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# **Regional Grey Matter Atrophy is associated with Social Cognition impairment in Progressive Multiple Sclerosis (MS).**



PROGRAMA DE  
ESCLEROSIS MÚLTIPLE UC

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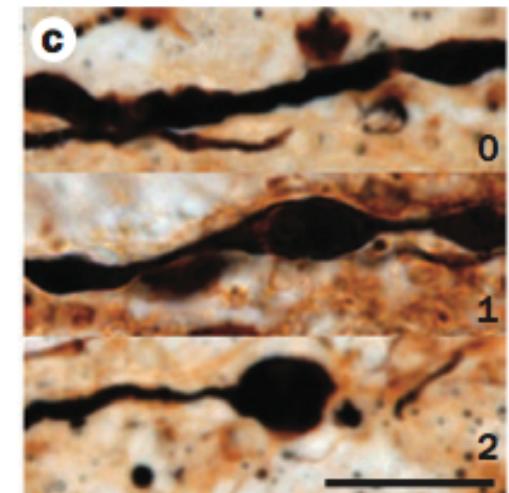
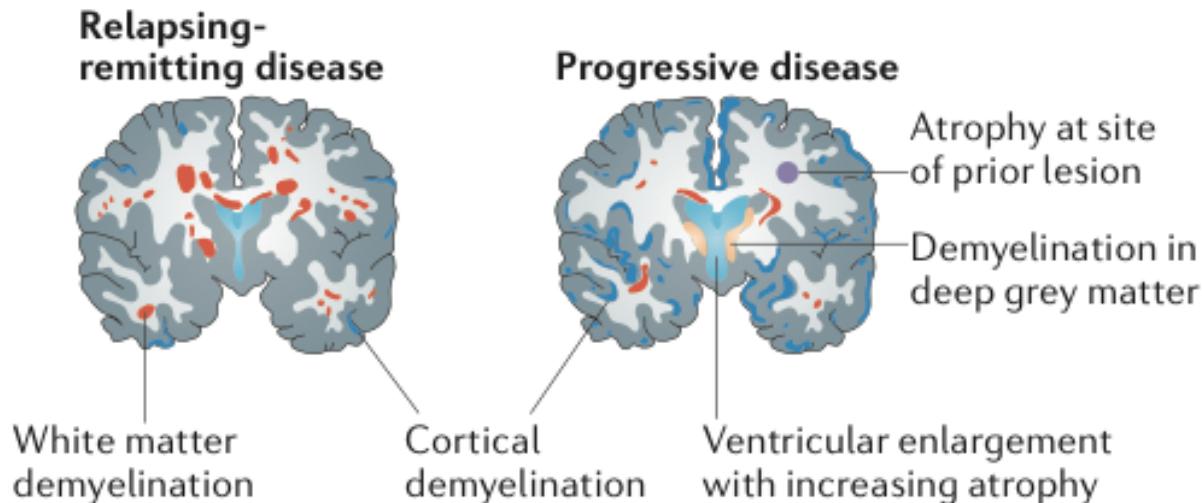
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# Focal White and Grey Matter Damage in MS.



**Myelin and Axonal loss generates brain damage and disability in young patients (During Critical Periods for Family and Work)**



