Human Brain Project

Co-funded by the European Union

THE MEDICAL INFORMATICS PLATFORM

MIP User Guide

How to Select the Variables - 1

You can access the variables available in the MIP at any time by clicking on the "variables" button in the upper banner

1

2

The left panel presents all the variables available for the selected " use case " , here the " use case dementia ".

They are grouped by theme and each theme is represented by a circle . Here we have the circle which represents the anatomical data

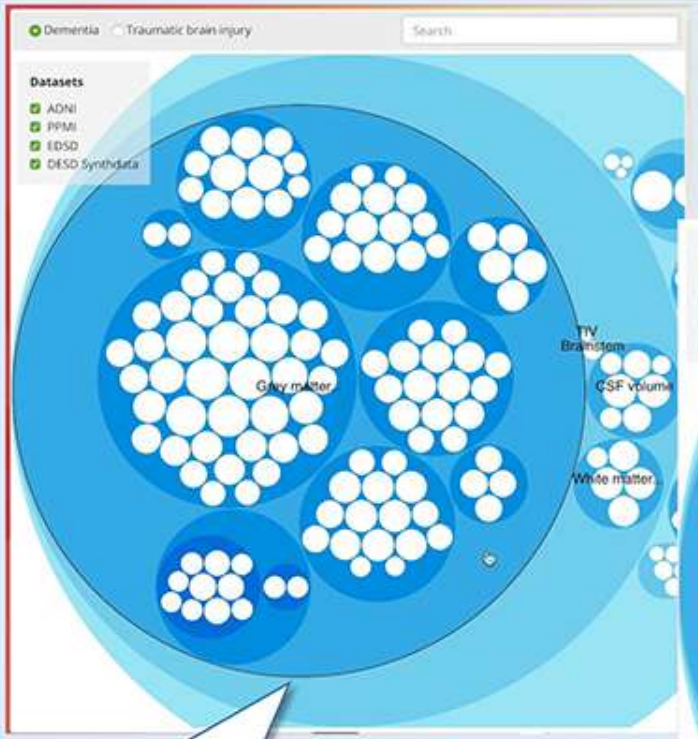
3

Demographic data

Diagnostic data

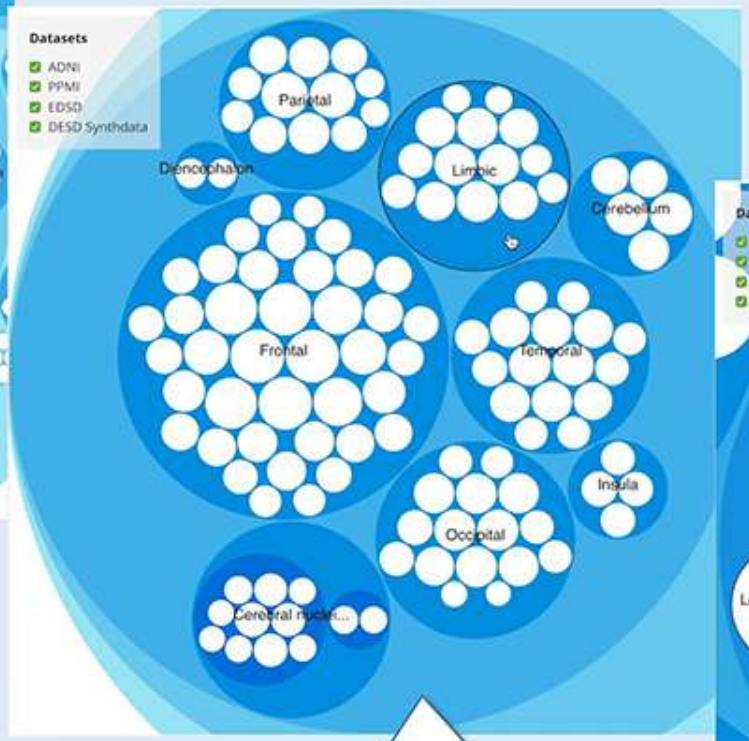
To move between these different themes, just click on a circle

