Our experience with BIDS conversion of fMRI data

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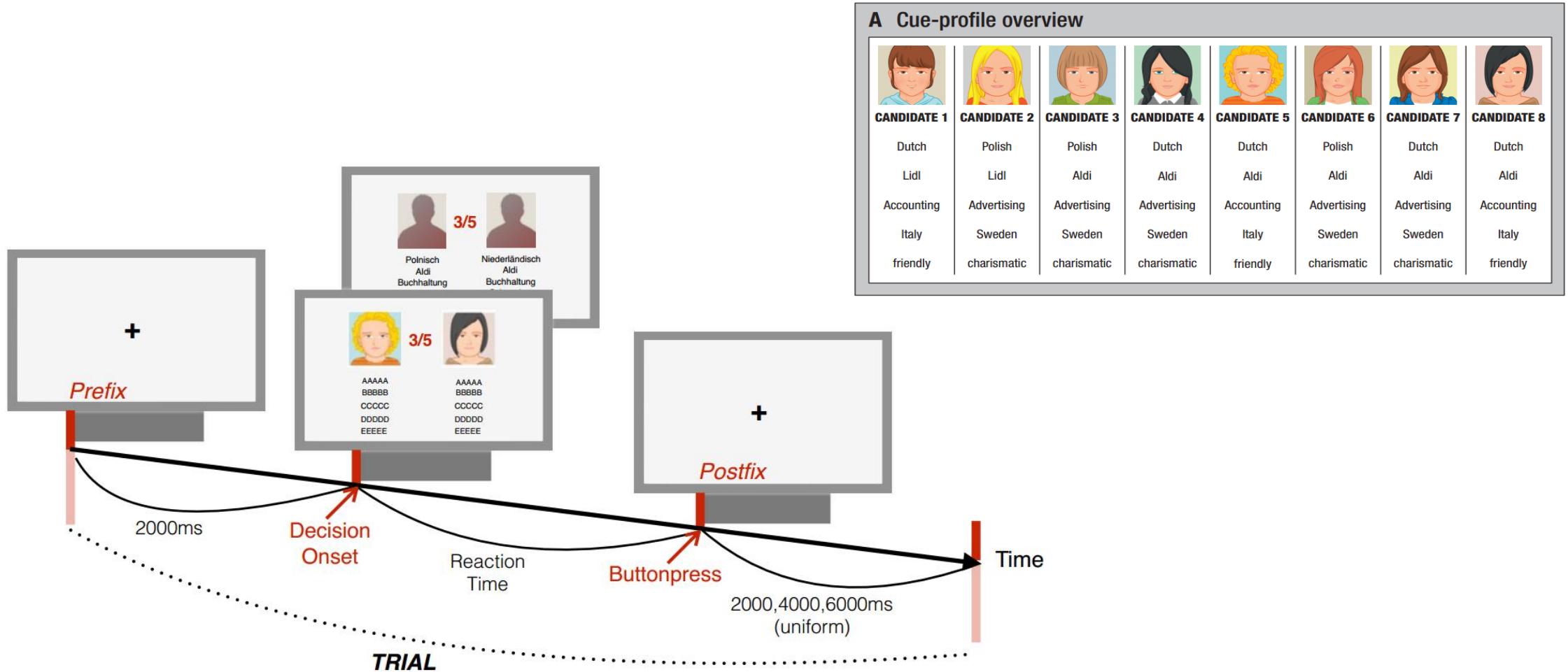
Freie Universität Berlin