# Cognitive Impairment

**40- 70% of MS Patients Exhibit some Cognitive Impairment**

**Most Commonly:**  
**Working Memory,  
Processing Speed,  
Episodic Memory and  
Executive Functions.**

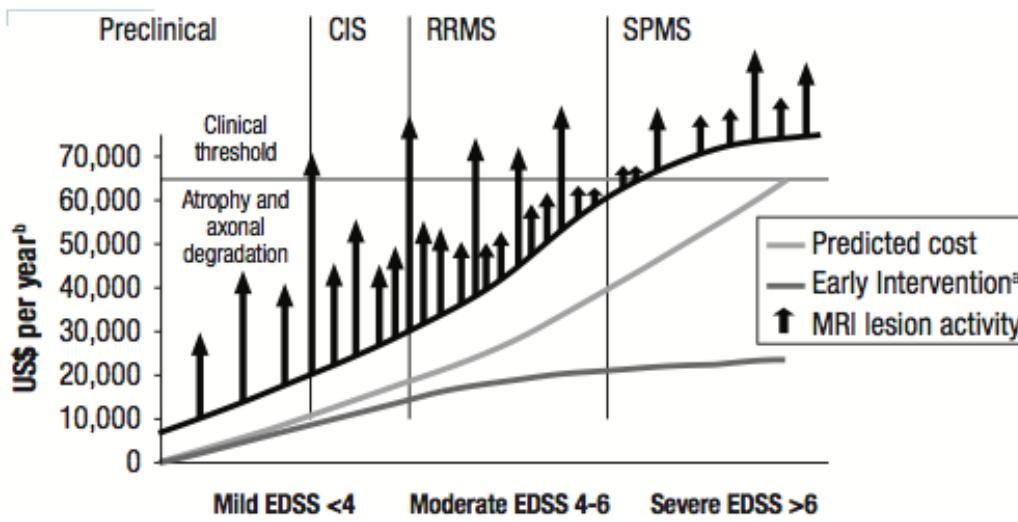
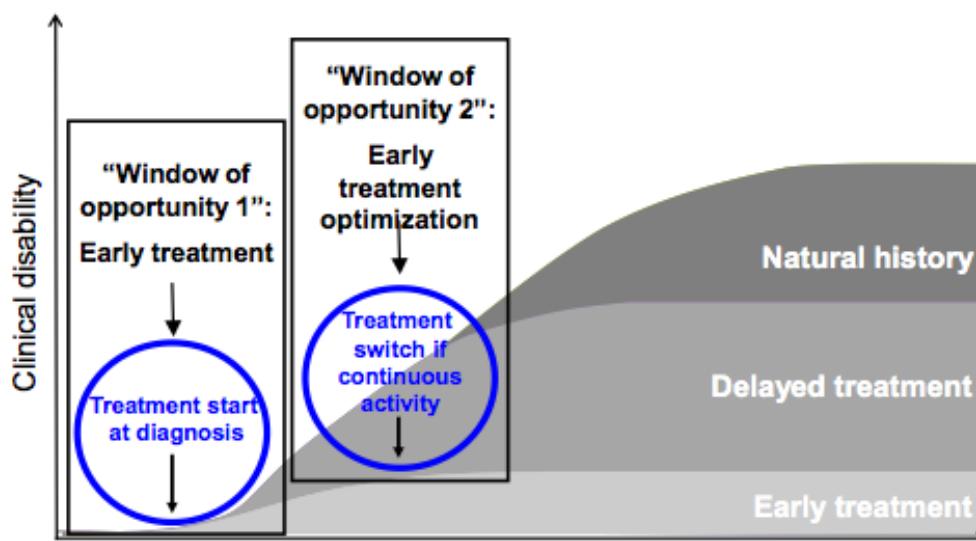
**Socio Cognitive Compromise Still Undefined**

**SOCIAL COGNITION:**  
**Decoding emotions in faces, inferring mental states, empathy.**

**UNDEFINED**



# Disability and Costs.



**Early Intervention in MS**

Modifies the disability's curve  
and the associated costs.

**QUALITY OF LIFE**

# Objective

- Identify Brain regions which volume is related to Social Cognition Performance in Multiple Sclerosis.



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# Materials & Methods

- 34 Patients with Progressive MS were included.
- **Neuropsychological evaluation:** PASAT (Working Memory), SDMT (Processing Speed) and **MiniSEA:** Mini-Social-and-Emotional-Assesment test, including Social Perception and Theory of Mind Test.
- **Brain MRI** was acquired using a Philips Ingenia 1.5T , including volumetric 3D-T1W and T2-FLAIR images.
- Lesion filling was performed using Lesion segmentation tool within the **SPM (Statistical Parametric Mapping)** software.



# MINI SEA



Jill had just moved into a new apartment. Jill went shopping and bought some new curtains for her bedroom.

When she had just finished decorating the apartment, her best friend, Lisa, came over.

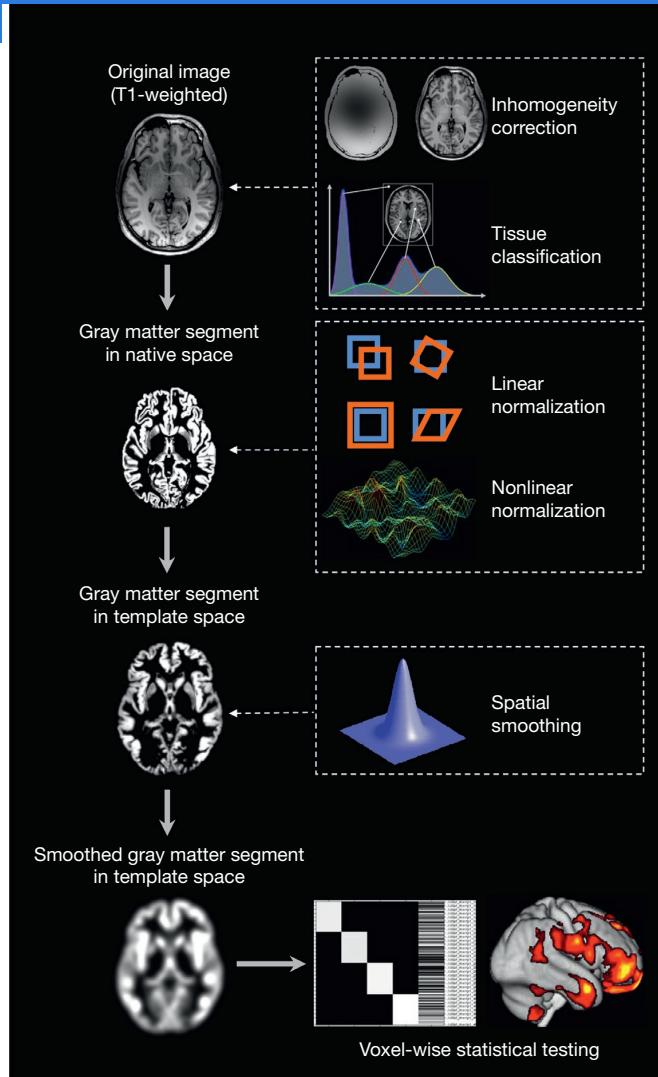
Jill gave her a tour of the apartment and asked, "How do you like my bedroom?" "Those curtains are horrible," Lisa said. "I hope you're going to get some new ones!"

