362	Piriform cortex L GM	0.00808
316	Substantia nigra L GM	0.00972
344	Cerebellum vermis GM	0.00984
470	Inferior frontal gyrus pars triangularis R WM	0.00996
253	Superior temporal gyrus middle part R GM	0.01022
327	Supramarginal gyrus R GM	0.01029
244	Hippocampus L GM	0.01163
349	Inferior frontal gyrus pars triangularis R GM	0.01218
293	Precentral gyrus R GM	0.01478
182	Postcentral gyrus R CSF	0.01504
338	Medulla oblongata GM	0.01517
144	Lateral remainder occipital lobe R CSF	0.01625
303	Postcentral gyrus R GM	0.01684
138	Cerebellum corpus medullare R CSF	0.01870
202	Pre-subgenual frontal cortex R CSF	0.02051
354	Cerebellum anterior lobe L GM	0.02139
353	Cerebellum anterior lobe R GM	0.02148

339	Midbrain GM	0.02236
201	Pre-subgenual frontal cortex L CSF	0.02290
270	Middle frontal gyrus L GM	0.02456
190	Medial orbital gyrus R CSF	0.02691
377	Middle inferior temporal gyrus L WM	0.03053
427	Lingual gyrus L WM	0.03104
376	Middle inferior temporal gyrus R WM	0.03119
358	Cerebellum inferior posterior lobe L GM	0.03368
357	Cerebellum inferior posterior lobe R GM	0.03406
286	Corpus callosum GM	0.03518
0	Background Background	0.03527
218	Midbrain CSF	0.03799
152	Posterior temporal lobe R CSF	0.03985
325	Superior temporal gyrus anterior part R GM	0.04254
140	Pons CSF	0.04360
283	Thalamus R GM	0.04524
262	Insula posterior long gyrus L GM	0.04527
172	Precentral gyrus R CSF	0.04634
263	Insula posterior long gyrus R GM	0.04715
166	Lateral ventricle excluding temporal horn R CSF	0.04744
206	Supramarginal gyrus R CSF	0.04753
132	Superior temporal gyrus middle part R CSF	0.04785
256	Middle inferior temporal gyrus L GM	0.04976
266	Anterior cingulate gyrus L GM	0.04992
167	Lateral ventricle excluding temporal horn l CSF	0.05132
210	Insula middle short gyrus R CSF	0.05273
292	Precentral gyrus L GM	0.05282
469	Inferior frontal gyrus pars opercularis L WM	0.05528
240	Piriform cortex R CSF	0.05565
187	Cuneus L CSF	0.05640
139	Cerebellum corpus medullare L CSF	0.05881
271	Middle frontal gyrus R GM	0.06347
222	Remainder of cerebral white matter generated R CSF	0.06652
188	Cuneus R CSF	0.07002
153	Angular gyrus L CSF	0.07048
392	Middle frontal gyrus R WM	0.07081
317	Substantia nigra R GM	0.07172
279	Nucleus accumbens R GM	0.07219
361	Piriform cortex R GM	0.07317
302	Postcentral gyrus L GM	0.07471
221	Remainder of cerebral white matter generated L CSF	0.07501
155	Caudate nucleus L CSF	0.08149
181	Postcentral gyrus L CSF	0.08565
396	Angular gyrus R WM	0.08767
383	Insula posterior long gyrus L WM	0.08965
156	Caudate nucleus R CSF	0.09200

199	Subcallosal area L CSF	0.09283
447	Supramarginal gyrus L WM	0.09417
243	Hippocampus R GM	0.09419
446	Superior temporal gyrus anterior part R WM	0.09630
288	Lateral ventricle excluding temporal horn l GM	0.09653
208	Insula anterior short gyrus R CSF	0.09879
424	Postcentral gyrus R WM	0.09918
289	Lateral ventricle temporal horn R GM	0.10372
154	Angular gyrus R CSF	0.10398
170	Third ventricle CSF	0.10536
209	Insula middle short gyrus L CSF	0.10867
220	Cerebral aqueduct CSF	0.10925
241	Piriform cortex L CSF	0.10975
16	Fusiform gyrus L Background	0.11064
385	Lateral remainder occipital lobe L WM	0.11241
176	Anterior orbital gyrus R CSF	0.11282
260	Cerebellum corpus medullare L GM	0.11401
32	Angular gyrus L Background	0.11639
232	Cerebellum anterior lobe R CSF	0.11803
394	Posterior temporal lobe R WM	0.11808
205	Supramarginal gyrus L CSF	0.11885
122	Hippocampus R CSF	0.11951
384	Insula posterior long gyrus R WM	0.11960
215	Insula anterior long gyrus L CSF	0.11994
421	Superior frontal gyrus L WM	0.12022
337	Insula anterior long gyrus R GM	0.12265
145	Anterior cingulate gyrus L CSF	0.12505
175	Anterior orbital gyrus L CSF	0.12533
223	Cerebellum vermis CSF	0.12646
217	Medulla oblongata CSF	0.12841
259	Cerebellum corpus medullare R GM	0.13069
184	Superior parietal gyrus R CSF	0.13071
439	Subgenual frontal cortex L WM	0.13452
407	Corpus callosum WM	0.13664
261	Pons GM	0.13705
198	Subgenual frontal cortex R CSF	0.14510
121	Background CSF	0.14651
285	Pallidum R GM	0.14674
363	Background WM	0.14784
328	Insula anterior short gyrus L GM	0.15289
426	Superior parietal gyrus R WM	0.15472
233	Cerebellum anterior lobe L CSF	0.15634
282	Thalamus L GM	0.15692
136	Fusiform gyrus R CSF	0.15988
373	Parahippocampal ambient gyri L WM	0.16092
273	Posterior temporal lobe R GM	0.16670

276	Caudate nucleus L GM	0.16739
364	Hippocampus R WM	0.17052
390	Posterior cingulate gyrus R WM	0.17207
131	Parahippocampal ambient gyri L CSF	0.17292
267	Anterior cingulate gyrus R GM	0.17388
365	Hippocampus L WM	0.18168
230	Cerebellum flocculonodular lobe R CSF	0.18190
162	Thalamus R CSF	0.18790
231	Cerebellum flocculonodular lobe L CSF	0.19314
397	Caudate nucleus L WM	0.19336
299	Inferior frontal gyrus pars orbitalis R GM	0.19615
216	Insula anterior long gyrus R CSF	0.19796
161	Thalamus L CSF	0.20145
402	Putamen R WM	0.20410
336	Insula anterior long gyrus L GM	0.20491
297	Anterior orbital gyrus R GM	0.20823
151	Posterior temporal lobe L CSF	0.20883
428	Lingual gyrus R WM	0.21393
84	Supramarginal gyrus L Background	0.21568
287	Lateral ventricle excluding temporal horn R GM	0.21644
398	Caudate nucleus R WM	0.21681
422	Superior frontal gyrus R WM	0.21692
482	Piriform cortex R WM	0.22095
326	Supramarginal gyrus L GM	0.22283
31	Posterior temporal lobe R Background	0.22432
250	Anterior temporal lobe lateral part L GM	0.22548
219	Fourth ventricle CSF	0.22734
174	Straight gyrus R CSF	0.23266
440	Subgenual frontal cortex R WM	0.23429
133	Superior temporal gyrus middle part L CSF	0.23566
207	Insula anterior short gyrus L CSF	0.23747
255	Middle inferior temporal gyrus R GM	0.24024
433	Lateral orbital gyrus L WM	0.24226
275	Angular gyrus R GM	0.24416
319	Subgenual frontal cortex R GM	0.25006
436	Posterior orbital gyrus R WM	0.25142
449	Insula anterior short gyrus L WM	0.25787
388	Anterior cingulate gyrus R WM	0.25994
277	Caudate nucleus R GM	0.26287
423	Postcentral gyrus L WM	0.26646
160	Putamen R CSF	0.26815
443	Pre-subgenual frontal cortex L WM	0.27268
313	Lateral orbital gyrus R GM	0.27960
130	Parahippocampal ambient gyri R CSF	0.28085
171	Precentral gyrus L CSF	0.28446
432	Medial orbital gyrus R WM	0.28847

448	Supramarginal gyrus R WM	0.29182
242	Background GM	0.29263
245	Amygdala R GM	0.29624
237	Cerebellum inferior posterior lobe L CSF	0.29910
430	Cuneus R WM	0.30256
165	Corpus callosum CSF	0.30437
15	Fusiform gyrus R Background	0.30882
200	Subcallosal area R CSF	0.30968
192	Lateral orbital gyrus R CSF	0.31378
274	Angular gyrus L GM	0.31440
33	Angular gyrus R Background	0.31507
177	Inferior frontal gyrus pars orbitalis L CSF	0.31555
420	Inferior frontal gyrus pars orbitalis R WM	0.31808
393	Posterior temporal lobe L WM	0.32176
450	Insula anterior short gyrus R WM	0.32260
318	Subgenual frontal cortex L GM	0.32282
348	Inferior frontal gyrus pars opercularis L GM	0.32688
331	Insula middle short gyrus R GM	0.32759
226	Inferior frontal gyrus pars opercularis R CSF	0.33792
183	Sup parietal gyrus L CSF	0.33829
141	Insula posterior long gyrus L CSF	0.34166
406	Pallidum R WM	0.34469
305	Superior parietal gyrus R GM	0.34638
417	Anterior orbital gyrus L WM	0.34651
115	Cerebellum inferior posterior lobe R Background	0.34871
178	Inferior frontal gyrus pars orbitalis R CSF	0.35261
444	Pre-subgenual frontal cortex R WM	0.35544
387	Anterior cingulate gyrus L WM	0.35753
371	Anterior temporal lobe lateral part L WM	0.35956
369	Anterior temporal lobe medial part L WM	0.36033
460	Midbrain WM	0.36974
72	Posterior orbital gyrus L Background	0.37790
413	Precentral gyrus L WM	0.38059
294	Straight gyrus L GM	0.38941
146	Anterior cingulate gyrus R CSF	0.39131
258	Fusiform gyrus L GM	0.39175
194	Posterior orbital gyrus R CSF	0.39388
108	Inferior frontal gyrus pars triangularis L Background	0.39804
147	Posterior cingulate gyrus L CSF	0.40012
123	Hippocampus L CSF	0.40453
459	Medulla oblongata WM	0.40516
53	Straight gyrus R Background	0.40533
395	Angular gyrus L WM	0.40652
269	Posterior cingulate gyrus R GM	0.40979
284	Pallidum L GM	0.41295
169	Lateral ventricle temporal horn L CSF	0.41509

