We thank the reviewers for their comments. When this was possible, we have striven to follow their indications.

High-level comments.

1. There are some spellings and Grammatical Mistakes.

We did a pass of editing on the paper.

2. This paper needs more data sets to be tested.

Could the reviewer indicate what public dataset can be considered ?

3. Missing discussion section.

The paper has been reorganized to include a discussion section.

4. Framing of some sentences are not appropriate that doesn't reflect the exact meaning.

This comment cannot be addressed in this current form.

Please provide detailed and constructive comments for the authors.

1. In abstract "there exists no observed confounders, " what does the author mean exactly by confounders here? Abstract should be re framed appropriately it must be precise and clear.

We have rewritten this part of the abstract to remove this ambiguity.

2. desparsified LASSO method need more description.

We have slightly modified the paragraph on desparsified Lasso. Yet, lengthy descriptions do not fit in an 8-pages paper; given that the use of Desparsified lasso in this context is clearly not the main point of the paper, we have to refer the reader to the paper that has introduced it.

3. How author's have considered different regions of Brain? Mentioned in section 3. Details are required.

Indeed, we have considered 5 pairs of regions. This has been made clearer in teh paper.

4. In section 4 authors also have defined different brain regions. How brain regions are created?

Brain regions are not created, they are selected from the atlas provided with the lesymap. This has been made explicit in the main text.

5. What is the time complexity of the implementation of multivariate methods?

The methods have cubic complexity. Then, given the limited dimensionality of the problem, this does not matter.

6. Reference are not correctly formatted. Needs appropriate formatting.

We checked the citations. Some of them are currently on Arxiv, which explains why they do not follow standard formatting (we use the bib reference provided by Arxiv). We have also corrected some citations.

7. Some existing literature should be included in the paper.

This comment is not specific enough.