

# Neurostructural Correlates of the Empathic Response in Psychotherapists

Domínguez-Arriola, M.E., Olalde-Mathieu V.E., Garza-Villarreal, E.A. & Barrios, F.A.  
Instituto de Neurobiología (UNAM) - Lab. C12

## Introduction

Empathy refers to all the processes that enable a person to understand the affective state of another through the activation of the own representations of such states. [1] It has a bottom-up component related to first-hand experiencing of an emotion and a top-down component related to mentalizing and emotion regulation (ER). [2]

Psychotherapists have been shown to possess higher cognitive empathic and ER capacities. [3]

This study seeks to determine if there is an association between structural brain measures and empathic skills in person-centered psychotherapists, in relation to nontherapists.

## Materials and methods

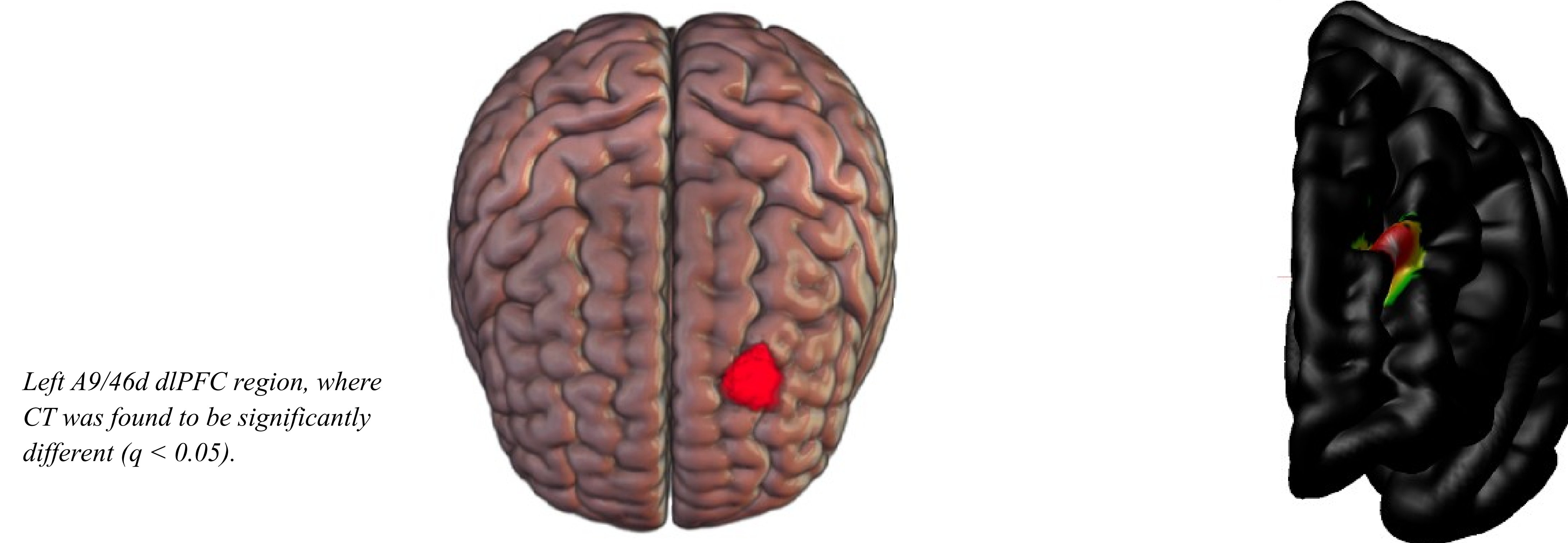
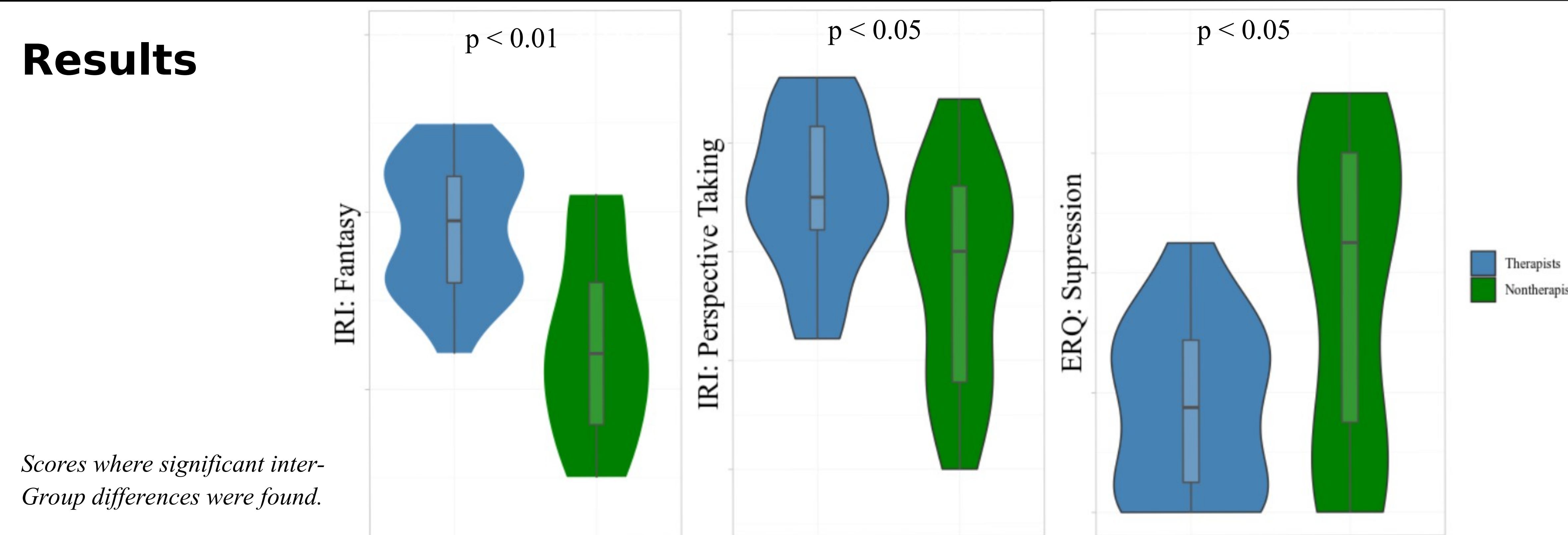
18 person-centered psychotherapists (9 women; age mean  $54.9 \pm 7.6$ ) and 18 nontherapists (9 women; age mean  $54.7 \pm 7.6$ ) were recruited for the study.