128	Anterior temporal lobe lateral part R CSF	0.42449
312	Lateral orbital gyrus L GM	0.43124
401	Putamen L WM	0.43303
314	Posterior orbital gyrus L GM	0.43969
425	Sup parietal gyrus L WM	0.44747
381	Cerebellum corpus medullare L WM	0.45181
478	Cerebellum inferior posterior lobe R WM	0.45394
60	Postcentral gyrus L Background	0.46312
11	Superior temporal gyrus middle part R Background	0.47169
311	Medial orbital gyrus R GM	0.47241
298	Inferior frontal gyrus pars orbitalis L GM	0.47645
379	Fusiform gyrus L WM	0.48000
409	Lateral ventricle excluding temporal horn l WM	0.48386
173	Straight gyrus L CSF	0.48742
304	Sup parietal gyrus L GM	0.49287
189	Medial orbital gyrus L CSF	0.49920
68	Medial orbital gyrus L Background	0.50088
203	Superior temporal gyrus anterior part L CSF	0.51184
474	Cerebellum anterior lobe R WM	0.51240
330	Insula middle short gyrus L GM	0.51334
126	Anterior temporal lobe medial part R CSF	0.51695
143	Lateral remainder occipital lobe L CSF	0.52100
458	Insula anterior long gyrus R WM	0.52378
322	Pre-subgenual frontal cortex L GM	0.52728
335	Insula anterior pole R GM	0.54885
324	Superior temporal gyrus anterior part L GM	0.55203
51	Precentral gyrus R Background	0.55343
107	Inferior frontal gyrus pars triangularis R Background	0.56104
71	Lateral orbital gyrus R Background	0.56179
29	Middle frontal gyrus R Background	0.56212
408	Lateral ventricle excluding temporal horn R WM	0.56265
434	Lateral orbital gyrus R WM	0.56458
452	Insula middle short gyrus R WM	0.56459
191	Lateral orbital gyrus L CSF	0.56868
197	Subgenual frontal cortex L CSF	0.56968
481	Subthalamic nucleus L WM	0.58204
137	Fusiform gyrus L CSF	0.58464
454	Insula posterior short gyrus R WM	0.58764
370	Anterior temporal lobe lateral part R WM	0.59192
291	Third ventricle GM	0.59492
159	Putamen L CSF	0.59983
346	Mamillary body L GM	0.60317
73	Posterior orbital gyrus R Background	0.60711
124	Amygdala R CSF	0.60829
468	Inferior frontal gyrus pars opercularis R WM	0.60940
473	Cerebellum flocculonodular lobe L WM	0.60991

105	Inferior frontal gyrus pars opercularis R Background	0.61082
58	Superior frontal gyrus L Background	0.61966
14	Middle inferior temporal gyrus L Background	0.62139
66	Cuneus L Background	0.62273
30	Posterior temporal lobe L Background	0.62408
374	Superior temporal gyrus middle part R WM	0.63067
214	Insula anterior pole R CSF	0.63947
480	Subthalamic nucleus R WM	0.64085
57	Inferior frontal gyrus pars orbitalis R Background	0.64833
82	Superior temporal gyrus anterior part L Background	0.65333
234	Cerebellum superior posterior lobe R CSF	0.65602
134	Middle inferior temporal gyrus R CSF	0.65856
453	Insula posterior short gyrus L WM	0.66111
382	Pons WM	0.66208
249	Anterior temporal lobe lateral part R GM	0.66489
63	Superior parietal gyrus R Background	0.66991
180	Superior frontal gyrus R CSF	0.67034
268	Posterior cingulate gyrus L GM	0.67145
380	Cerebellum corpus medullare R WM	0.67163
149	Middle frontal gyrus L CSF	0.67616
23	Lateral remainder occipital lobe R Background	0.67782
403	Thalamus L WM	0.67829
9	Parahippocampal ambient gyri R Background	0.68081
235	Cerebellum superior posterior lobe L CSF	0.68269
435	Posterior orbital gyrus L WM	0.68395
5	Anterior temporal lobe medial part R Background	0.68474
148	Posterior cingulate gyrus R CSF	0.69252
414	Precentral gyrus R WM	0.70539
419	Inferior frontal gyrus pars orbitalis L WM	0.70928
59	Superior frontal gyrus R Background	0.72246
418	Anterior orbital gyrus R WM	0.72491
389	Posterior cingulate gyrus L WM	0.72887
301	Superior frontal gyrus R GM	0.73045
479	Cerebellum inferior posterior lobe L WM	0.73277
300	Superior frontal gyrus L GM	0.73706
451	Insula middle short gyrus L WM	0.74432
475	Cerebellum anterior lobe L WM	0.74689
472	Cerebellum flocculonodular lobe R WM	0.75286
6	Anterior temporal lobe medial part L Background	0.75674
372	Parahippocampal ambient gyri R WM	0.75784
70	Lateral orbital gyrus L Background	0.75812
213	Insula anterior pole L CSF	0.76289
476	Cerebellum superior posterior lobe R WM	0.76441
375	Superior temporal gyrus middle part L WM	0.76991
321	Subcallosal area R GM	0.77148
125	Amygdala L CSF	0.77944

431	Medial orbital gyrus L WM	0.78175
179	Superior frontal gyrus L CSF	0.78562
52	Straight gyrus L Background	0.78851
228	Inferior frontal gyrus pars triangularis R CSF	0.79057
50	Precentral gyrus L Background	0.79110
12	Superior temporal gyrus middle part L Background	0.79194
441	Subcallosal area L WM	0.79316
404	Thalamus R WM	0.79528
340	Fourth ventricle GM	0.79933
464	Remainder of cerebral white matter generated R WM	0.80460
212	Insula posterior short gyrus R CSF	0.80488
83	Superior temporal gyrus anterior part R Background	0.80728
8	Anterior temporal lobe lateral part L Background	0.80827
168	Lateral ventricle temporal horn R CSF	0.81371
272	Posterior temporal lobe L GM	0.81716
295	Straight gyrus R GM	0.82198
343	Remainder of cerebral white matter generated R GM	0.82394
142	Insula posterior long gyrus R CSF	0.82433
438	Substantia nigra R WM	0.82434
347	Inferior frontal gyrus pars opercularis R GM	0.82957
135	Middle inferior temporal gyrus L CSF	0.83367
437	Substantia nigra L WM	0.84495
13	Middle inferior temporal gyrus R Background	0.84757
127	Anterior temporal lobe medial part L CSF	0.84972
251	Parahippocampal ambient gyri R GM	0.85165
445	Superior temporal gyrus anterior part L WM	0.85329
320	Subcallosal area L GM	0.85703
342	Remainder of cerebral white matter generated L GM	0.85850
110	Cerebellum flocculonodular lobe L Background	0.86212
61	Postcentral gyrus R Background	0.86249
85	Supramarginal gyrus R Background	0.86557
229	Inferior frontal gyrus pars triangularis L CSF	0.86961
150	Middle frontal gyrus R CSF	0.87569
323	Pre-subgenual frontal cortex R GM	0.87733
257	Fusiform gyrus R GM	0.87881
22	Lateral remainder occipital lobe L Background	0.87886
333	Insula posterior short gyrus R GM	0.88146
463	Remainder of cerebral white matter generated L WM	0.88325
129	Anterior temporal lobe lateral part L CSF	0.88918
227	Inferior frontal gyrus pars opercularis L CSF	0.89423
236	Cerebellum inferior posterior lobe R CSF	0.89429
442	Subcallosal area R WM	0.89434
96	Medulla oblongata Background	0.89665
332	Insula posterior short gyrus L GM	0.89898
334	Insula anterior pole L GM	0.90051
106	Inferior frontal gyrus pars opercularis L Background	0.90613

54	Anterior orbital gyrus L Background	0.90731
56	Inferior frontal gyrus pars orbitalis L Background	0.90861
109	Cerebellum flocculonodular lobe R Background	0.91028
455	Insula anterior pole L WM	0.91898
28	Middle frontal gyrus L Background	0.91967
296	Anterior orbital gyrus L GM	0.92102
69	Medial orbital gyrus R Background	0.92213
62	Sup parietal gyrus L Background	0.92418
378	Fusiform gyrus R WM	0.92632
211	Insula posterior short gyrus L CSF	0.92928
465	Cerebellum vermis WM	0.93256
310	Medial orbital gyrus L GM	0.93570
345	Mamillary body R GM	0.93887
114	Cerebellum superior posterior lobe L Background	0.94227
368	Anterior temporal lobe medial part R WM	0.94671
7	Anterior temporal lobe lateral part R Background	0.95005
252	Parahippocampal ambient gyri L GM	0.95434
193	Posterior orbital gyrus L CSF	0.95630
204	Superior temporal gyrus anterior part R CSF	0.96238
247	Anterior temporal lobe medial part R GM	0.97067
248	Anterior temporal lobe medial part L GM	0.97115
477	Cerebellum superior posterior lobe L WM	0.97497
329	Insula anterior short gyrus R GM	0.97612
113	Cerebellum superior posterior lobe R Background	0.98413
405	Pallidum L WM	0.98433
315	Posterior orbital gyrus R GM	0.98949
429	Cuneus L WM	0.99446
457	Insula anterior long gyrus L WM	0.99518
116	Cerebellum inferior posterior lobe L Background	0.99518
456	Insula anterior pole R WM	0.99645
415	Straight gyrus L WM	0.99811
55	Anterior orbital gyrus R Background	0.99817

A.3 SWEDD

Table A.3: p-values for exploration group for all regions in the SWEDD cohort

Label_No	Region	p.value
246	Amygdala L GM	0.00041
428	Lingual gyrus R WM	0.00295
162	Thalamus R CSF	0.00306
218	Midbrain CSF	0.00335
222	Remainder of cerebral white matter generated R CSF	0.00453
362	Piriform cortex L GM	0.00457