Project Goals

Convert raw data according to BIDS (1.02) format

Plan and run preprocessing, first and second level GLM

Write a DataSet report*
(Intro, Methods, Data records and Technical validation)
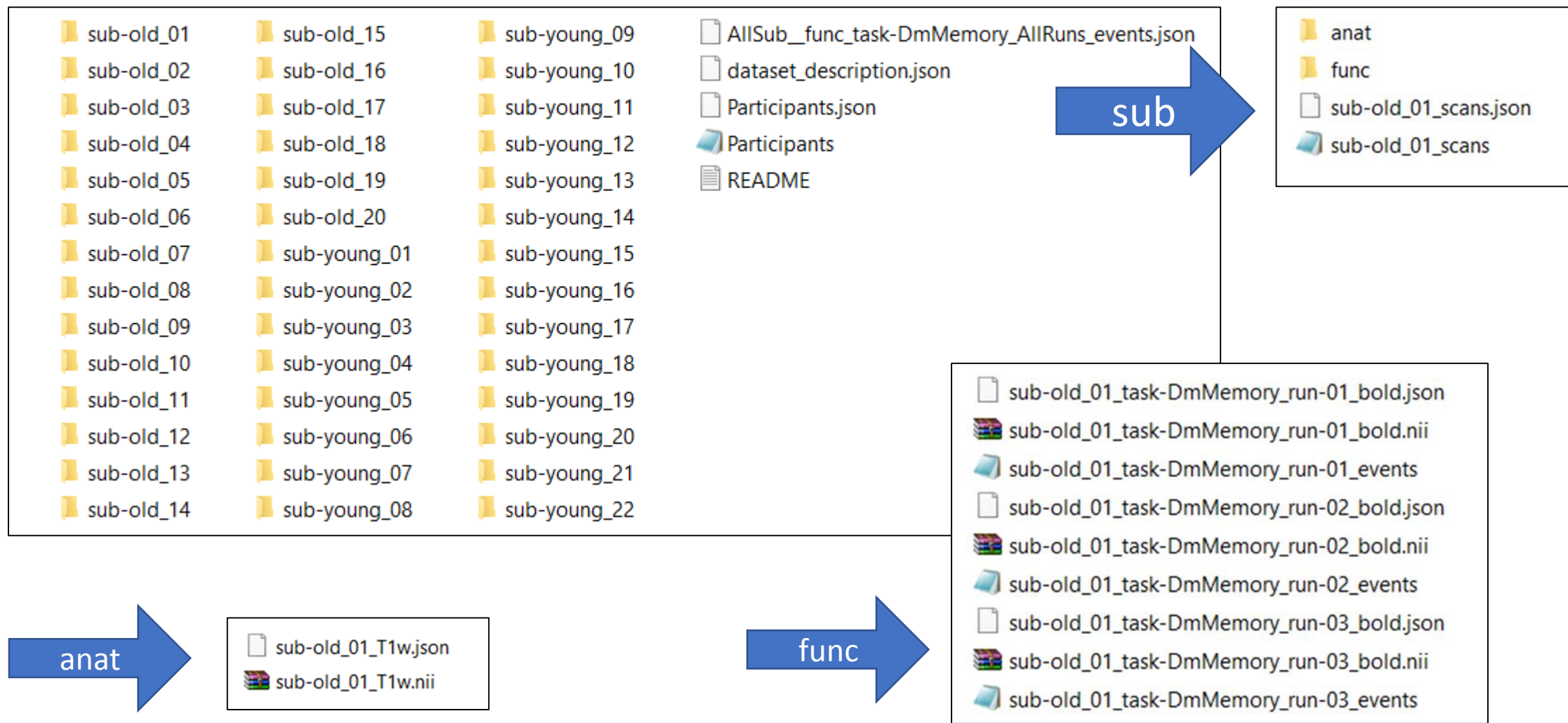
Publish DataSet paper (open science)