Psychometrics: Reactivity Index (IRI) [4] and the Emotion Regulation Questionnaire (ERQ) [5].

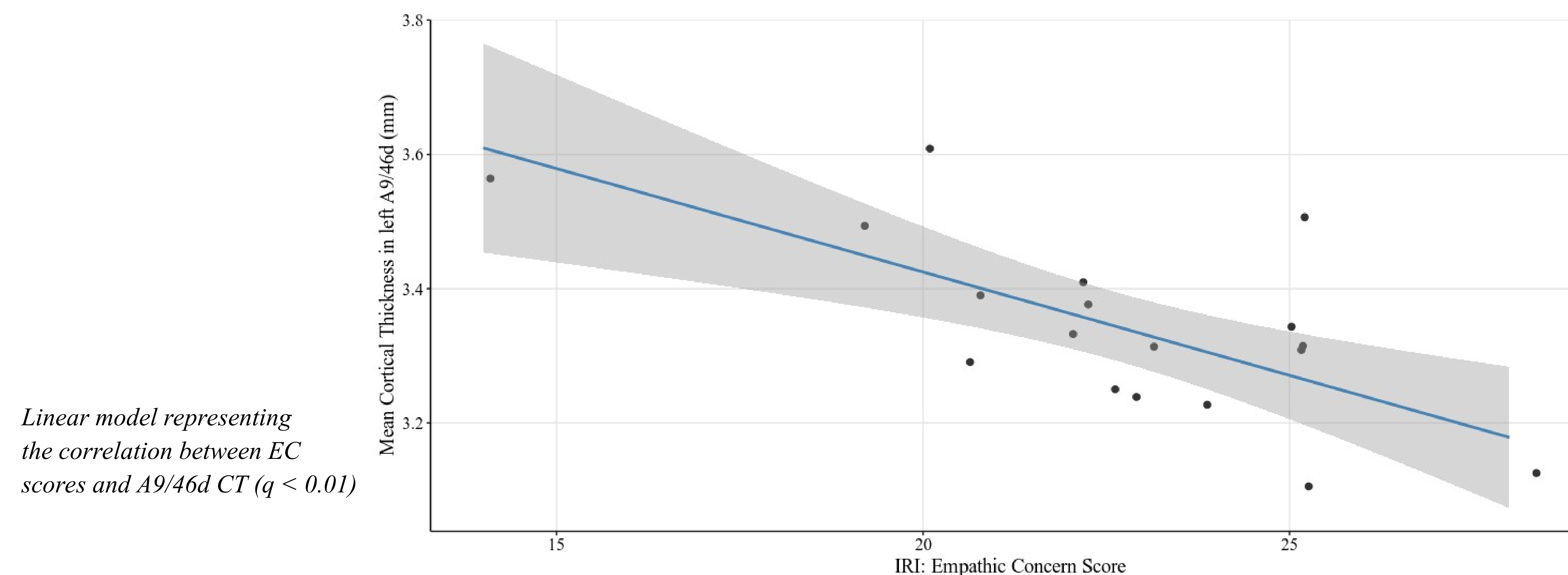
sMRI was performed on a 3 Tesla scanner with a 32-channel head coil. T1w images were acquired through an SPGR sequence. CIVET was used to extract brain surfaces and estimate cortical thickness (CT) [6]

Using a linear model, vertex-wise comparisons were performed at each ROI, and FDR corrected. Sex and gender were included as covariates of no interest.

## Results



Left A9/46d dlPFC region, where CT was found to be significantly different ( $q < 0.05$ ).



## Conclusions

These findings reveal that a region in the dlPFC was significantly thicker in a group of psychotherapists. The cortical thickness in this region negatively correlates with the tendency to feel empathically concerned for others. Overall, these results suggest that expertise in such a profession that demands augmented empathic skills could be reflected in cortical dorsolateral prefrontal variations.

This region is relevant especially for the cognitive ER aspect of empathic phenomena. [2]

## References

- [1] Preston, S. D., & de Waal, F. B. M. (2002). Empathy: Its ultimate and proximate bases. *Behavioral and Brain Sciences*, 25(1), 1–20.
  - [2] De Waal, F. B. M., & Preston, S. D. (2017). Mammalian empathy: Behavioural manifestations and neural basis. *Nature Reviews Neuroscience*
  - [3] Olalde-Mathieu, V., Sassi, F., Reyes-Aguilar, A., Mercadillo, R., Alcauter, S., & Barrios, F. (2020). Greater Empathic Abilities and Their Correlation With Resting State Brain Connectivity in Psychotherapists Compared To Non-Psychotherapists
  - [4] Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113–126
  - [5] Cohodes, E. M., Rivera, L., Oliver Bucio, G., & Noroña, C. R. (2014). Emotion Regulation Questionnaire (ERQ); Spanish translation. Translated in collaboration with original ERQ author, James Gross, PhD
  - [6] Lerch, J. P., Van Der Kouwe, A. J. W., Raznahan, A., Paus, T., Johansen-Berg, H., Miller, K. L., Smith, S. M., Fischl, B., & Sotiropoulos, S. N. (2017). Studying neuroanatomy using MRI. *Nature Neuroscience*, 20(3), 314–326
- Consult complete reference list at: <https://tinyurl.com/y6tg6fjd>

## Acknowledgments

We would like to thank Israel Vaca-Palomares for his advise and supervision, as well as Leopoldo González Santos for the technical support.