161	Thalamus L CSF	0.00481
336	Insula anterior long gyrus L GM	0.00590
130	Parahippocampal ambient gyri R CSF	0.00642
221	Remainder of cerebral white matter generated L CSF	0.00667
441	Subcallosal area L WM	0.00976
361	Piriform cortex R GM	0.00981
131	Parahippocampal ambient gyri L CSF	0.01239
140	Pons CSF	0.01545
427	Lingual gyrus L WM	0.01552
244	Hippocampus L GM	0.02482
139	Cerebellum corpus medullare L CSF	0.02611
245	Amygdala R GM	0.02809
416	Straight gyrus R WM	0.02969
278	Nucleus accumbens L GM	0.03095
243	Hippocampus R GM	0.03386
138	Cerebellum corpus medullare R CSF	0.03714
342	Remainder of cerebral white matter generated L GM	0.03827
233	Cerebellum anterior lobe L CSF	0.04062
404	Thalamus R WM	0.04192
338	Medulla oblongata GM	0.04512
279	Nucleus accumbens R GM	0.04573
448	Supramarginal gyrus R WM	0.04596
231	Cerebellum flocculonodular lobe L CSF	0.04597
442	Subcallosal area R WM	0.04981
291	Third ventricle GM	0.05018
285	Pallidum R GM	0.05701
379	Fusiform gyrus L WM	0.05761
230	Cerebellum flocculonodular lobe R CSF	0.05873
385	Lateral remainder occipital lobe L WM	0.05922
261	Pons GM	0.06054
409	Lateral ventricle excluding temporal horn l WM	0.06191
403	Thalamus L WM	0.06236
390	Posterior cingulate gyrus R WM	0.06272
343	Remainder of cerebral white matter generated R GM	0.06294
305	Superior parietal gyrus R GM	0.06406
232	Cerebellum anterior lobe R CSF	0.06524
284	Pallidum L GM	0.06642
306	Lingual gyrus L GM	0.06662
426	Superior parietal gyrus R WM	0.06748
126	Anterior temporal lobe medial part R CSF	0.07849
455	Insula anterior pole L WM	0.07914
143	Lateral remainder occipital lobe L CSF	0.08031
241	Piriform cortex L CSF	0.08049
0	Background Background	0.08119
217	Medulla oblongata CSF	0.08209
262	Insula posterior long gyrus L GM	0.08717

287	Lateral ventricle excluding temporal horn R GM	0.08798
468	Inferior frontal gyrus pars opercularis R WM	0.08892
386	Lateral remainder occipital lobe R WM	0.09087
307	Lingual gyrus R GM	0.09278
345	Mamillary body R GM	0.09696
288	Lateral ventricle excluding temporal horn l GM	0.09967
408	Lateral ventricle excluding temporal horn R WM	0.10078
240	Piriform cortex R CSF	0.10379
401	Putamen L WM	0.10502
286	Corpus callosum GM	0.11124
337	Insula anterior long gyrus R GM	0.11143
248	Anterior temporal lobe medial part L GM	0.11937
447	Supramarginal gyrus L WM	0.12698
156	Caudate nucleus R CSF	0.12856
194	Posterior orbital gyrus R CSF	0.13580
257	Fusiform gyrus R GM	0.13717
136	Fusiform gyrus R CSF	0.13760
85	Supramarginal gyrus R Background	0.14315
192	Lateral orbital gyrus R CSF	0.15122
406	Pallidum R WM	0.15320
464	Remainder of cerebral white matter generated R WM	0.16059
405	Pallidum L WM	0.16352
223	Cerebellum vermis CSF	0.16569
480	Subthalamic nucleus R WM	0.16687
325	Superior temporal gyrus anterior part R GM	0.16813
155	Caudate nucleus L CSF	0.17133
258	Fusiform gyrus L GM	0.17244
127	Anterior temporal lobe medial part L CSF	0.17541
339	Midbrain GM	0.17720
397	Caudate nucleus L WM	0.17913
186	Lingual gyrus R CSF	0.17992
374	Superior temporal gyrus middle part R WM	0.18045
460	Midbrain WM	0.18386
395	Angular gyrus L WM	0.18421
355	Cerebellum superior posterior lobe R GM	0.18648
145	Anterior cingulate gyrus L CSF	0.19067
354	Cerebellum anterior lobe L GM	0.19156
331	Insula middle short gyrus R GM	0.19722
292	Precentral gyrus L GM	0.20039
463	Remainder of cerebral white matter generated L WM	0.20423
165	Corpus callosum CSF	0.20744
176	Anterior orbital gyrus R CSF	0.20895
263	Insula posterior long gyrus R GM	0.21126
387	Anterior cingulate gyrus L WM	0.21382
309	Cuneus R GM	0.22080
274	Angular gyrus L GM	0.22585

437	Substantia nigra L WM	0.22618
293	Precentral gyrus R GM	0.22972
349	Inferior frontal gyrus pars triangularis R GM	0.23249
264	Lateral remainder occipital lobe L GM	0.23297
407	Corpus callosum WM	0.23692
72	Posterior orbital gyrus L Background	0.23723
402	Putamen R WM	0.24338
226	Inferior frontal gyrus pars opercularis R CSF	0.25155
260	Cerebellum corpus medullare L GM	0.25337
321	Subcallosal area R GM	0.25409
179	Superior frontal gyrus L CSF	0.25498
283	Thalamus R GM	0.25641
369	Anterior temporal lobe medial part L WM	0.25758
124	Amygdala R CSF	0.25916
219	Fourth ventricle CSF	0.26081
304	Sup parietal gyrus L GM	0.26466
252	Parahippocampal ambient gyri L GM	0.26713
472	Cerebellum flocculonodular lobe R WM	0.27375
449	Insula anterior short gyrus L WM	0.27695
160	Putamen R CSF	0.28015
175	Anterior orbital gyrus L CSF	0.28106
16	Fusiform gyrus L Background	0.28540
372	Parahippocampal ambient gyri R WM	0.28692
251	Parahippocampal ambient gyri R GM	0.28758
255	Middle inferior temporal gyrus R GM	0.28759
394	Posterior temporal lobe R WM	0.29330
210	Insula middle short gyrus R CSF	0.30287
388	Anterior cingulate gyrus R WM	0.30381
465	Cerebellum vermis WM	0.30404
125	Amygdala L CSF	0.30493
122	Hippocampus R CSF	0.30642
259	Cerebellum corpus medullare R GM	0.31924
389	Posterior cingulate gyrus L WM	0.33026
180	Superior frontal gyrus R CSF	0.33220
420	Inferior frontal gyrus pars orbitalis R WM	0.33250
357	Cerebellum inferior posterior lobe R GM	0.33454
237	Cerebellum inferior posterior lobe L CSF	0.33511
324	Superior temporal gyrus anterior part L GM	0.34151
22	Lateral remainder occipital lobe L Background	0.34252
378	Fusiform gyrus R WM	0.34331
440	Subgenual frontal cortex R WM	0.34336
443	Pre-subgenual frontal cortex L WM	0.34510
211	Insula posterior short gyrus L CSF	0.35393
398	Caudate nucleus R WM	0.35440
351	Cerebellum flocculonodular lobe R GM	0.35722
272	Posterior temporal lobe L GM	0.35733

229	Inferior frontal gyrus pars triangularis L CSF	0.36374
33	Angular gyrus R Background	0.36799
373	Parahippocampal ambient gyri L WM	0.36968
265	Lateral remainder occipital lobe R GM	0.38155
391	Middle frontal gyrus L WM	0.38335
422	Superior frontal gyrus R WM	0.38640
356	Cerebellum superior posterior lobe L GM	0.38822
451	Insula middle short gyrus L WM	0.39204
159	Putamen L CSF	0.39836
220	Cerebral aqueduct CSF	0.40030
326	Supramarginal gyrus L GM	0.40146
475	Cerebellum anterior lobe L WM	0.40294
469	Inferior frontal gyrus pars opercularis L WM	0.40434
269	Posterior cingulate gyrus R GM	0.40454
335	Insula anterior pole R GM	0.40547
208	Insula anterior short gyrus R CSF	0.40591
216	Insula anterior long gyrus R CSF	0.40885
433	Lateral orbital gyrus L WM	0.40886
346	Mamillary body L GM	0.40968
459	Medulla oblongata WM	0.41179
150	Middle frontal gyrus R CSF	0.41585
370	Anterior temporal lobe lateral part R WM	0.41635
62	Sup parietal gyrus L Background	0.41849
347	Inferior frontal gyrus pars opercularis R GM	0.41899
123	Hippocampus L CSF	0.42021
153	Angular gyrus L CSF	0.42223
154	Angular gyrus R CSF	0.42309
297	Anterior orbital gyrus R GM	0.42579
137	Fusiform gyrus L CSF	0.42801
282	Thalamus L GM	0.42973
289	Lateral ventricle temporal horn R GM	0.43549
185	Lingual gyrus L CSF	0.43575
425	Sup parietal gyrus L WM	0.43781
200	Subcallosal area R CSF	0.43884
198	Subgenual frontal cortex R CSF	0.44249
121	Background CSF	0.44651
311	Medial orbital gyrus R GM	0.45016
73	Posterior orbital gyrus R Background	0.45525
421	Superior frontal gyrus L WM	0.45628
30	Posterior temporal lobe L Background	0.46126
456	Insula anterior pole R WM	0.46592
308	Cuneus L GM	0.46594
424	Postcentral gyrus R WM	0.46672
358	Cerebellum inferior posterior lobe L GM	0.46815
396	Angular gyrus R WM	0.46822
327	Supramarginal gyrus R GM	0.47807

317	Substantia nigra R GM	0.47970
377	Middle inferior temporal gyrus L WM	0.48300
273	Posterior temporal lobe R GM	0.48309
383	Insula posterior long gyrus L WM	0.48714
253	Superior temporal gyrus middle part R GM	0.48812
348	Inferior frontal gyrus pars opercularis L GM	0.49522
5	Anterior temporal lobe medial part R Background	0.49601
353	Cerebellum anterior lobe R GM	0.49673
174	Straight gyrus R CSF	0.49711
476	Cerebellum superior posterior lobe R WM	0.50211
96	Medulla oblongata Background	0.50306
209	Insula middle short gyrus L CSF	0.50359
290	Lateral ventricle temporal horn L GM	0.50420
23	Lateral remainder occipital lobe R Background	0.50752
247	Anterior temporal lobe medial part R GM	0.50816
474	Cerebellum anterior lobe R WM	0.51192
170	Third ventricle CSF	0.51260
50	Precentral gyrus L Background	0.51367
167	Lateral ventricle excluding temporal horn l CSF	0.51537
250	Anterior temporal lobe lateral part L GM	0.51616
340	Fourth ventricle GM	0.51935
446	Superior temporal gyrus anterior part R WM	0.52420
6	Anterior temporal lobe medial part L Background	0.53374
193	Posterior orbital gyrus L CSF	0.53761
296	Anterior orbital gyrus L GM	0.53820
197	Subgenual frontal cortex L CSF	0.54223
57	Inferior frontal gyrus pars orbitalis R Background	0.54774
52	Straight gyrus L Background	0.55093
313	Lateral orbital gyrus R GM	0.55411
107	Inferior frontal gyrus pars triangularis R Background	0.55840
109	Cerebellum flocculonodular lobe R Background	0.56129
419	Inferior frontal gyrus pars orbitalis L WM	0.56706
108	Inferior frontal gyrus pars triangularis L Background	0.56840
457	Insula anterior long gyrus L WM	0.57059
144	Lateral remainder occipital lobe R CSF	0.57147
323	Pre-subgenual frontal cortex R GM	0.57332
66	Cuneus L Background	0.57348
69	Medial orbital gyrus R Background	0.57375
199	Subcallosal area L CSF	0.57531
281	Putamen R GM	0.57591
207	Insula anterior short gyrus L CSF	0.57897
178	Inferior frontal gyrus pars orbitalis R CSF	0.57966
215	Insula anterior long gyrus L CSF	0.58139
236	Cerebellum inferior posterior lobe R CSF	0.58222
470	Inferior frontal gyrus pars triangularis R WM	0.58719
173	Straight gyrus L CSF	0.58732