*Wakeman D. G. & Henson R. N., 2015
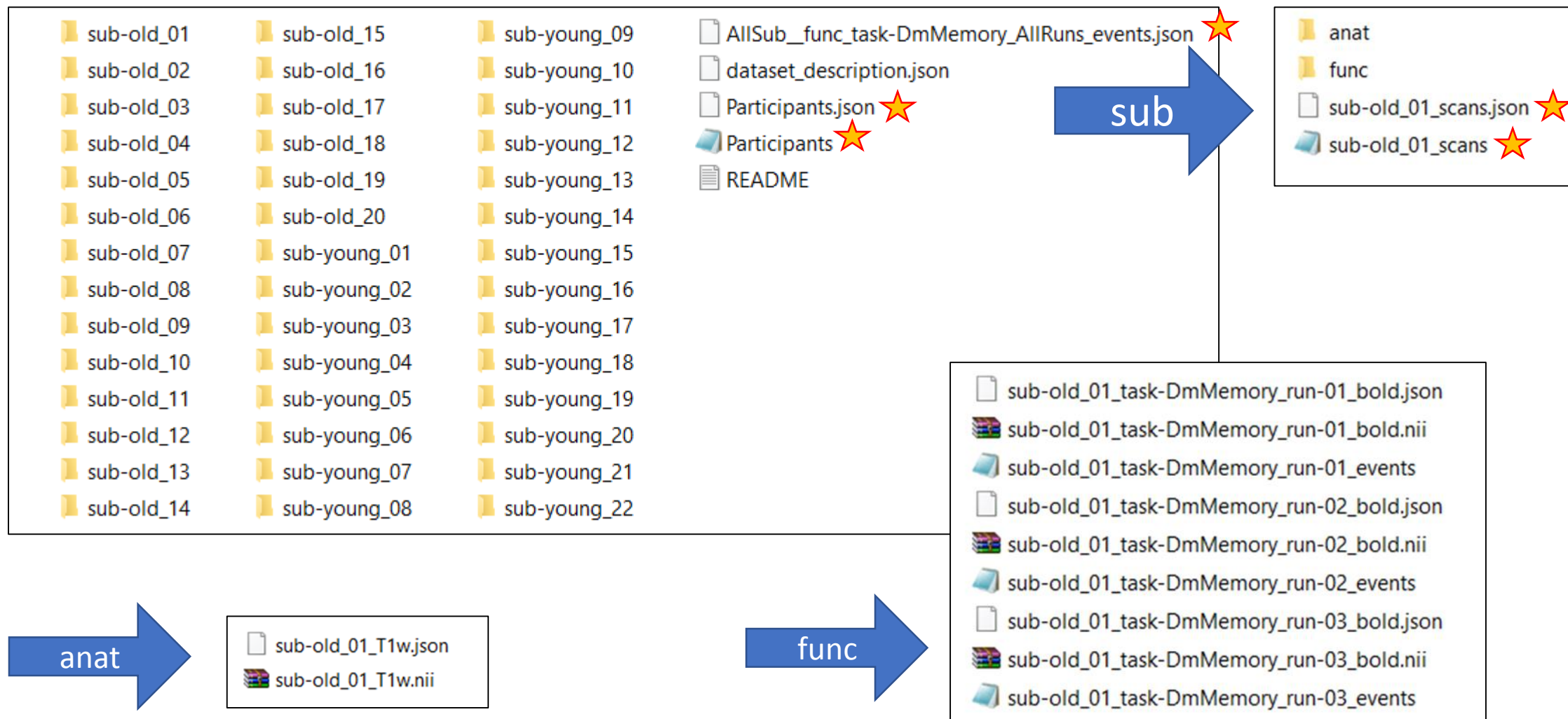
The data

Brain Imaging Data Structure (BIDS)

"Lack of consensus (or a standard) leads to misunderstandings and time wasted on rearranging data or rewriting scripts expecting certain structure…" (http://bids.neuroimaging.io/)