**Face Emotion Recognition and Theory of Mind abilities will be studied and correlated to brain structure.**



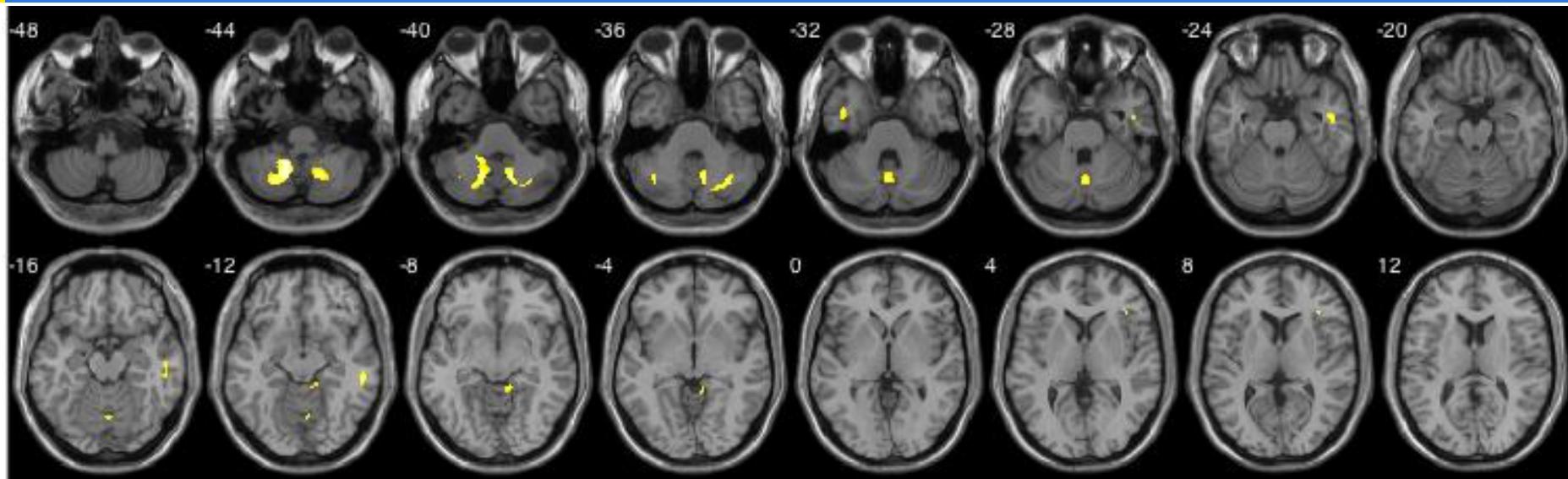
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# Voxel Based Morphometry



**SAGITAL T1 3D Images were Analyzed in order to identify brain regions which volume is related to performance in tasks that evaluate specific functions.**

# Results: Gender Differences.



- Voxels With Higher Grey Matter density in women compared to men.