205	Supramarginal gyrus L CSF	0.58761
182	Postcentral gyrus R CSF	0.58784
299	Inferior frontal gyrus pars orbitalis R GM	0.59209
213	Insula anterior pole L CSF	0.59251
271	Middle frontal gyrus R GM	0.59258
134	Middle inferior temporal gyrus R CSF	0.59386
334	Insula anterior pole L GM	0.59624
333	Insula posterior short gyrus R GM	0.59973
9	Parahippocampal ambient gyri R Background	0.60072
452	Insula middle short gyrus R WM	0.60149
166	Lateral ventricle excluding temporal horn R CSF	0.60306
318	Subgenual frontal cortex L GM	0.60819
201	Pre-subgenual frontal cortex L CSF	0.61162
133	Superior temporal gyrus middle part L CSF	0.61249
68	Medial orbital gyrus L Background	0.61254
477	Cerebellum superior posterior lobe L WM	0.61471
382	Pons WM	0.61553
364	Hippocampus R WM	0.61625
206	Supramarginal gyrus R CSF	0.61712
478	Cerebellum inferior posterior lobe R WM	0.62047
268	Posterior cingulate gyrus L GM	0.62285
320	Subcallosal area L GM	0.62317
365	Hippocampus L WM	0.62361
60	Postcentral gyrus L Background	0.62362
184	Superior parietal gyrus R CSF	0.62518
149	Middle frontal gyrus L CSF	0.62793
168	Lateral ventricle temporal horn R CSF	0.62823
190	Medial orbital gyrus R CSF	0.62915
132	Superior temporal gyrus middle part R CSF	0.63051
7	Anterior temporal lobe lateral part R Background	0.63283
453	Insula posterior short gyrus L WM	0.63296
242	Background GM	0.63387
482	Piriform cortex R WM	0.63919
430	Cuneus R WM	0.64219
415	Straight gyrus L WM	0.64552
393	Posterior temporal lobe L WM	0.64555
328	Insula anterior short gyrus L GM	0.64737
436	Posterior orbital gyrus R WM	0.65450
169	Lateral ventricle temporal horn L CSF	0.65831
322	Pre-subgenual frontal cortex L GM	0.66172
115	Cerebellum inferior posterior lobe R Background	0.66984
454	Insula posterior short gyrus R WM	0.67315
55	Anterior orbital gyrus R Background	0.68043
148	Posterior cingulate gyrus R CSF	0.68274
202	Pre-subgenual frontal cortex R CSF	0.68790
129	Anterior temporal lobe lateral part L CSF	0.69057

59	Superior frontal gyrus R Background	0.69854
204	Superior temporal gyrus anterior part R CSF	0.69904
128	Anterior temporal lobe lateral part R CSF	0.69965
314	Posterior orbital gyrus L GM	0.70403
381	Cerebellum corpus medullare L WM	0.71172
479	Cerebellum inferior posterior lobe L WM	0.71195
473	Cerebellum flocculonodular lobe L WM	0.71714
53	Straight gyrus R Background	0.72026
414	Precentral gyrus R WM	0.72070
29	Middle frontal gyrus R Background	0.72539
375	Superior temporal gyrus middle part L WM	0.73280
146	Anterior cingulate gyrus R CSF	0.73315
392	Middle frontal gyrus R WM	0.73740
61	Postcentral gyrus R Background	0.73963
58	Superior frontal gyrus L Background	0.74000
423	Postcentral gyrus L WM	0.74114
31	Posterior temporal lobe R Background	0.74263
380	Cerebellum corpus medullare R WM	0.74296
172	Precentral gyrus R CSF	0.74668
84	Supramarginal gyrus L Background	0.74680
254	Superior temporal gyrus middle part L GM	0.74838
147	Posterior cingulate gyrus L CSF	0.74886
189	Medial orbital gyrus L CSF	0.74958
376	Middle inferior temporal gyrus R WM	0.75224
181	Postcentral gyrus L CSF	0.75230
329	Insula anterior short gyrus R GM	0.75640
302	Postcentral gyrus L GM	0.75690
344	Cerebellum vermis GM	0.75894
301	Superior frontal gyrus R GM	0.76770
371	Anterior temporal lobe lateral part L WM	0.76959
70	Lateral orbital gyrus L Background	0.77132
8	Anterior temporal lobe lateral part L Background	0.77202
11	Superior temporal gyrus middle part R Background	0.77447
249	Anterior temporal lobe lateral part R GM	0.77526
234	Cerebellum superior posterior lobe R CSF	0.77562
275	Angular gyrus R GM	0.78055
54	Anterior orbital gyrus L Background	0.78402
56	Inferior frontal gyrus pars orbitalis L Background	0.78408
12	Superior temporal gyrus middle part L Background	0.78472
431	Medial orbital gyrus L WM	0.78502
295	Straight gyrus R GM	0.78610
445	Superior temporal gyrus anterior part L WM	0.78894
280	Putamen L GM	0.79346
332	Insula posterior short gyrus L GM	0.79825
435	Posterior orbital gyrus L WM	0.79897
188	Cuneus R CSF	0.79914

227	Inferior frontal gyrus pars opercularis L CSF	0.79941
116	Cerebellum inferior posterior lobe L Background	0.79960
228	Inferior frontal gyrus pars triangularis R CSF	0.80075
83	Superior temporal gyrus anterior part R Background	0.80268
135	Middle inferior temporal gyrus L CSF	0.80394
212	Insula posterior short gyrus R CSF	0.80692
187	Cuneus L CSF	0.80695
114	Cerebellum superior posterior lobe L Background	0.81356
439	Subgenual frontal cortex L WM	0.81389
471	Inferior frontal gyrus pars triangularis L WM	0.81637
312	Lateral orbital gyrus L GM	0.82631
294	Straight gyrus L GM	0.82710
235	Cerebellum superior posterior lobe L CSF	0.83016
82	Superior temporal gyrus anterior part L Background	0.83549
417	Anterior orbital gyrus L WM	0.83709
142	Insula posterior long gyrus R CSF	0.83861
14	Middle inferior temporal gyrus L Background	0.84254
110	Cerebellum flocculonodular lobe L Background	0.84581
277	Caudate nucleus R GM	0.85154
330	Insula middle short gyrus L GM	0.85390
266	Anterior cingulate gyrus L GM	0.85465
256	Middle inferior temporal gyrus L GM	0.85733
434	Lateral orbital gyrus R WM	0.86175
32	Angular gyrus L Background	0.86331
298	Inferior frontal gyrus pars orbitalis L GM	0.86432
113	Cerebellum superior posterior lobe R Background	0.86786
450	Insula anterior short gyrus R WM	0.87089
171	Precentral gyrus L CSF	0.87221
15	Fusiform gyrus R Background	0.87735
214	Insula anterior pole R CSF	0.88066
350	Inferior frontal gyrus pars triangularis L GM	0.88106
71	Lateral orbital gyrus R Background	0.88242
481	Subthalamic nucleus L WM	0.88329
13	Middle inferior temporal gyrus R Background	0.89154
267	Anterior cingulate gyrus R GM	0.90497
51	Precentral gyrus R Background	0.90576
300	Superior frontal gyrus L GM	0.90714
106	Inferior frontal gyrus pars opercularis L Background	0.91425
152	Posterior temporal lobe R CSF	0.91459
63	Superior parietal gyrus R Background	0.91501
432	Medial orbital gyrus R WM	0.91619
384	Insula posterior long gyrus R WM	0.92157
319	Subgenual frontal cortex R GM	0.92182
141	Insula posterior long gyrus L CSF	0.92680
183	Sup parietal gyrus L CSF	0.92902
28	Middle frontal gyrus L Background	0.92936

177	Inferior frontal gyrus pars orbitalis L CSF	0.92976
368	Anterior temporal lobe medial part R WM	0.93134
105	Inferior frontal gyrus pars opercularis R Background	0.93436
303	Postcentral gyrus R GM	0.93718
203	Superior temporal gyrus anterior part L CSF	0.94358
429	Cuneus L WM	0.95079
191	Lateral orbital gyrus L CSF	0.95428
316	Substantia nigra L GM	0.95744
438	Substantia nigra R WM	0.97122
315	Posterior orbital gyrus R GM	0.97766
151	Posterior temporal lobe L CSF	0.97999
458	Insula anterior long gyrus R WM	0.98296
276	Caudate nucleus L GM	0.98585
270	Middle frontal gyrus L GM	0.98735
418	Anterior orbital gyrus R WM	0.98995
444	Pre-subgenual frontal cortex R WM	0.99150
310	Medial orbital gyrus L GM	0.99389
413	Precentral gyrus L WM	0.99619
352	Cerebellum flocculonodular lobe L GM	0.99659
363	Background WM	0.99877

A.4 GenPD

Table A.4: p-values for exploration group for all regions in the GenPD cohort

Label_No	Region	p.value
0	Background Background	0.00001
479	Cerebellum inferior posterior lobe L WM	0.00105
185	Lingual gyrus L CSF	0.00574
338	Medulla oblongata GM	0.00700
477	Cerebellum superior posterior lobe L WM	0.00739
376	Middle inferior temporal gyrus R WM	0.00809
416	Straight gyrus R WM	0.00982
337	Insula anterior long gyrus R GM	0.01124
446	Superior temporal gyrus anterior part R WM	0.01137
437	Substantia nigra L WM	0.01340
456	Insula anterior pole R WM	0.01462
286	Corpus callosum GM	0.01532
361	Piriform cortex R GM	0.01737
128	Anterior temporal lobe lateral part R CSF	0.01910
6	Anterior temporal lobe medial part L Background	0.02186
447	Supramarginal gyrus L WM	0.02270
478	Cerebellum inferior posterior lobe R WM	0.02356
433	Lateral orbital gyrus L WM	0.02526

