

# Supplementary Materials

## Learning to Estimate the Fiber Orientation Distribution Function from Diffusion-Weighted MRI

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### 1 Detailed expert tractography scores

Tables S1 to S3 below show the detailed scores assigned by the three experts to 8 different tracts on the tractograms from 17 test subjects from the dHCP dataset.

Subject No.	Method	CNG	IFOF	UF	FF	CST	AC	FST	MCP	total
Subject 1	Proposed	3	2	2	3	3	3	3	3	22
	SFM	2	1	1	1	3	2	2	3	15
Subject 2	Proposed	3	3	3	3	3	2	3	3	23
	SFM	2	1	2	1	2	2	2	3	15
Subject 3	Proposed	2	3	3	3	3	3	3	3	23
	SFM	1	2	2	2	3	2	2	2	16
Subject 4	Proposed	3	3	3	3	3	3	3	2	23
	SFM	2	2	1	2	2	2	3	1	15
Subject 5	Proposed	3	3	1	3	3	3	3	3	22
	SFM	1	2	1	2	1	3	1	1	12
Subject 6	Proposed	3	3	2	3	3	3	3	3	23
	SFM	1	1	2	2	2	2	2	3	15
Subject 7	Proposed	3	3	2	2	3	3	3	2	21
	SFM	2	1	1	1	2	3	3	1	14
Subject 8	Proposed	3	3	2	2	2	3	3	3	21
	SFM	2	1	1	1	2	3	2	2	14
Subject 9	Proposed	3	3	2	3	3	3	3	3	23
	SFM	3	2	1	1	2	2	2	2	15
Subject 10	Proposed	2	2	1	1	3	2	3	2	16
	SFM	1	1	1	2	3	2	2	2	14
Subject 11	Proposed	2	3	2	2	2	2	3	2	18
	SFM	1	2	1	1	2	2	3	1	13
Subject 12	Proposed	3	3	3	3	3	2	3	3	23
	SFM	3	3	2	2	3	2	2	2	19
Subject 13	Proposed	1	3	3	2	2	3	3	3	20
	SFM	2	3	3	1	2	3	3	2	19
Subject 14	Proposed	3	3	1	3	1	2	3	2	18
	SFM	3	1	1	2	2	1	2	1	13
Subject 15	Proposed	3	3	1	2	2	3	3	3	20
	SFM	2	2	1	3	2	3	3	2	18
Subject 16	Proposed	3	3	3	3	3	3	3	2	23
	SFM	3	2	2	3	3	3	3	1	20
Subject 17	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	3	3	2	2	2	2	2	18

Table S1: Detailed scores from Expert 1.

CNG: Cingulum, IFOF: Inferior fronto-occipital fasciculus, UF: Uncinate fasciculus, FF: Frontopontine fibers, CST: Corticospinal tract, AC: Anterior Commissure, FST: Fornix and striae terminalis, MCP: Middle Cerebellar Peduncles, total: sum of the scores for the eight tracts.

Subject No.	Method	CNG	IFOF	UF	FF	CST	AC	FST	MCP	total
Subject 1	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	1	2	2	2	2	15
Subject 2	Proposed	3	2	2	2	3	2	3	3	20
	SFM	2	1	1	1	2	2	2	3	14
Subject 3	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 4	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 5	Proposed	3	3	2	3	2	3	3	3	22
	SFM	2	2	2	1	2	3	2	2	16
Subject 6	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	2	2	16
Subject 7	Proposed	3	3	2	2	2	3	3	2	20
	SFM	2	2	2	1	2	2	2	1	14
Subject 8	Proposed	3	3	3	2	3	2	3	3	22
	SFM	2	1	1	1	2	2	2	2	13
Subject 9	Proposed	3	2	3	3	3	3	3	3	23
	SFM	3	1	2	1	2	2	2	2	15
Subject 10	Proposed	3	3	1	2	3	2	3	2	19
	SFM	2	2	1	1	2	2	2	2	14
Subject 11	Proposed	3	3	3	2	3	2	3	3	22
	SFM	2	2	1	2	2	2	3	2	16
Subject 12	Proposed	3	3	3	2	3	2	3	2	21
	SFM	2	2	2	2	3	2	2	2	17
Subject 13	Proposed	2	2	3	2	2	2	3	3	19
	SFM	2	2	2	2	2	2	3	2	17
Subject 14	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	2	2	16
Subject 15	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	3	2	17
Subject 16	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 17	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	3	2	2	2	2	2	17

Table S2: Detailed scores from Expert 2.

