Part 1 of Onboarding Challenge:

Task: *Go through BIDS Input directory and determine Contents, purpose, and relationship to other files*

HNU_1

- BIDS is designed to standardize and describe raw data (DICOM files).
- sub-0025429_ses-1_run-1_T1w.nii.gz T1 weighted anatomical scan (resource 8.3).
- sub-0025429_ses-1_task-rest_run-1_bold.nii.gz Task imaging data. This is imaging data acquired during BOLD imaging, which includes resting state fMRI (resource 8.4).
- BOLD (Blood oxygenation level dependent) imaging is standard technique to generate images in fMRI studies. Relies on regional differences in cerebral blood flow to delineate regional activity. (Resource)

Site-SI

- sub-NDARAD481FXF_T1w.nii.gz weighted anatomical scan.
- sub-NDARAD481FXF_magnitude1.nii.gz
- sub-NDARAD481FXF_magnitude2.nii.gz
- sub-NDARAD481FXF_phasediff.nii.gz
    - These are fieldmap data files, which is required to correct inhomogeneities. There are 4 different scenarios where fieldmap data can come in. in this scenario, is if one phasediff image with 2 magnitude images (common output for build in fieldmap sequence on Siemens scanners). (Resource 8.9.1)
    - These files have corresponding JSON files that describe its corresponding image.
- sub-NDARAD481FXF_task-rest_bold.nii.gz Task imaging data. This is imaging data acquired during BOLD imaging, which includes resting state fMRI.
    - This file has a corresponding JSON file. A JSON file is required for this task rest data (unlike HNU_1) because information on Phase Encoding Direction is required for this file when using fieldmap data. (Resource 8.4)

CPAC Output Directory

Cpac-preproc - ANAT

- sub-0025429_ses-1_desc-brain_T1w.nii.gz anatomical brain. Skull stripped and output of brain extraction brain in anatomical space. Direct output of brain extraction (Resource and report.rst for nii_desc-brain_T1w_48)
- sub-0025429_ses-1_desc-preproc_T1w.nii.gz anatomical reorient. Deobliqued, reoriented whole-head anatomical scan. Result of anatomical segmentation. From working directory anat_reorient (Resource and report.rst for nii_desc-preproc_T1w_43)
- sub-0025429_ses-1_desc-reorient_T1w.nii.gz anatomical reorient. Deobliqued, reoriented whole-head anatomical scan. Result of anatomical segmentation. From working directory anat_reorient. Same as desc-preproc_T1w.nii.gz (Resource and report.rst for nii_desc-reorient_T1w_44)