326	Supramarginal gyrus L GM	0.02637
246	Amygdala L GM	0.02869
129	Anterior temporal lobe lateral part L CSF	0.02870
325	Superior temporal gyrus anterior part R GM	0.03173
327	Supramarginal gyrus R GM	0.03818
161	Thalamus L CSF	0.04398
417	Anterior orbital gyrus L WM	0.04402
187	Cuneus L CSF	0.04557
310	Medial orbital gyrus L GM	0.04937
448	Supramarginal gyrus R WM	0.05632
186	Lingual gyrus R CSF	0.05669
178	Inferior frontal gyrus pars orbitalis R CSF	0.05769
188	Cuneus R CSF	0.05821
183	Sup parietal gyrus L CSF	0.05827
336	Insula anterior long gyrus L GM	0.05926
329	Insula anterior short gyrus R GM	0.06054
431	Medial orbital gyrus L WM	0.06142
407	Corpus callosum WM	0.06146
362	Piriform cortex L GM	0.06226
422	Superior frontal gyrus R WM	0.06364
214	Insula anterior pole R CSF	0.06686
419	Inferior frontal gyrus pars orbitalis L WM	0.06964
401	Putamen L WM	0.07021
162	Thalamus R CSF	0.07224
331	Insula middle short gyrus R GM	0.07511
352	Cerebellum flocculonodular lobe L GM	0.07973
402	Putamen R WM	0.07997
191	Lateral orbital gyrus L CSF	0.08001
244	Hippocampus L GM	0.08040
143	Lateral remainder occipital lobe L CSF	0.08103
305	Superior parietal gyrus R GM	0.08321
256	Middle inferior temporal gyrus L GM	0.08535
156	Caudate nucleus R CSF	0.08597
387	Anterior cingulate gyrus L WM	0.09069
218	Midbrain CSF	0.09508
275	Angular gyrus R GM	0.09615
476	Cerebellum superior posterior lobe R WM	0.09847
374	Superior temporal gyrus middle part R WM	0.09950
203	Superior temporal gyrus anterior part L CSF	0.10040
377	Middle inferior temporal gyrus L WM	0.10251
440	Subgenual frontal cortex R WM	0.10411
345	Mamillary body R GM	0.10571
221	Remainder of cerebral white matter generated L CSF	0.10884
170	Third ventricle CSF	0.10892
137	Fusiform gyrus L CSF	0.10952
438	Substantia nigra R WM	0.11053

169	Lateral ventricle temporal horn L CSF	0.11131
436	Posterior orbital gyrus R WM	0.11351
295	Straight gyrus R GM	0.11513
429	Cuneus L WM	0.11586
150	Middle frontal gyrus R CSF	0.11680
255	Middle inferior temporal gyrus R GM	0.11804
243	Hippocampus R GM	0.12134
192	Lateral orbital gyrus R CSF	0.12227
135	Middle inferior temporal gyrus L CSF	0.12425
296	Anterior orbital gyrus L GM	0.12430
270	Middle frontal gyrus L GM	0.12532
274	Angular gyrus L GM	0.12634
450	Insula anterior short gyrus R WM	0.12962
347	Inferior frontal gyrus pars opercularis R GM	0.13061
342	Remainder of cerebral white matter generated L GM	0.13949
323	Pre-subgenual frontal cortex R GM	0.14006
85	Supramarginal gyrus R Background	0.14196
290	Lateral ventricle temporal horn L GM	0.14294
351	Cerebellum flocculonodular lobe R GM	0.15022
432	Medial orbital gyrus R WM	0.15035
268	Posterior cingulate gyrus L GM	0.15138
245	Amygdala R GM	0.15520
303	Postcentral gyrus R GM	0.15736
405	Pallidum L WM	0.15807
180	Superior frontal gyrus R CSF	0.15843
317	Substantia nigra R GM	0.15934
5	Anterior temporal lobe medial part R Background	0.16067
144	Lateral remainder occipital lobe R CSF	0.16168
222	Remainder of cerebral white matter generated R CSF	0.16242
335	Insula anterior pole R GM	0.16504
184	Superior parietal gyrus R CSF	0.16561
413	Precentral gyrus L WM	0.16596
61	Postcentral gyrus R Background	0.16625
481	Subthalamic nucleus L WM	0.16880
455	Insula anterior pole L WM	0.17014
395	Angular gyrus L WM	0.17458
132	Superior temporal gyrus middle part R CSF	0.18108
403	Thalamus L WM	0.18135
14	Middle inferior temporal gyrus L Background	0.18318
126	Anterior temporal lobe medial part R CSF	0.18354
443	Pre-subgenual frontal cortex L WM	0.18501
276	Caudate nucleus L GM	0.18588
389	Posterior cingulate gyrus L WM	0.19690
343	Remainder of cerebral white matter generated R GM	0.20921
141	Insula posterior long gyrus L CSF	0.20989
378	Fusiform gyrus R WM	0.21035

140	Pons CSF	0.21138
152	Posterior temporal lobe R CSF	0.21392
363	Background WM	0.21441
368	Anterior temporal lobe medial part R WM	0.21564
354	Cerebellum anterior lobe L GM	0.22001
442	Subcallosal area R WM	0.22868
194	Posterior orbital gyrus R CSF	0.23348
301	Superior frontal gyrus R GM	0.23427
424	Postcentral gyrus R WM	0.23796
121	Background CSF	0.23894
444	Pre-subgenual frontal cortex R WM	0.23983
155	Caudate nucleus L CSF	0.24335
426	Superior parietal gyrus R WM	0.24389
415	Straight gyrus L WM	0.24435
201	Pre-subgenual frontal cortex L CSF	0.24469
200	Subcallosal area R CSF	0.24487
105	Inferior frontal gyrus pars opercularis R Background	0.24536
210	Insula middle short gyrus R CSF	0.24606
394	Posterior temporal lobe R WM	0.24833
59	Superior frontal gyrus R Background	0.24894
441	Subcallosal area L WM	0.24896
204	Superior temporal gyrus anterior part R CSF	0.24920
263	Insula posterior long gyrus R GM	0.24958
236	Cerebellum inferior posterior lobe R CSF	0.24988
8	Anterior temporal lobe lateral part L Background	0.25018
304	Sup parietal gyrus L GM	0.25155
348	Inferior frontal gyrus pars opercularis L GM	0.25659
30	Posterior temporal lobe L Background	0.26419
231	Cerebellum flocculonodular lobe L CSF	0.26473
469	Inferior frontal gyrus pars opercularis L WM	0.26491
420	Inferior frontal gyrus pars orbitalis R WM	0.26571
181	Postcentral gyrus L CSF	0.26673
393	Posterior temporal lobe L WM	0.26739
269	Posterior cingulate gyrus R GM	0.26786
457	Insula anterior long gyrus L WM	0.26996
175	Anterior orbital gyrus L CSF	0.27027
153	Angular gyrus L CSF	0.27084
217	Medulla oblongata CSF	0.27249
473	Cerebellum flocculonodular lobe L WM	0.27621
391	Middle frontal gyrus L WM	0.27894
344	Cerebellum vermis GM	0.27986
458	Insula anterior long gyrus R WM	0.29197
386	Lateral remainder occipital lobe R WM	0.29228
328	Insula anterior short gyrus L GM	0.30392
409	Lateral ventricle excluding temporal horn l WM	0.30659
123	Hippocampus L CSF	0.31098

237	Cerebellum inferior posterior lobe L CSF	0.31270
472	Cerebellum flocculonodular lobe R WM	0.31327
199	Subcallosal area L CSF	0.31693
285	Pallidum R GM	0.31726
172	Precentral gyrus R CSF	0.32098
404	Thalamus R WM	0.32106
249	Anterior temporal lobe lateral part R GM	0.32187
234	Cerebellum superior posterior lobe R CSF	0.32265
408	Lateral ventricle excluding temporal horn R WM	0.32658
273	Posterior temporal lobe R GM	0.32711
382	Pons WM	0.32931
297	Anterior orbital gyrus R GM	0.33113
396	Angular gyrus R WM	0.33173
414	Precentral gyrus R WM	0.33321
357	Cerebellum inferior posterior lobe R GM	0.33689
242	Background GM	0.34110
480	Subthalamic nucleus R WM	0.34341
300	Superior frontal gyrus L GM	0.34444
58	Superior frontal gyrus L Background	0.34542
319	Subgenual frontal cortex R GM	0.34678
425	Sup parietal gyrus L WM	0.34815
398	Caudate nucleus R WM	0.35070
250	Anterior temporal lobe lateral part L GM	0.35204
340	Fourth ventricle GM	0.35255
333	Insula posterior short gyrus R GM	0.35733
369	Anterior temporal lobe medial part L WM	0.36062
471	Inferior frontal gyrus pars triangularis L WM	0.36686
171	Precentral gyrus L CSF	0.36811
209	Insula middle short gyrus L CSF	0.37006
332	Insula posterior short gyrus L GM	0.37312
320	Subcallosal area L GM	0.37388
430	Cuneus R WM	0.37453
134	Middle inferior temporal gyrus R CSF	0.37494
470	Inferior frontal gyrus pars triangularis R WM	0.37806
383	Insula posterior long gyrus L WM	0.38514
33	Angular gyrus R Background	0.38565
63	Superior parietal gyrus R Background	0.38663
11	Superior temporal gyrus middle part R Background	0.38909
31	Posterior temporal lobe R Background	0.39476
309	Cuneus R GM	0.40303
248	Anterior temporal lobe medial part L GM	0.40303
298	Inferior frontal gyrus pars orbitalis L GM	0.40479
107	Inferior frontal gyrus pars triangularis R Background	0.40937
445	Superior temporal gyrus anterior part L WM	0.41359
165	Corpus callosum CSF	0.41536
257	Fusiform gyrus R GM	0.41634