- Source data versus Derived data

- Compulsory and Optional aspects

- Inheritance principle

BIDS

Folder structure

📁 sub-old_01	📁 sub-old_15	📁 sub-young_09	📄 AllSub_func_task-DmMemory_AllRuns_events.json
📁 sub-old_02	📁 sub-old_16	📁 sub-young_10	📄 dataset_description.json
📁 sub-old_03	📁 sub-old_17	📁 sub-young_11	📄 Participants.json
📁 sub-old_04	📁 sub-old_18	📁 sub-young_12	📄 Participants
📁 sub-old_05	📁 sub-old_19	📁 sub-young_13	📄 README
📁 sub-old_06	📁 sub-old_20	📁 sub-young_14	
📁 sub-old_07	📁 sub-young_01	📁 sub-young_15	
📁 sub-old_08	📁 sub-young_02	📁 sub-young_16	
📁 sub-old_09	📁 sub-young_03	📁 sub-young_17	
📁 sub-old_10	📁 sub-young_04	📁 sub-young_18	
📁 sub-old_11	📁 sub-young_05	📁 sub-young_19	
📁 sub-old_12	📁 sub-young_06	📁 sub-young_20	
📁 sub-old_13	📁 sub-young_07	📁 sub-young_21	
📁 sub-old_14	📁 sub-young_08	📁 sub-young_22	

sub →
- 📁 anat
- 📁 func
- 📄 sub-old_01_scans.json
- 📄 sub-old_01_scans

anat →
- 📄 sub-old_01_T1w.json
- 📄 sub-old_01_T1w.nii

func →
- 📄 sub-old_01_task-DmMemory_run-01_bold.json
- 📄 sub-old_01_task-DmMemory_run-01_bold.nii
- 📄 sub-old_01_task-DmMemory_run-01_events
- 📄 sub-old_01_task-DmMemory_run-02_bold.json
- 📄 sub-old_01_task-DmMemory_run-02_bold.nii
- 📄 sub-old_01_task-DmMemory_run-02_events
- 📄 sub-old_01_task-DmMemory_run-03_bold.json
- 📄 sub-old_01_task-DmMemory_run-03_bold.nii
- 📄 sub-old_01_task-DmMemory_run-03_events

BIDS

Folder structure

BIDS

JSON files

sub-young_01_task-memory_run-01_bold.json ✕ +

```
1    {"RepetitionTime":2,"TaskName":"Memory"}
```

sub-young_01_task-DmMemory_run-01_bold.json ✕ +

```
1    {
2      "NiftiCreator": "dicm2nii.m 20170720",
3      "SeriesNumber": 4,
4      "ImageType": "ORIGINAL\\PRIMARY\\M\\ND\\NORM\\MOSAIC",
5      "Modality": "MR",
6      "AcquisitionDateTime": "1795-11-27T15:57:41",
7      "TotalReadoutTime": 0.072959915,
8      "SliceTiming": [1.0025,0,1.0575,0.055,1.115,0.11,1.17,0.165,1.225
9      "RepetitionTime": 2,
10     "PhaseEncodingDirection": "y-",
11     "EffectiveEchoSpacing": 0.00028499967,
12     "EchoTime": 0.03,
13     "SliceThickness": 3,
14     "FlipAngle": 80,
15     "Manufacturer": "SIEMENS",
16     "SoftwareVersion": "syngo MR B17",
17     "MRAcquisitionType": "2D",
18     "InstitutionName": "MPI for Human Development",
19     "InstitutionAddress": "Lentzallee 94,Berlin,District,DE,14195",
20     "DeviceSerialNumber": "35453",
21     "ScanningSequence": "EP",
22     "SequenceVariant": "SK",
23     "ScanOptions": "FS",
24     "SequenceName": "*epfid2d1_72",
25     "ParticipantSex": "F",
26     "ParticipantAge": "27",
27     "ParticipantSize": 1.73,
28     "ParticipantWeight": 60,
29     "ParticipantPosition": "HFS",
30     "TaskName": "DmMemory",
```

BIDS awareness right from the start!

1. Proper documentation
   I. Experimental conditions in .json files
   II. Problems while acquiring data
   III. **Naming of Runs**
       (Scanner input is converted to the .json file)

2. Folder structure during scanning

3. Field Input (units)

4. Field names

Special thanks

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