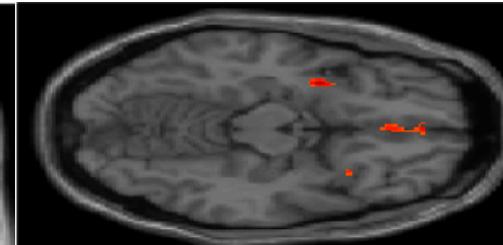
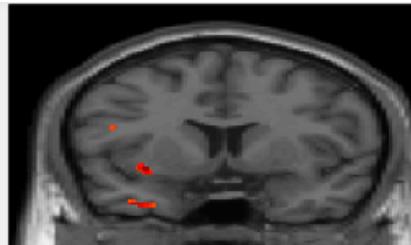
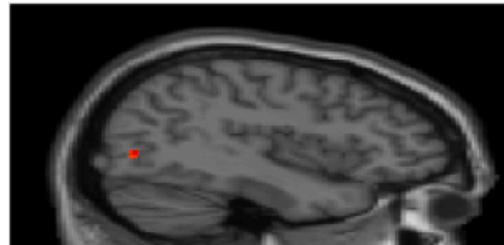
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**INTERNAL  
CONTROL**

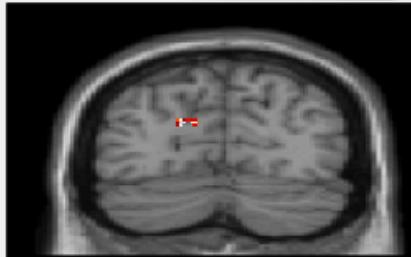
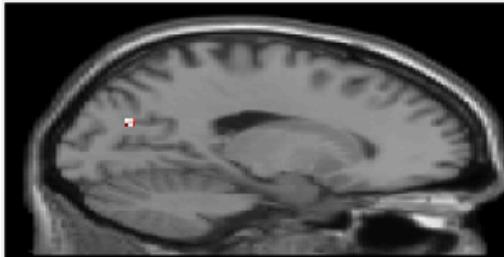


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# Results: COGNITIVE PERFORMANCE



PASAT  
Working Memory



SDMT  
Processing Speed

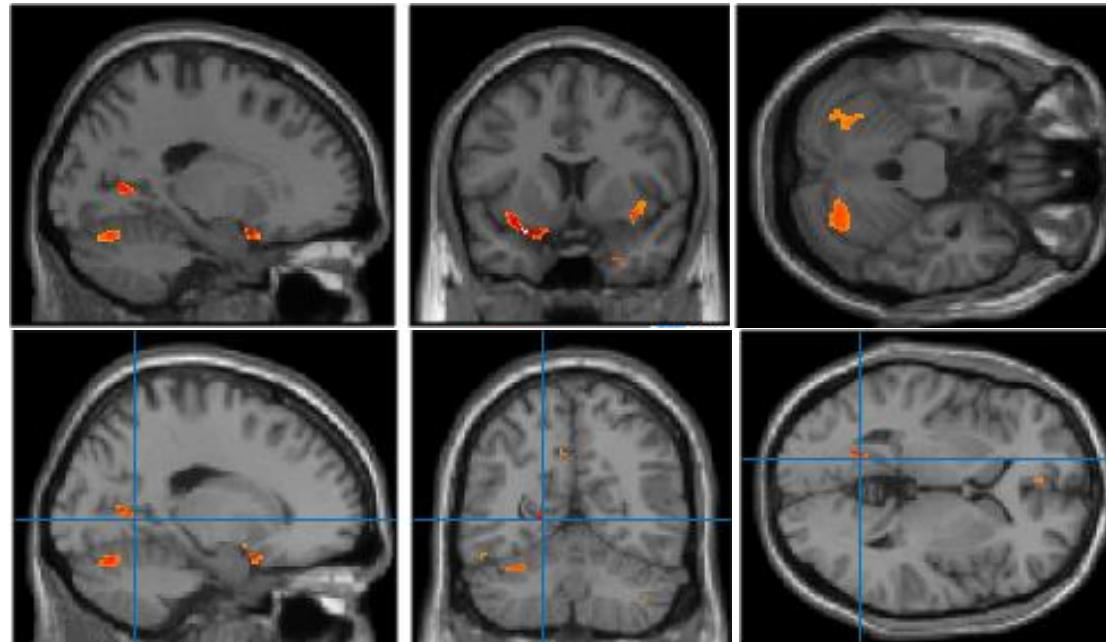
- Voxels in which grey matter density is significantly related to conventional cognitive test. We obtained a traditional localization of brain functions.



**INTERNAL  
CONTROL**



# Results: SOCIAL COGNITION



**THEORY OF MIND**  
**(a)**

**SOCIAL PERCEPTION**  
**(b)**

(a) Right Fusiform Gyrus, Bilateral Cingulate Cortex and Insula.  
(b) Left Cingulate and Frontal Lobe.



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# CONCLUSIONS

- **MRI identifies Social Cognition impairment as an independent issue in MS and provides a neural substrate.**
- *Fusiform Gyrus, Cingulate Cortex and Insula* volume are related to Social Perception Performance.
- *Left Cingulate and inferior Frontal Gyrus* are related to Theory of Mind impairment.



# References

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