How to Select the Variables - 2



Here, anatomical data have been sub divided into gray matter and white matter

1

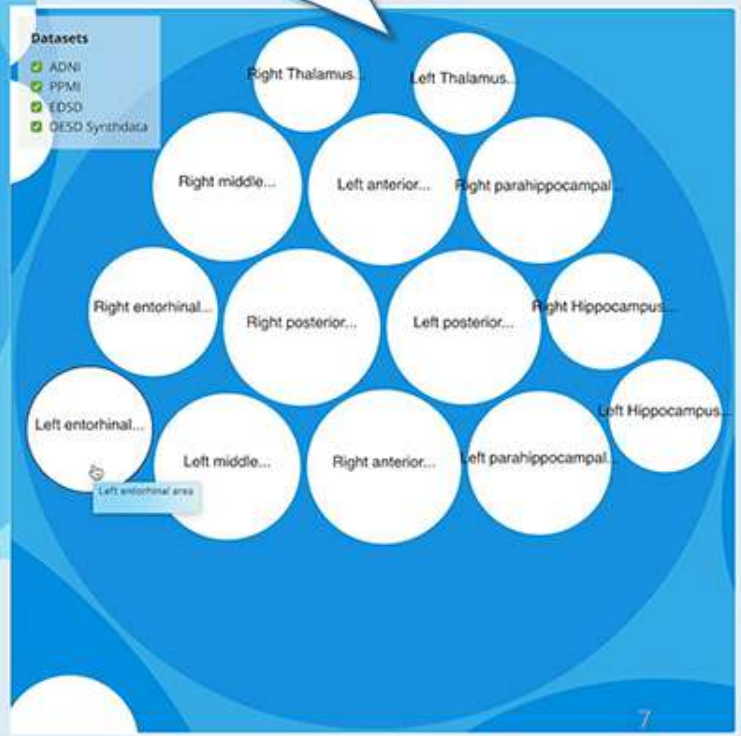


If you select "gray matter", the brain regions appear

2

3

And if you select a particular region, the limbic region for example, all the variables of this region appear



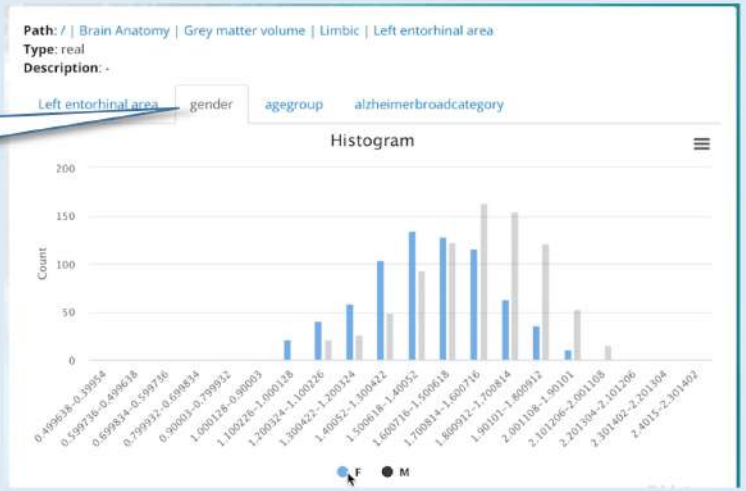
How to Select the Variables - 3

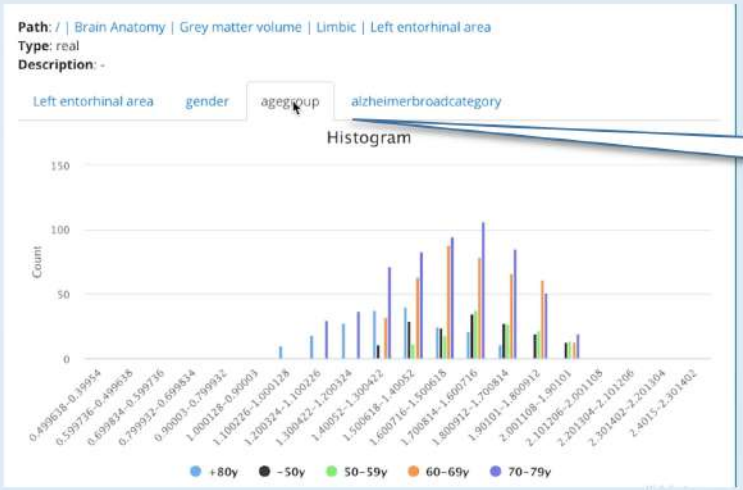
1

To select a variable, simply click on it. The panel at the bottom right updates immediately showing the distribution associated with the newly selected variable. By default, the distribution is based on all the data available in the selected data sets