84	Supramarginal gyrus L Background	0.41770
454	Insula posterior short gyrus R WM	0.41941
166	Lateral ventricle excluding temporal horn R CSF	0.41972
142	Insula posterior long gyrus R CSF	0.42208
60	Postcentral gyrus L Background	0.42536
452	Insula middle short gyrus R WM	0.42720
54	Anterior orbital gyrus L Background	0.42854
322	Pre-subgenual frontal cortex L GM	0.43083
314	Posterior orbital gyrus L GM	0.43550
261	Pons GM	0.43612
215	Insula anterior long gyrus L CSF	0.43769
291	Third ventricle GM	0.43820
205	Supramarginal gyrus L CSF	0.44250
262	Insula posterior long gyrus L GM	0.44255
159	Putamen L CSF	0.44434
271	Middle frontal gyrus R GM	0.44529
160	Putamen R CSF	0.44815
127	Anterior temporal lobe medial part L CSF	0.44836
265	Lateral remainder occipital lobe R GM	0.45040
355	Cerebellum superior posterior lobe R GM	0.45284
385	Lateral remainder occipital lobe L WM	0.45506
381	Cerebellum corpus medullare L WM	0.45641
227	Inferior frontal gyrus pars opercularis L CSF	0.46720
380	Cerebellum corpus medullare R WM	0.46842
358	Cerebellum inferior posterior lobe L GM	0.47235
253	Superior temporal gyrus middle part R GM	0.47558
264	Lateral remainder occipital lobe L GM	0.47563
406	Pallidum R WM	0.47698
216	Insula anterior long gyrus R CSF	0.47901
82	Superior temporal gyrus anterior part L Background	0.48361
349	Inferior frontal gyrus pars triangularis R GM	0.49238
23	Lateral remainder occipital lobe R Background	0.49283
13	Middle inferior temporal gyrus R Background	0.49360
435	Posterior orbital gyrus L WM	0.49402
278	Nucleus accumbens L GM	0.49729
384	Insula posterior long gyrus R WM	0.49909
146	Anterior cingulate gyrus R CSF	0.49998
465	Cerebellum vermis WM	0.50002
294	Straight gyrus L GM	0.50113
212	Insula posterior short gyrus R CSF	0.50114
145	Anterior cingulate gyrus L CSF	0.50310
235	Cerebellum superior posterior lobe L CSF	0.50402
53	Straight gyrus R Background	0.50516
427	Lingual gyrus L WM	0.51009
260	Cerebellum corpus medullare L GM	0.51636
133	Superior temporal gyrus middle part L CSF	0.53856

418	Anterior orbital gyrus R WM	0.54217
62	Sup parietal gyrus L Background	0.54274
334	Insula anterior pole L GM	0.54442
379	Fusiform gyrus L WM	0.54788
277	Caudate nucleus R GM	0.54850
208	Insula anterior short gyrus R CSF	0.54946
283	Thalamus R GM	0.55171
230	Cerebellum flocculonodular lobe R CSF	0.55492
346	Mamillary body L GM	0.55503
356	Cerebellum superior posterior lobe L GM	0.55675
428	Lingual gyrus R WM	0.55738
22	Lateral remainder occipital lobe L Background	0.55935
315	Posterior orbital gyrus R GM	0.56343
136	Fusiform gyrus R CSF	0.57136
449	Insula anterior short gyrus L WM	0.57264
284	Pallidum L GM	0.57436
308	Cuneus L GM	0.57867
228	Inferior frontal gyrus pars triangularis R CSF	0.58104
226	Inferior frontal gyrus pars opercularis R CSF	0.58316
353	Cerebellum anterior lobe R GM	0.58366
439	Subgenual frontal cortex L WM	0.58940
179	Superior frontal gyrus L CSF	0.59045
475	Cerebellum anterior lobe L WM	0.60036
339	Midbrain GM	0.60527
252	Parahippocampal ambient gyri L GM	0.60539
397	Caudate nucleus L WM	0.61384
364	Hippocampus R WM	0.61597
116	Cerebellum inferior posterior lobe L Background	0.61598
306	Lingual gyrus L GM	0.62161
190	Medial orbital gyrus R CSF	0.62236
468	Inferior frontal gyrus pars opercularis R WM	0.62692
7	Anterior temporal lobe lateral part R Background	0.62718
289	Lateral ventricle temporal horn R GM	0.62721
279	Nucleus accumbens R GM	0.62874
390	Posterior cingulate gyrus R WM	0.63663
168	Lateral ventricle temporal horn R CSF	0.63722
50	Precentral gyrus L Background	0.63737
219	Fourth ventricle CSF	0.64562
299	Inferior frontal gyrus pars orbitalis R GM	0.65601
106	Inferior frontal gyrus pars opercularis L Background	0.65876
288	Lateral ventricle excluding temporal horn l GM	0.66115
16	Fusiform gyrus L Background	0.66429
370	Anterior temporal lobe lateral part R WM	0.66651
113	Cerebellum superior posterior lobe R Background	0.67656
372	Parahippocampal ambient gyri R WM	0.67744
55	Anterior orbital gyrus R Background	0.68211

213	Insula anterior pole L CSF	0.69935
198	Subgenual frontal cortex R CSF	0.70209
267	Anterior cingulate gyrus R GM	0.70336
316	Substantia nigra L GM	0.70441
96	Medulla oblongata Background	0.70528
247	Anterior temporal lobe medial part R GM	0.70669
272	Posterior temporal lobe L GM	0.70763
139	Cerebellum corpus medullare L CSF	0.71397
151	Posterior temporal lobe L CSF	0.72064
68	Medial orbital gyrus L Background	0.72181
350	Inferior frontal gyrus pars triangularis L GM	0.72574
421	Superior frontal gyrus L WM	0.72671
388	Anterior cingulate gyrus R WM	0.72701
251	Parahippocampal ambient gyri R GM	0.72762
233	Cerebellum anterior lobe L CSF	0.72928
459	Medulla oblongata WM	0.73475
423	Postcentral gyrus L WM	0.73521
207	Insula anterior short gyrus L CSF	0.73709
223	Cerebellum vermis CSF	0.73885
266	Anterior cingulate gyrus L GM	0.73935
259	Cerebellum corpus medullare R GM	0.74089
373	Parahippocampal ambient gyri L WM	0.74185
232	Cerebellum anterior lobe R CSF	0.74430
281	Putamen R GM	0.74602
211	Insula posterior short gyrus L CSF	0.74655
147	Posterior cingulate gyrus L CSF	0.74658
72	Posterior orbital gyrus L Background	0.74937
167	Lateral ventricle excluding temporal horn l CSF	0.76286
241	Piriform cortex L CSF	0.76302
318	Subgenual frontal cortex L GM	0.76860
312	Lateral orbital gyrus L GM	0.77356
474	Cerebellum anterior lobe R WM	0.77379
451	Insula middle short gyrus L WM	0.78034
189	Medial orbital gyrus L CSF	0.78080
287	Lateral ventricle excluding temporal horn R GM	0.78376
108	Inferior frontal gyrus pars triangularis L Background	0.78465
174	Straight gyrus R CSF	0.78556
324	Superior temporal gyrus anterior part L GM	0.78729
307	Lingual gyrus R GM	0.78825
240	Piriform cortex R CSF	0.79261
176	Anterior orbital gyrus R CSF	0.79554
148	Posterior cingulate gyrus R CSF	0.79698
482	Piriform cortex R WM	0.79886
12	Superior temporal gyrus middle part L Background	0.79928
311	Medial orbital gyrus R GM	0.80164
114	Cerebellum superior posterior lobe L Background	0.80633

51	Precentral gyrus R Background	0.81420
69	Medial orbital gyrus R Background	0.81640
71	Lateral orbital gyrus R Background	0.82206
110	Cerebellum flocculonodular lobe L Background	0.82228
202	Pre-subgenual frontal cortex R CSF	0.82386
293	Precentral gyrus R GM	0.82756
177	Inferior frontal gyrus pars orbitalis L CSF	0.82855
9	Parahippocampal ambient gyri R Background	0.82867
371	Anterior temporal lobe lateral part L WM	0.83033
73	Posterior orbital gyrus R Background	0.83453
125	Amygdala L CSF	0.84033
464	Remainder of cerebral white matter generated R WM	0.84794
292	Precentral gyrus L GM	0.84938
392	Middle frontal gyrus R WM	0.84943
330	Insula middle short gyrus L GM	0.85596
463	Remainder of cerebral white matter generated L WM	0.85728
56	Inferior frontal gyrus pars orbitalis L Background	0.86124
313	Lateral orbital gyrus R GM	0.86303
149	Middle frontal gyrus L CSF	0.86472
229	Inferior frontal gyrus pars triangularis L CSF	0.87664
138	Cerebellum corpus medullare R CSF	0.87716
460	Midbrain WM	0.88105
193	Posterior orbital gyrus L CSF	0.88254
258	Fusiform gyrus L GM	0.88551
321	Subcallosal area R GM	0.88558
115	Cerebellum inferior posterior lobe R Background	0.88783
182	Postcentral gyrus R CSF	0.88865
254	Superior temporal gyrus middle part L GM	0.89001
282	Thalamus L GM	0.89007
66	Cuneus L Background	0.90088
302	Postcentral gyrus L GM	0.90654
52	Straight gyrus L Background	0.90793
154	Angular gyrus R CSF	0.90988
206	Supramarginal gyrus R CSF	0.91477
83	Superior temporal gyrus anterior part R Background	0.91855
131	Parahippocampal ambient gyri L CSF	0.92202
220	Cerebral aqueduct CSF	0.92846
57	Inferior frontal gyrus pars orbitalis R Background	0.94051
122	Hippocampus R CSF	0.94072
124	Amygdala R CSF	0.94355
375	Superior temporal gyrus middle part L WM	0.94633
434	Lateral orbital gyrus R WM	0.94945
280	Putamen L GM	0.95529
453	Insula posterior short gyrus L WM	0.95782
130	Parahippocampal ambient gyri R CSF	0.96136
15	Fusiform gyrus R Background	0.96633

28	Middle frontal gyrus L Background	0.96668
32	Angular gyrus L Background	0.97487
197	Subgenual frontal cortex L CSF	0.97563
29	Middle frontal gyrus R Background	0.98027
365	Hippocampus L WM	0.98994
173	Straight gyrus L CSF	0.99257
70	Lateral orbital gyrus L Background	0.99526
109	Cerebellum flocculonodular lobe R Background	0.99968