- sub-0025429_ses-1_dseg-axial-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_from-T1w_to-template_mode-image_desc-linear_xfm.nii.gz ants affine xfm. Linear affine warp from anatomical space to template space (Resource). Comes from ANTS_T1_to_template_49/write_compostie_linear_xfm.
- sub-0025429_ses-1_from-T1w_to-template_mode-image_desc-nonlinear_xfm.nii.gz anatomical to mni nonlinear xfm. Nonlinear warp transform from anatomical space to template space. In this case, using antsRegistration (saw by going to command.txt) Same as transfrom3Warp.nii.gz.
- sub-0025429_ses-1_from-T1w_to-template_mode-image_xfm.nii.gz ants initial xfm (?). warp from anatomical to template space. Difference between this and linear_xfm is that this file uses transfrom3Warp.nii.gz as transform in command.
- sub-0025429_ses-1_from-template_to-T1w_mode-image_desc-linear_xfm.nii.gz inverse of T1w_to-template_mode-image_desc-linear_xfm.nii.gz. comes from ANTS_T1_to_template_49/write_compostie_invlinear_xfm.
- sub-0025429_ses-1_from-template_to-T1w_mode-image_desc-nonlinear_xfm.nii.gz inverse of T1w_to-template_mode-image_desc-nonlinear_xfm. Same as transfrom3InverseWarp.nii.gz file from /anat_mni_ants_register/calc_ants_warp/.
- sub-0025429_ses-1_from-template_to-T1w_mode-image_xfm.nii.gz inverse of from-T1w_to-template_mode-image_xfm. Same command, but the files in transform tag are applied in reverse compared to from- T1w_to-template_mode-image_xfm. (seen from report.rst)
- sub-0025429_ses-1_label-CSF_desc-preproc_mask.nii.gz overlap of CSF mask with warp segment tissue prior. From CSF_75/overlap_CSF_75_map_with_prior/segment_seg_0_maths.nii.gz.
- sub-0025429_ses-1_label-CSF_mask.nii.gz binary mask of CSF in anatomical space. Result of anatomical segmentation. From /segment_75/segment_seg_0.nii.gz (Resource)
- sub-0025429_ses-1_label-CSF_probseg.nii.gz Probability map from CSF segmentation. Comes from /segment_75/segment_prob_0.nii.gz.
- sub-0025429_ses-1_label-GM_desc-preproc_mask.nii.gz overlap of GM mask with warp segment tissue prior. From GM_75/overlap_GM_75_map_with_prior/segment_seg_1_maths.nii.gz.
- sub-0025429_ses-1_label-GM_mask.nii.gz binary mask of grey matter in anatomical space. Result of anatomical segmentation. Comes from /segment_75/segment_seg_1.nii.gz (Resource).
- sub-0025429_ses-1_label-GM_probseg.nii.gz Probability map from GM segmentation. Comes from /segment_75/segment_prob_1.nii.gz.
- sub-0025429_ses-1_label-WM_desc-preproc_mask.nii.gz overlap of WM mask with warp segment tissue prior. From CSF_75/overlap_CSF_75_map_with_prior/segment_seg_2_maths.nii.gz.

- sub-0025429_ses-1_label-WM_mask.nii.gz binary mask of white matter in anatomical space. Result of anatomical segmentation. From /segment_75/segment_seg_2.nii.gz (Resource)
- sub-0025429_ses-1_label-WM_probseg.nii.gz Probability map from WM segmentation. Comes from /segment_75/segment_prob_2.nii.gz.
- sub-0025429_ses-1_space-T1w_desc-brain_mask.nii.gz brain mask from anat_skullstrip_43/sub-0025429_ses-1_run-1_T1w_resample_skullstrip_calc.nii.gz. Calculated version of sub-0025429_ses-1_run-1_T1w_resample_skullstrip with logical operation to mask 3D volume against criteria. (from report.rst)
- sub-0025429_ses-1_space-template_desc-brain_T1w.nii.gz anatomical to standard. anatomical whole head scan warped to standard/template. (Resource). Comes from /anat_mni_ants_register/calc_ants_warp/transform_Warped.nii.gz
- sub-0025429_ses-1_space-template_label-CSF_mask.nii.gz CSF mask warped to template space. Template used for transformation is MNI152_T1_2mm_resample.nii.gz
- sub-0025429_ses-1_space-template_label-GM_mask.nii.gz GM mask warped to template space. Template used for transformation is MNI152_T1_2mm_resample.nii.gz
- sub-0025429_ses-1_space-template_label-WM_mask.nii.gz WM mask warped to template space. Template used for transformation is MNI152_T1_2mm_resample.nii.gz
- *All of these image files have a corresponding JSON file. JSON files provide information about the sources needed for that node.*

Cpac-preproc – FUNC

- sub-0025429_ses-1_task-rest_run-1_bold-snr-axial-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_bold-snr-hist-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_bold-snr-sagittal-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_desc-1_regressors.1D 1D file of nuisance regressors after bandpass filtering. From node /filtering_bold_default_183/_scan_rest_run-1/frequency_filter/regressor_bandpassed_demeaned_filtered.1D (from report.rst)
- sub-0025429_ses-1_task-rest_run-1_desc-2_regressors.1D 1D file of nuisance regressors with no GSR after bandpass filtering. From node /filtering_bold_defaultNoGSR_183/_scan_rest_run-1/frequency_filter/regressor_bandpassed_demeaned_filtered.1D (from report.rst)
- sub-0025429_ses-1_task-rest_run-1_desc-mean_bold.nii.gz functional mean of reoriented image. (from report.rst)
- sub-0025429_ses-1_task-rest_run-1_desc-preproc-1_bold.nii.gz time series image after nuisance regressor and bandpass filtering. warped to template space. This case, it is nuisance regressor with GSR. (from report.rst)