2

You can also have this distribution by gender



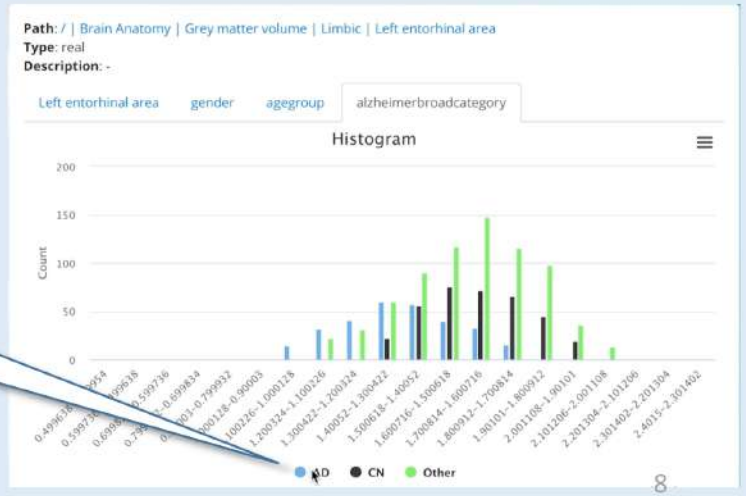


Distribution by age group or according to Alzheimer's disease

3

Distribution of Alzheimer's patients, with no cognitive impairment, and who do not belong to the previous two categories.

4



How to Select the Variables - 4

To perform an experiment, these variables are used in two ways: either as variables, that is to say observations or dependent variables; or we use them as co- variables, that is, predictors or independent variables

1

To add a variable to one of these two categories, just click on the associated button, for example here on the green "as variable" button . Automatically the circle of the selected variable changes color and becomes green

2

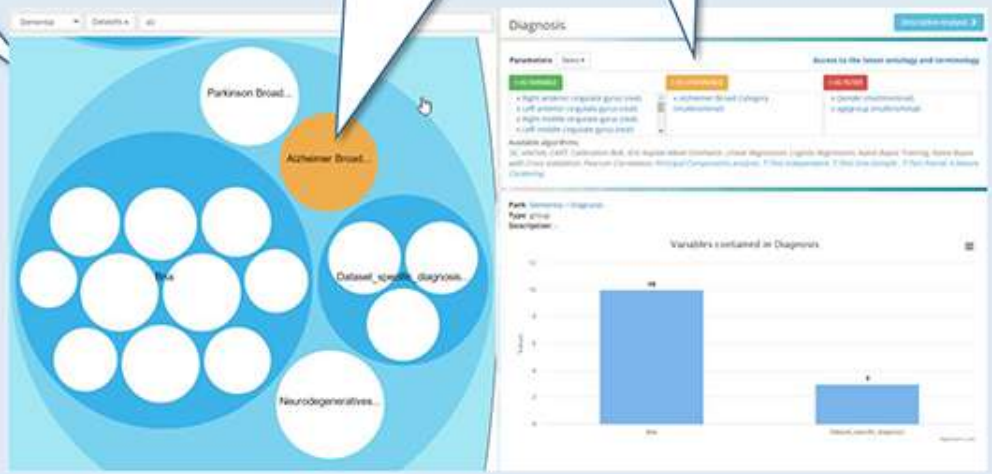
To select a variable from another theme, zoom out by clicking outside the circle

3

This allows you to select another circle. For example here the "diagnosis" part, and the variable “Alzheimer broad category "

4

This variable I will can be made a co- variable by simply clicking on the orange button



How to Analyse the Variables

At this stage of the study, you have selected the variables and have placed them either in the variables or covariables category

On the left we can see a summary of the selected datasets, here ADNI, CHUC CLM and BRESCIA. Below, we can see a summary of the selected variables and covariables . The variable is Left entorhinal area and covariables are Alzheimer Broad Category and Gender