A.5 GenUn

Table A.5: p-values for exploration group for all regions in the GenUn cohort

Label_No	Region	p.value
0	Background Background	0.00000
376	Middle inferior temporal gyrus R WM	0.00000
416	Straight gyrus R WM	0.00002
377	Middle inferior temporal gyrus L WM	0.00002
374	Superior temporal gyrus middle part R WM	0.00046
289	Lateral ventricle temporal horn R GM	0.00094
307	Lingual gyrus R GM	0.00095
132	Superior temporal gyrus middle part R CSF	0.00097
345	Mamillary body R GM	0.00102
435	Posterior orbital gyrus L WM	0.00114
440	Subgenual frontal cortex R WM	0.00125
216	Insula anterior long gyrus R CSF	0.00152
133	Superior temporal gyrus middle part L CSF	0.00161
135	Middle inferior temporal gyrus L CSF	0.00164
369	Anterior temporal lobe medial part L WM	0.00188
183	Sup parietal gyrus L CSF	0.00193
169	Lateral ventricle temporal horn L CSF	0.00242
432	Medial orbital gyrus R WM	0.00259
437	Substantia nigra L WM	0.00260
129	Anterior temporal lobe lateral part L CSF	0.00263
425	Sup parietal gyrus L WM	0.00272
215	Insula anterior long gyrus L CSF	0.00284
417	Anterior orbital gyrus L WM	0.00320
469	Inferior frontal gyrus pars opercularis L WM	0.00474
306	Lingual gyrus L GM	0.00489
203	Superior temporal gyrus anterior part L CSF	0.00531
290	Lateral ventricle temporal horn L GM	0.00652
178	Inferior frontal gyrus pars orbitalis R CSF	0.00652
426	Superior parietal gyrus R WM	0.00716

123	Hippocampus L CSF	0.00905
479	Cerebellum inferior posterior lobe L WM	0.00927
152	Posterior temporal lobe R CSF	0.00954
370	Anterior temporal lobe lateral part R WM	0.00960
143	Lateral remainder occipital lobe L CSF	0.01092
427	Lingual gyrus L WM	0.01214
431	Medial orbital gyrus L WM	0.01331
142	Insula posterior long gyrus R CSF	0.01374
227	Inferior frontal gyrus pars opercularis L CSF	0.01390
477	Cerebellum superior posterior lobe L WM	0.01390
309	Cuneus R GM	0.01392
445	Superior temporal gyrus anterior part L WM	0.01462
439	Subgenual frontal cortex L WM	0.01481
254	Superior temporal gyrus middle part L GM	0.01671
153	Angular gyrus L CSF	0.01850
420	Inferior frontal gyrus pars orbitalis R WM	0.01886
229	Inferior frontal gyrus pars triangularis L CSF	0.01937
279	Nucleus accumbens R GM	0.02035
415	Straight gyrus L WM	0.02216
429	Cuneus L WM	0.02245
473	Cerebellum flocculonodular lobe L WM	0.02259
134	Middle inferior temporal gyrus R CSF	0.02771
308	Cuneus L GM	0.02932
210	Insula middle short gyrus R CSF	0.02976
387	Anterior cingulate gyrus L WM	0.03021
187	Cuneus L CSF	0.03026
368	Anterior temporal lobe medial part R WM	0.03262
6	Anterior temporal lobe medial part L Background	0.03266
272	Posterior temporal lobe L GM	0.03361
433	Lateral orbital gyrus L WM	0.03416
188	Cuneus R CSF	0.03473
141	Insula posterior long gyrus L CSF	0.03489
422	Superior frontal gyrus R WM	0.03538
288	Lateral ventricle excluding temporal horn l GM	0.03747
471	Inferior frontal gyrus pars triangularis L WM	0.04003
414	Precentral gyrus R WM	0.04046
331	Insula middle short gyrus R GM	0.04275
338	Medulla oblongata GM	0.04354
185	Lingual gyrus L CSF	0.04504
128	Anterior temporal lobe lateral part R CSF	0.04816
207	Insula anterior short gyrus L CSF	0.04901
177	Inferior frontal gyrus pars orbitalis L CSF	0.05002
200	Subcallosal area R CSF	0.05103
478	Cerebellum inferior posterior lobe R WM	0.05180
320	Subcallosal area L GM	0.05251
351	Cerebellum flocculonodular lobe R GM	0.06159

398	Caudate nucleus R WM	0.06160
443	Pre-subgenual frontal cortex L WM	0.06190
191	Lateral orbital gyrus L CSF	0.06272
206	Supramarginal gyrus R CSF	0.06290
397	Caudate nucleus L WM	0.06445
204	Superior temporal gyrus anterior part R CSF	0.06562
481	Subthalamic nucleus L WM	0.06929
319	Subgenual frontal cortex R GM	0.06984
390	Posterior cingulate gyrus R WM	0.07024
223	Cerebellum vermis CSF	0.07082
394	Posterior temporal lobe R WM	0.07438
212	Insula posterior short gyrus R CSF	0.07500
405	Pallidum L WM	0.07532
137	Fusiform gyrus L CSF	0.08113
287	Lateral ventricle excluding temporal horn R GM	0.08208
214	Insula anterior pole R CSF	0.08660
383	Insula posterior long gyrus L WM	0.08791
209	Insula middle short gyrus L CSF	0.09214
353	Cerebellum anterior lobe R GM	0.09395
371	Anterior temporal lobe lateral part L WM	0.09574
322	Pre-subgenual frontal cortex L GM	0.09576
344	Cerebellum vermis GM	0.09626
424	Postcentral gyrus R WM	0.09668
302	Postcentral gyrus L GM	0.10019
363	Background WM	0.10060
226	Inferior frontal gyrus pars opercularis R CSF	0.10353
184	Superior parietal gyrus R CSF	0.10483
276	Caudate nucleus L GM	0.10598
194	Posterior orbital gyrus R CSF	0.10928
375	Superior temporal gyrus middle part L WM	0.10964
168	Lateral ventricle temporal horn R CSF	0.11308
419	Inferior frontal gyrus pars orbitalis L WM	0.11644
373	Parahippocampal ambient gyri L WM	0.11800
442	Subcallosal area R WM	0.11924
131	Parahippocampal ambient gyri L CSF	0.12054
465	Cerebellum vermis WM	0.12142
328	Insula anterior short gyrus L GM	0.12350
192	Lateral orbital gyrus R CSF	0.12420
434	Lateral orbital gyrus R WM	0.12431
208	Insula anterior short gyrus R CSF	0.12709
438	Substantia nigra R WM	0.12769
476	Cerebellum superior posterior lobe R WM	0.12980
121	Background CSF	0.13139
323	Pre-subgenual frontal cortex R GM	0.13218
202	Pre-subgenual frontal cortex R CSF	0.13240
122	Hippocampus R CSF	0.13347

8	Anterior temporal lobe lateral part L Background	0.13402
335	Insula anterior pole R GM	0.13590
130	Parahippocampal ambient gyri R CSF	0.14209
234	Cerebellum superior posterior lobe R CSF	0.15276
389	Posterior cingulate gyrus L WM	0.15948
423	Postcentral gyrus L WM	0.17163
136	Fusiform gyrus R CSF	0.17591
396	Angular gyrus R WM	0.17727
337	Insula anterior long gyrus R GM	0.17925
352	Cerebellum flocculonodular lobe L GM	0.18074
441	Subcallosal area L WM	0.18598
449	Insula anterior short gyrus L WM	0.18803
211	Insula posterior short gyrus L CSF	0.18819
180	Superior frontal gyrus R CSF	0.19075
146	Anterior cingulate gyrus R CSF	0.19088
401	Putamen L WM	0.19130
228	Inferior frontal gyrus pars triangularis R CSF	0.19345
312	Lateral orbital gyrus L GM	0.19374
156	Caudate nucleus R CSF	0.19495
218	Midbrain CSF	0.20202
199	Subcallosal area L CSF	0.20246
248	Anterior temporal lobe medial part L GM	0.20423
391	Middle frontal gyrus L WM	0.20676
278	Nucleus accumbens L GM	0.20875
406	Pallidum R WM	0.20976
408	Lateral ventricle excluding temporal horn R WM	0.20985
346	Mamillary body L GM	0.21037
190	Medial orbital gyrus R CSF	0.22171
233	Cerebellum anterior lobe L CSF	0.22503
106	Inferior frontal gyrus pars opercularis L Background	0.22504
12	Superior temporal gyrus middle part L Background	0.22570
418	Anterior orbital gyrus R WM	0.22598
82	Superior temporal gyrus anterior part L Background	0.22868
349	Inferior frontal gyrus pars triangularis R GM	0.23333
327	Supramarginal gyrus R GM	0.23501
475	Cerebellum anterior lobe L WM	0.23552
159	Putamen L CSF	0.23575
413	Precentral gyrus L WM	0.23633
259	Cerebellum corpus medullare R GM	0.23660
357	Cerebellum inferior posterior lobe R GM	0.23895
409	Lateral ventricle excluding temporal horn l WM	0.24166
463	Remainder of cerebral white matter generated L WM	0.24189
456	Insula anterior pole R WM	0.24922
393	Posterior temporal lobe L WM	0.25560
161	Thalamus L CSF	0.25605
407	Corpus callosum WM	0.25703

14	Middle inferior temporal gyrus L Background	0.25742
147	Posterior cingulate gyrus L CSF	0.25769
266	Anterior cingulate gyrus L GM	0.26202
372	Parahippocampal ambient gyri R WM	0.26699
384	Insula posterior long gyrus R WM	0.26808
273	Posterior temporal lobe R GM	0.26936
358	Cerebellum inferior posterior lobe L GM	0.27213
265	Lateral remainder occipital lobe R GM	0.27935
447	Supramarginal gyrus L WM	0.28353
472	Cerebellum flocculonodular lobe R WM	0.28755
336	Insula anterior long gyrus L GM	0.28777
96	Medulla oblongata Background	0.29363
286	Corpus callosum GM	0.29445
85	Supramarginal gyrus R Background	0.29994
54	Anterior orbital gyrus L Background	0.30043
171	Precentral gyrus L CSF	0.30101
468	Inferior frontal gyrus pars opercularis R WM	0.30113
277	Caudate nucleus R GM	0.30825
140	Pons CSF	0.31355
72	Posterior orbital gyrus L Background	0.31821
446	Superior temporal gyrus anterior part R WM	0.32059
7	Anterior temporal lobe lateral part R Background	0.32115
166	Lateral ventricle excluding temporal horn R CSF	0.32412
219	Fourth ventricle CSF	0.33147
246	Amygdala L GM	0.33365
326	Supramarginal gyrus L GM	0.33374
13	Middle inferior temporal gyrus R Background	0.33459
315	Posterior orbital gyrus R GM	0.34218
193	Posterior orbital gyrus L CSF	0.34476
470	Inferior frontal gyrus pars triangularis R WM	0.34796
264	Lateral remainder occipital lobe L GM	0.34821
217	Medulla oblongata CSF	0.34957
31	Posterior temporal lobe R Background	0.35033
340	Fourth ventricle GM	0.35259
333	Insula posterior short gyrus R GM	0.35277
311	Medial orbital gyrus R GM	0.35349
113	Cerebellum superior posterior lobe R Background	0.35433
174	Straight gyrus R CSF	0.35665
299	Inferior frontal gyrus pars orbitalis R GM	0.35901
162	Thalamus R CSF	0.36134
5	Anterior temporal lobe medial part R Background	0.36279
421	Superior frontal gyrus L WM	0.36300
403	Thalamus L WM	0.36636
167	Lateral ventricle excluding temporal horn l CSF	0.36847
11	Superior temporal gyrus middle part R Background	0.36921
52	Straight gyrus L Background	0.37372