CNG: Cingulum, IFOF: Inferior fronto-occipital fasciculus, UF: Uncinate fasciculus, FF: Frontopontine fibers, CST: Corticospinal tract, AC: Anterior Commissure, FST: Fornix and striae terminalis, MCP: Middle Cerebellar Peduncles, total: sum of the scores for the eight tracts.

Subject No.	Method	CNG	IFOF	UF	FF	CST	AC	FST	MCP	total
Subject 1	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	1	2	2	2	2	15
Subject 2	Proposed	3	2	2	2	3	2	3	3	20
	SFM	2	1	1	1	2	2	2	3	14
Subject 3	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 4	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 5	Proposed	3	3	2	3	2	3	3	3	22
	SFM	2	2	2	1	2	3	2	2	16
Subject 6	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	2	2	16
Subject 7	Proposed	3	3	2	2	2	3	3	2	20
	SFM	2	2	2	1	2	2	2	1	14
Subject 8	Proposed	3	3	3	2	3	2	3	3	22
	SFM	2	1	1	1	2	2	2	2	13
Subject 9	Proposed	3	2	3	3	3	3	3	3	23
	SFM	3	1	2	1	2	2	2	2	15
Subject 10	Proposed	3	3	1	2	3	2	3	2	19
	SFM	2	2	1	1	2	2	2	2	14
Subject 11	Proposed	3	3	3	2	3	2	3	3	22
	SFM	2	2	1	2	2	2	3	2	16
Subject 12	Proposed	3	3	3	2	3	2	3	2	21
	SFM	2	2	2	2	3	2	2	2	17
Subject 13	Proposed	2	2	3	2	2	2	3	3	19
	SFM	2	2	2	2	2	2	3	2	17
Subject 14	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	2	2	16
Subject 15	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	2	2	2	2	3	2	17
Subject 16	Proposed	3	3	3	3	3	3	3	3	24
	SFM	2	2	2	2	2	2	2	2	16
Subject 17	Proposed	3	3	2	3	3	3	3	3	23
	SFM	2	2	3	2	2	2	2	2	17

Table S3: Detailed scores from Expert 3.

CNG: Cingulum, IFOF: Inferior fronto-occipital fasciculus, UF: Uncinate fasciculus, FF: Frontopontine fibers, CST: Corticospinal tract, AC: Anterior Commissure, FST: Fornix and striae terminalis, MCP: Middle Cerebellar Peduncles, total: sum of the scores for the eight tracts.

Table S4 shows the results of Wilcoxon signed-rank statistical significance tests to compare the scores assigned to the tracts generated by the proposed method and SFM.

Tract	Expert 1	Expert 2	Expert 3
Cingulum	+1	+1	+1
Inferior fronto-occipital fasciculus	+1	+1	+1
Uncinate fasciculus	+1	0	0
Frontopontine fibers	+1	+1	+1
Corticospinal tract	0	+1	+1
Anterior Commissure	0	+1	0
Fornix and striae terminalis	+1	+1	0
Middle Cerebellar Penducles	+1	+1	+1
total (sum of the scores for the eight tracts)	+1	+1	+1

Table S4: Results of statistical significance tests with Wilcoxon signed-rank test to compare the scores assigned to individual tracts for the proposed method and SFM. “+1” indicates that the score received by the proposed method was significantly higher than SFM at  $p = 0.01$ . “0” indicates that the two methods were not different at  $p = 0.01$ .