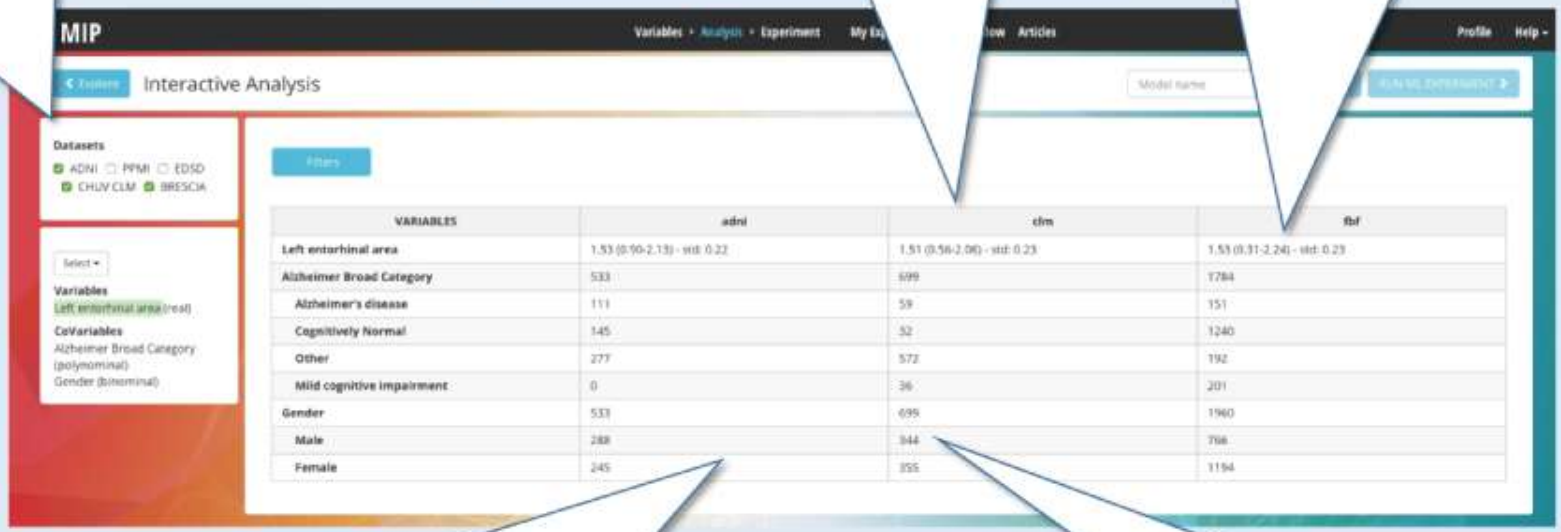
1

In the center, a table presents a summary of the different variables by dataset, here ADNI, CLM and Brescia

2

For continuous variables like the volume of the left entorhinal area, we have the mean, the confidence interval as well as the standard deviation . For the Brescia dataset , the mean is 1.53, the confidence interval is 0.31 - 2.24, and the standard deviation is 0.23

3



If several categorical variables have been selected, the breakdown by level is made for each variable, independently of the other variables. In our example, for the ADNI dataset, we see that the 533 participants are distributed between the different levels of the variable Alzheimer Broad Category and the variable Gender

4

For categorical variables, the interface presents the workforce for each level of the variable. Thus for the CLM dataset and the Gender variable , we see that there are 699 participants, 344 men and 355 women

5

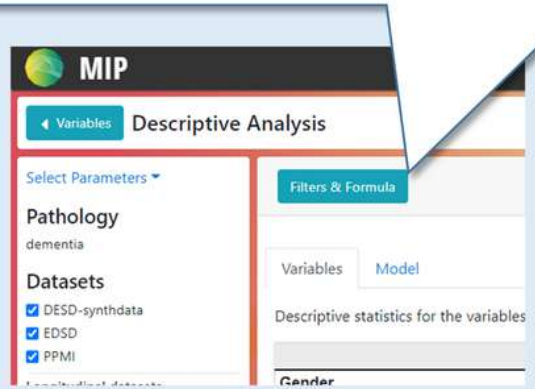
6

Finally at this stage, it is possible to modify the datasets used, for example by adding EDSD. The central table will be updated to includes the information related to this new dataset

How to Filter & Save a Variable

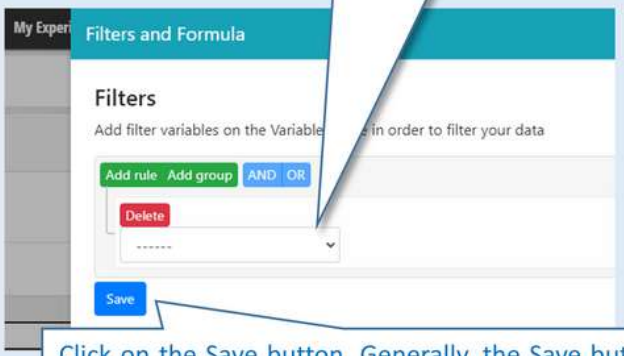
We are now going to focus on data filtering. For this you must click the button Filter & Formula, top left of the central panel. A new panel appears, it will allow to apply filters on the variables