249	Anterior temporal lobe lateral part R GM	0.37627
107	Inferior frontal gyrus pars triangularis R Background	0.37941
321	Subcallosal area R GM	0.38158
292	Precentral gyrus L GM	0.38361
350	Inferior frontal gyrus pars triangularis L GM	0.38541
453	Insula posterior short gyrus L WM	0.38706
232	Cerebellum anterior lobe R CSF	0.38921
175	Anterior orbital gyrus L CSF	0.39270
281	Putamen R GM	0.39434
189	Medial orbital gyrus L CSF	0.39548
295	Straight gyrus R GM	0.39615
448	Supramarginal gyrus R WM	0.39805
342	Remainder of cerebral white matter generated L GM	0.40440
125	Amygdala L CSF	0.41841
58	Superior frontal gyrus L Background	0.42122
280	Putamen L GM	0.42199
155	Caudate nucleus L CSF	0.42218
83	Superior temporal gyrus anterior part R Background	0.43276
182	Postcentral gyrus R CSF	0.43500
339	Midbrain GM	0.44027
32	Angular gyrus L Background	0.44193
139	Cerebellum corpus medullare L CSF	0.44586
160	Putamen R CSF	0.45221
59	Superior frontal gyrus R Background	0.45518
388	Anterior cingulate gyrus R WM	0.45906
149	Middle frontal gyrus L CSF	0.46298
244	Hippocampus L GM	0.46324
251	Parahippocampal ambient gyri R GM	0.46492
382	Pons WM	0.46668
325	Superior temporal gyrus anterior part R GM	0.46819
300	Superior frontal gyrus L GM	0.46905
84	Supramarginal gyrus L Background	0.46965
458	Insula anterior long gyrus R WM	0.47183
444	Pre-subgenual frontal cortex R WM	0.47733
330	Insula middle short gyrus L GM	0.47759
255	Middle inferior temporal gyrus R GM	0.48218
262	Insula posterior long gyrus L GM	0.48341
170	Third ventricle CSF	0.48798
270	Middle frontal gyrus L GM	0.49603
482	Piriform cortex R WM	0.50119
15	Fusiform gyrus R Background	0.50359
256	Middle inferior temporal gyrus L GM	0.50376
354	Cerebellum anterior lobe L GM	0.51378
386	Lateral remainder occipital lobe R WM	0.51490
457	Insula anterior long gyrus L WM	0.51781
172	Precentral gyrus R CSF	0.52907

110	Cerebellum flocculonodular lobe L Background	0.53064
242	Background GM	0.53577
271	Middle frontal gyrus R GM	0.53797
201	Pre-subgenual frontal cortex L CSF	0.54483
303	Postcentral gyrus R GM	0.55312
126	Anterior temporal lobe medial part R CSF	0.55383
314	Posterior orbital gyrus L GM	0.55406
310	Medial orbital gyrus L GM	0.55875
464	Remainder of cerebral white matter generated R WM	0.55882
231	Cerebellum flocculonodular lobe L CSF	0.56018
380	Cerebellum corpus medullare R WM	0.56065
127	Anterior temporal lobe medial part L CSF	0.56530
347	Inferior frontal gyrus pars opercularis R GM	0.57161
452	Insula middle short gyrus R WM	0.57534
252	Parahippocampal ambient gyri L GM	0.57547
108	Inferior frontal gyrus pars triangularis L Background	0.57605
334	Insula anterior pole L GM	0.58195
53	Straight gyrus R Background	0.58383
474	Cerebellum anterior lobe R WM	0.58798
364	Hippocampus R WM	0.59102
317	Substantia nigra R GM	0.59264
392	Middle frontal gyrus R WM	0.60188
247	Anterior temporal lobe medial part R GM	0.61671
28	Middle frontal gyrus L Background	0.61787
291	Third ventricle GM	0.61892
253	Superior temporal gyrus middle part R GM	0.62917
294	Straight gyrus L GM	0.63506
221	Remainder of cerebral white matter generated L CSF	0.63687
261	Pons GM	0.66094
274	Angular gyrus L GM	0.66341
304	Sup parietal gyrus L GM	0.66423
296	Anterior orbital gyrus L GM	0.66555
402	Putamen R WM	0.66564
66	Cuneus L Background	0.66797
459	Medulla oblongata WM	0.67039
460	Midbrain WM	0.67761
23	Lateral remainder occipital lobe R Background	0.67843
62	Sup parietal gyrus L Background	0.67858
455	Insula anterior pole L WM	0.68300
57	Inferior frontal gyrus pars orbitalis R Background	0.69942
56	Inferior frontal gyrus pars orbitalis L Background	0.70100
450	Insula anterior short gyrus R WM	0.70345
356	Cerebellum superior posterior lobe L GM	0.70712
260	Cerebellum corpus medullare L GM	0.71051
29	Middle frontal gyrus R Background	0.71516
55	Anterior orbital gyrus R Background	0.71532

165	Corpus callosum CSF	0.72598
124	Amygdala R CSF	0.72668
348	Inferior frontal gyrus pars opercularis L GM	0.72673
361	Piriform cortex R GM	0.72820
365	Hippocampus L WM	0.72900
197	Subgenual frontal cortex L CSF	0.73362
379	Fusiform gyrus L WM	0.73569
283	Thalamus R GM	0.73604
148	Posterior cingulate gyrus R CSF	0.74274
297	Anterior orbital gyrus R GM	0.74476
258	Fusiform gyrus L GM	0.75069
275	Angular gyrus R GM	0.75825
145	Anterior cingulate gyrus L CSF	0.76356
240	Piriform cortex R CSF	0.76636
69	Medial orbital gyrus R Background	0.77169
318	Subgenual frontal cortex L GM	0.77617
378	Fusiform gyrus R WM	0.77958
154	Angular gyrus R CSF	0.78166
16	Fusiform gyrus L Background	0.78298
385	Lateral remainder occipital lobe L WM	0.78568
235	Cerebellum superior posterior lobe L CSF	0.78751
105	Inferior frontal gyrus pars opercularis R Background	0.79040
293	Precentral gyrus R GM	0.79205
50	Precentral gyrus L Background	0.79689
430	Cuneus R WM	0.80329
236	Cerebellum inferior posterior lobe R CSF	0.80404
381	Cerebellum corpus medullare L WM	0.81316
176	Anterior orbital gyrus R CSF	0.81702
269	Posterior cingulate gyrus R GM	0.81903
301	Superior frontal gyrus R GM	0.82358
179	Superior frontal gyrus L CSF	0.82366
241	Piriform cortex L CSF	0.82420
68	Medial orbital gyrus L Background	0.83075
436	Posterior orbital gyrus R WM	0.83516
395	Angular gyrus L WM	0.83600
268	Posterior cingulate gyrus L GM	0.83696
282	Thalamus L GM	0.84002
213	Insula anterior pole L CSF	0.84151
329	Insula anterior short gyrus R GM	0.84224
355	Cerebellum superior posterior lobe R GM	0.84517
186	Lingual gyrus R CSF	0.84690
150	Middle frontal gyrus R CSF	0.84994
181	Postcentral gyrus L CSF	0.85274
144	Lateral remainder occipital lobe R CSF	0.85728
245	Amygdala R GM	0.85749
313	Lateral orbital gyrus R GM	0.85849

220	Cerebral aqueduct CSF	0.85902
51	Precentral gyrus R Background	0.86019
284	Pallidum L GM	0.86204
257	Fusiform gyrus R GM	0.86404
454	Insula posterior short gyrus R WM	0.86440
305	Superior parietal gyrus R GM	0.86622
205	Supramarginal gyrus L CSF	0.86992
60	Postcentral gyrus L Background	0.87108
109	Cerebellum flocculonodular lobe R Background	0.87134
343	Remainder of cerebral white matter generated R GM	0.87352
114	Cerebellum superior posterior lobe L Background	0.88112
30	Posterior temporal lobe L Background	0.88514
324	Superior temporal gyrus anterior part L GM	0.89162
198	Subgenual frontal cortex R CSF	0.89476
263	Insula posterior long gyrus R GM	0.90354
33	Angular gyrus R Background	0.90681
404	Thalamus R WM	0.90906
267	Anterior cingulate gyrus R GM	0.91111
71	Lateral orbital gyrus R Background	0.91521
9	Parahippocampal ambient gyri R Background	0.92251
298	Inferior frontal gyrus pars orbitalis L GM	0.92259
316	Substantia nigra L GM	0.92380
237	Cerebellum inferior posterior lobe L CSF	0.92400
115	Cerebellum inferior posterior lobe R Background	0.92442
70	Lateral orbital gyrus L Background	0.92475
116	Cerebellum inferior posterior lobe L Background	0.93338
480	Subthalamic nucleus R WM	0.93907
73	Posterior orbital gyrus R Background	0.94285
362	Piriform cortex L GM	0.94716
61	Postcentral gyrus R Background	0.96456
243	Hippocampus R GM	0.97123
173	Straight gyrus L CSF	0.97187
285	Pallidum R GM	0.97446
428	Lingual gyrus R WM	0.97581
151	Posterior temporal lobe L CSF	0.97857
332	Insula posterior short gyrus L GM	0.97991
138	Cerebellum corpus medullare R CSF	0.98002
22	Lateral remainder occipital lobe L Background	0.98211
222	Remainder of cerebral white matter generated R CSF	0.98423
230	Cerebellum flocculonodular lobe R CSF	0.98515
250	Anterior temporal lobe lateral part L GM	0.98580
451	Insula middle short gyrus L WM	0.98654
63	Superior parietal gyrus R Background	0.98896

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