- sub-0025429_ses-1_task-rest_run-1_desc-preproc-2_bold.nii.gz time series image after nuisance regressor and bandpass filtering. warped to template space. This case, it is nuisance regressor without GSR. (from report.rst)
- sub-0025429_ses-1_task-rest_run-1_dvars.1D 1D file of motion stats DVARS. DVARS is the spatial root mean square of the data after temporal differencing. Comes from dvars_strip.1D. (Resource)
- sub-0025429_ses-1_task-rest_run-1_framewise-displacement-jenkinson-plot-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_framewise-displacement-jenkinson.1D 1D file of motion stats FD_J. FD_J measure indexes the movement of the head from one volume to the next calculated via Jenkinson (Resource). FD_J assumes the brain to be a sphere (radius = 80mm), but differs in that it takes into account variations in head motion among voxels prior to integrating over the sphere (Resource)
- sub-0025429_ses-1_task-rest_run-1_framewise-displacement-power.1D FD_P measure indexes the movement of the head from one volume to the next calculated via Power. (Resource) Assumes that all voxels undergo equivalent displacements along a sphere (radius = 50mm) in response to a given rotation (Resource)
- sub-0025429_ses-1_task-rest_run-1_from-bold_to-T1w_mode-image_desc-linear_xfm.mat matrix file of mean bold image after bbreg. Functional to anatomical space linear transform. FSL_FLIRT format (Resource)
- sub-0025429_ses-1_task-rest_run-1_from-bold_to-template_mode-image_xfm.nii.gz functional to standard transform. Data from native functional bold to template space. (Resource)
- sub-0025429_ses-1_task-rest_run-1_from-template_to-bold_mode-image_xfm.nii.gz inverse transform. From template space to native functional bold.
- sub-0025429_ses-1_task-rest_run-1_max-displacement.1D 1D file of motion statistics maximum displacement. Displacement causes prolonged shifts in signal intensity (resource).
- sub-0025429_ses-1_task-rest_run-1_motion-params.txt Text file containing the single-value max or mean numbers of each head motion parameter/measure. (resource)
- sub-0025429_ses-1_task-rest_run-1_movement-parameters-rot-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_movement-parameters-trans-qc.png PNG image files of all QC interface montages, graphs, and charts. (Resource)
- sub-0025429_ses-1_task-rest_run-1_movement-parameters.1D same as motion-params.txt but as a 1D file.
- sub-0025429_ses-1_task-rest_run-1_power-params.txt contains MeanFD_Power, MeanFD_jenkinson, rootMeanSqaureFD, FDquantile(top1/4thFD), MeanDVARS calculations. (5 values total)
- sub-0025429_ses-1_task-rest_run-1_space-bold_desc-brain_mask.nii.gz binary mask of brain in functional space. (Resource)

- sub-0025429_ses-1_task-rest_run-1_space-T1w_desc-mean_bold.nii.gz image file of mean bold image after bbreg in anatomical space. The matrix file corresponding to this file is from-bold_to-T1w_mode-image_desc-linear_xfm.mat.
- sub-0025429_ses-1_task-rest_run-1_space-template_desc-bold_mask.nii.gz binary mask of functional space brain warped to standard template space. (Resource).
- sub-0025429_ses-1_task-rest_run-1_space-template_desc-mean_bold.nii.gz mean functional (one volume 3D file of functional scan) warped to standard template space. (Resource).
- sub-0025429_ses-1_task-rest_run-1_space-template_desc-preproc-1_bold.nii.gz functional timeseries warped to standard template space. 4D timeseries. This time series corresponds to the first nuisance regressor output with GSR (Resource).

sub-0025429_ses-1_task-rest_run-1_space-template_desc-preproc-2_bold.nii.gz functional timeseries warped to standard template space. 4D timeseries. This time series corresponds to the second nuisance regressor output without GSR (Resource).