1



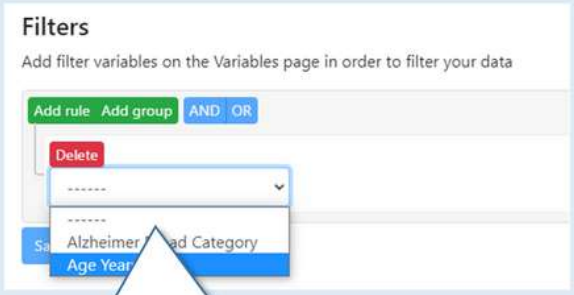
To work only on participants over the age of 60, click on the empty field.

2



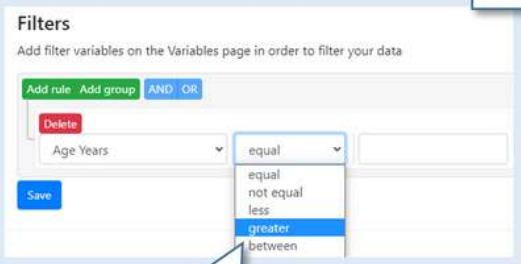
Click on the Save button. Generally, the Save button allows you to take into account the changes in the filter. We then see that the description of the variables is updated to consider the new filter

5



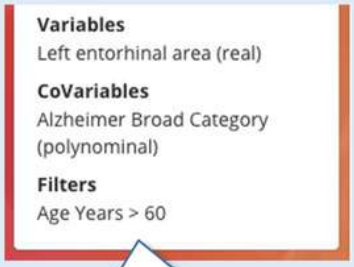
A drop-down menu appears where we find our variables. We select Age Years

3



In the next field select Greater. In the last field type 60

4



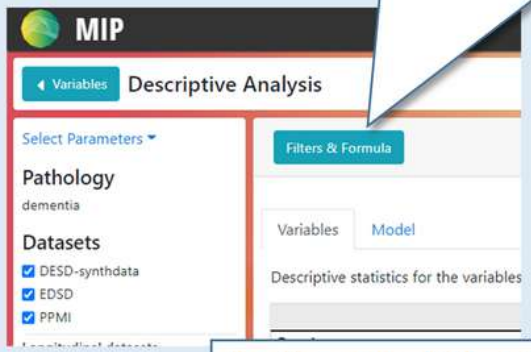
Result. The filter applied is also noted under the variables

6

How to use Formula and Interactions

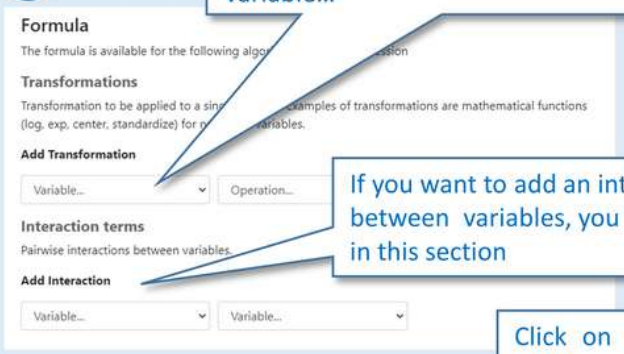
We are now going to focus on formulas. For this you must click the button Filters & Formula, top left of the central panel. A new panel appears, it will allow to apply transformation on a variable or add interaction between variables

1



In the next steps we will apply a logarithm transformation to the variable Left entorhinal area as an example so click on the field Variable...

2



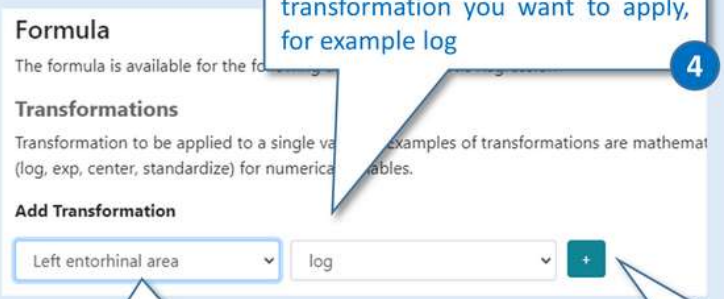
If you want to add an interaction between variables, you can do it in this section

Finally, just click on the create experiment button to go to the next step

8

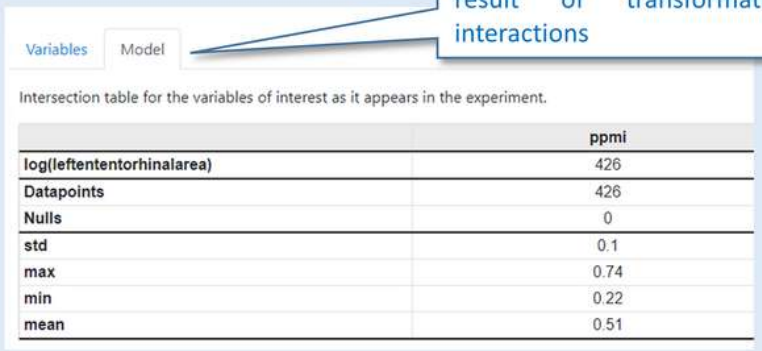
In the next field select the transformation you want to apply, for example log

4

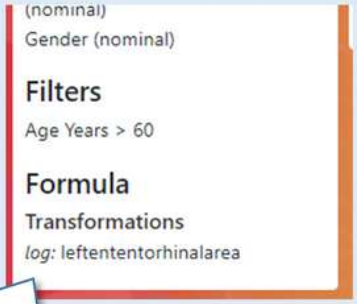


Click on the tab Model to see the result of transformations and interactions

6



	ppmi
log(leftententorhinalarea)	426
Datapoints	426
Nulls	0
std	0.1
max	0.74
min	0.22
mean	0.51



A drop-down menu appears where we find our variable. We select Left entorhinal area

3

Click on the + button to save and apply the transformation

5

The summary of transformations and interactions applied are also noted under Filters

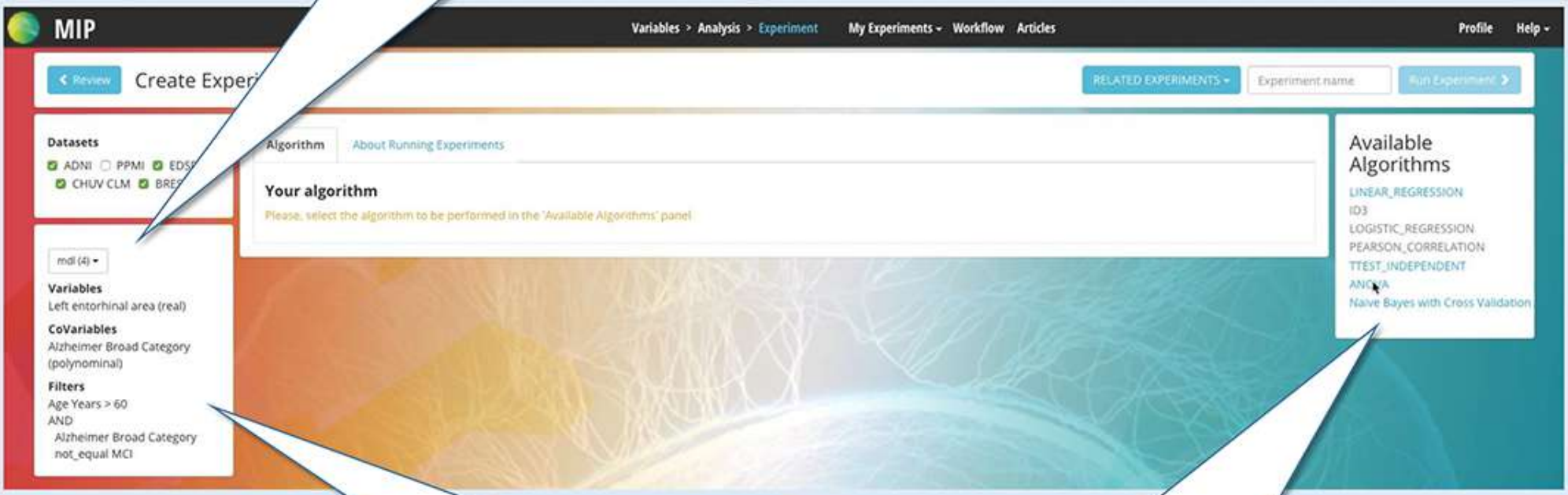
7

How to Perform a T-Test - 1

After clicking Run Experiment this screen is presented

At this stage of the study, we have selected the variables, and we have finished the filtering stage . The summary of the previous steps can be found in the panel to the left of the interface

1



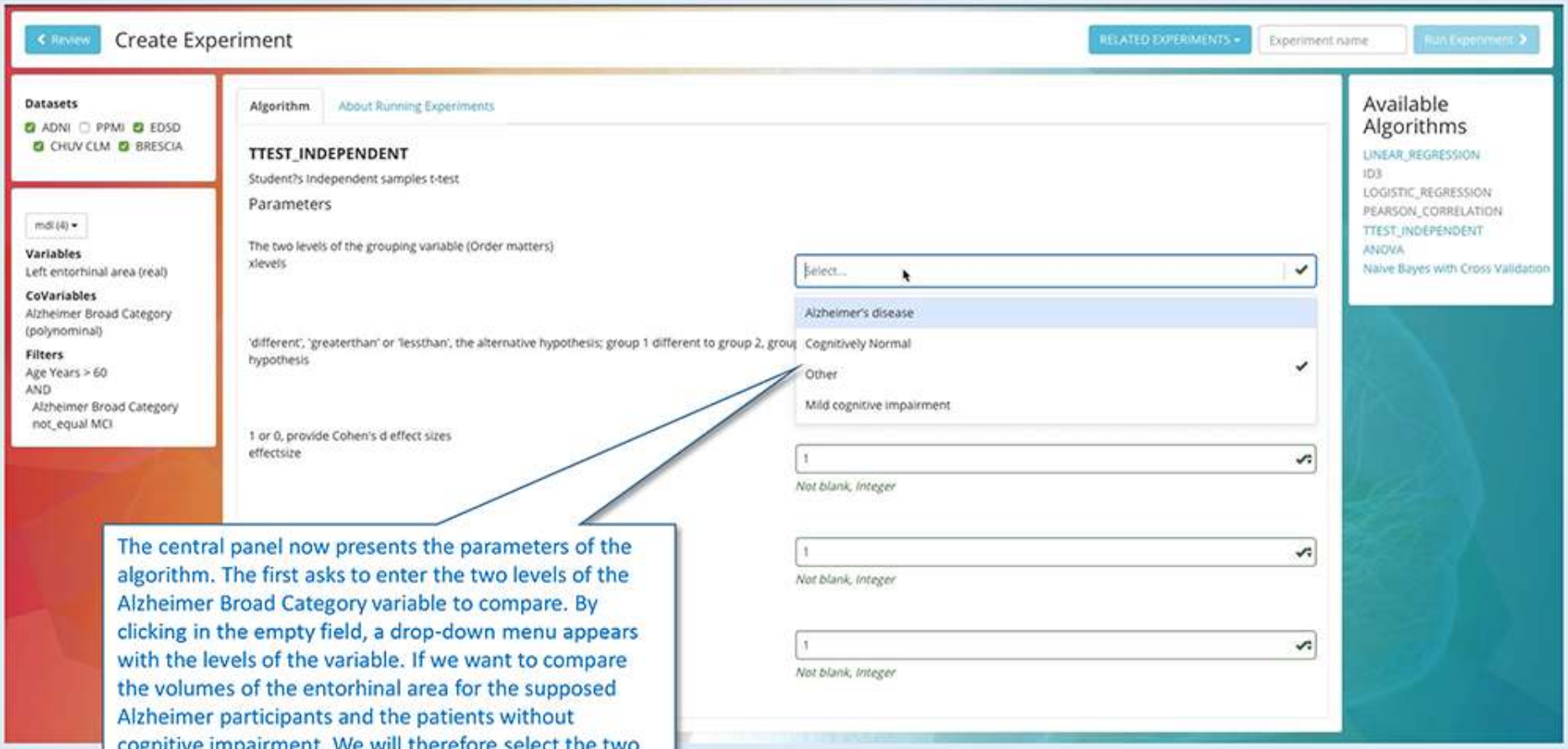
To carry out an independent T-test, the dependent variable must be of real type, and the independent variable of categorial type. Here, the dependent variable is Left entorhinal area , and the independent variable is Alzheimer Broad Category

2

The right panel presents the algorithms compatible with these variables in blue, the others are grayed out. To carry out a T-test, click on TTest_indépendant

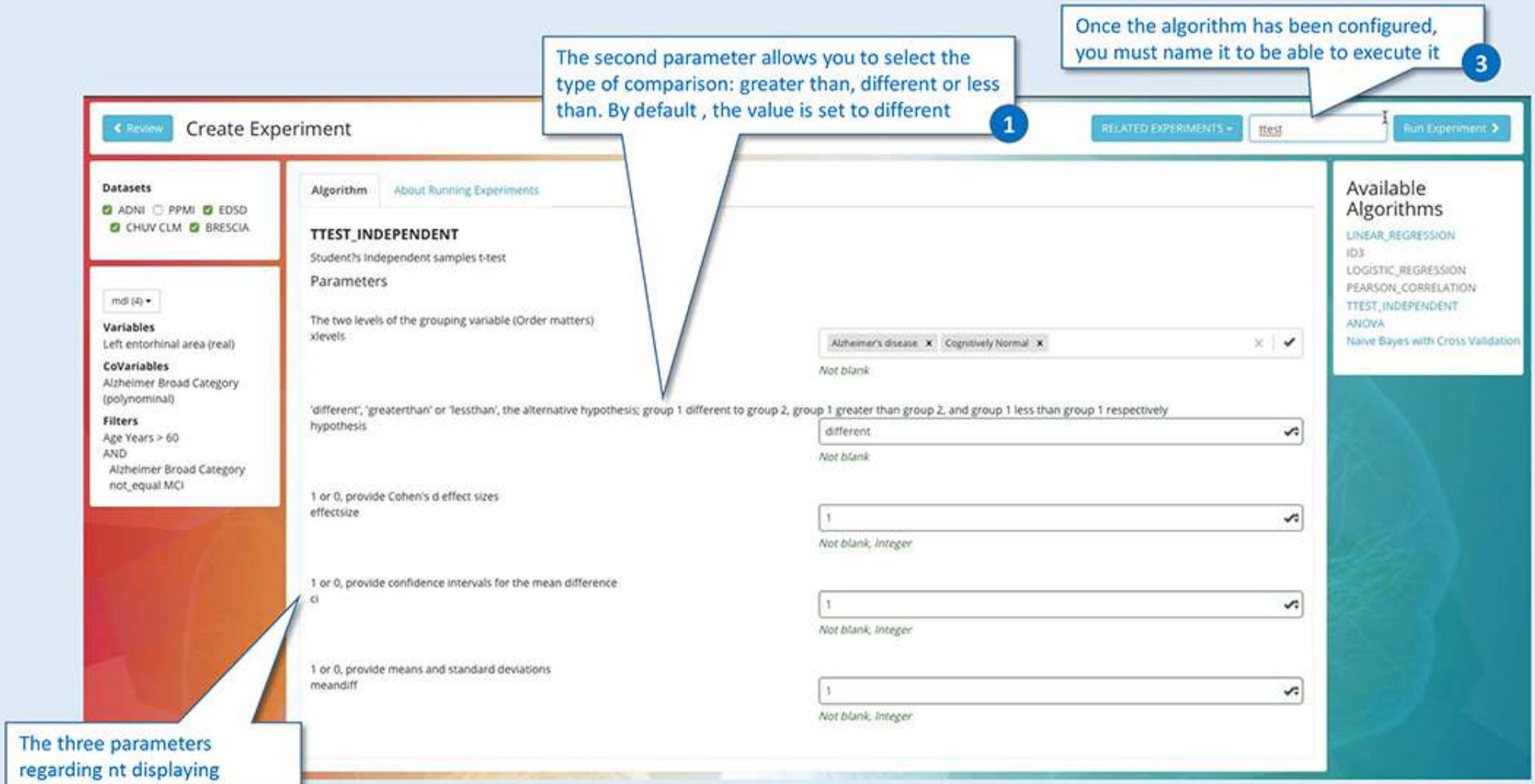
3

How to Perform a T-Test - 2



The central panel now presents the parameters of the algorithm. The first asks to enter the two levels of the Alzheimer Broad Category variable to compare. By clicking in the empty field, a drop-down menu appears with the levels of the variable. If we want to compare the volumes of the entorhinal area for the supposed Alzheimer participants and the patients without cognitive impairment. We will therefore select the two modalities Alzheimer's disease and Cognitivly Normal

How to Perform a T-Test - 3



How to Perform a T-Test - 4