The Boston Naming Test identifies presymptomatic anomia in *MAPT* mutation carriers

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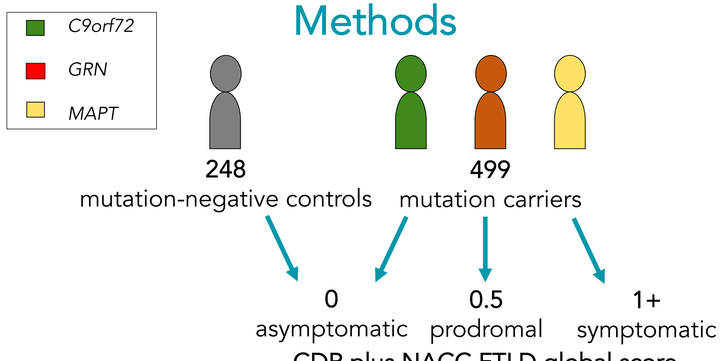
Background

- Amongst FTD variants, semantic deficits seem particularly prominent in *MAPT* mutation carriers (Hardy et al., 2016).
- *C9orf72* mutation carriers are often found to show early impairments on various cognitive tests (Russell et al., 2020; Moore et al., 2020) .
- To date, no task has been found to identify early cognitive changes in *MAPT* mutation carriers specifically.

Methods



		N	Age (SD)	Education (SD)	% Male	FTLD-CDR-SOB
Controls		248	44.9 (12.7)	14.4 (3.2)	43.2	0.0 (0)
C9ORF72	0	110	44.2 (11.7)	14.3 (3.0)	41.8	0.0 (0)
	0.5	36	49.3 (11.4)	14.1 (2.5)	38.9	1.2 (0.8)
	1+	66	62.1 (8.6)	13.2 (3.7)	65.2	10.7 (5.4)
GRN	0	128	45.8 (12.2)	14.7 (3.4)	35.2	0.0 (0)
	0.5	30	51.7 (13.4)	14.0 (4.0)	50.0	1.0 (0.8)
	1+	43	63.5 (7.9)	11.9 (3.3)	51.2	8.6 (5.4)
MAPT	0	48	39.3 (10.5)	14.4 (3.6)	39.6	0.0 (0)
	0.5	14	45.7 (12.6)	13.5 (2.4)	28.6	1.1 (0.8)
	1+	24	57.3 (10.2)	13.7 (3.9)	66.7	9.3 (5.5)

Results

- Boston Naming Test (BNT) performance (naming 30 pictures of objects) was compared between all groups (stars in bars for comparisons with control group) using a bootstrapped linear regression model, adjusting for age and education.

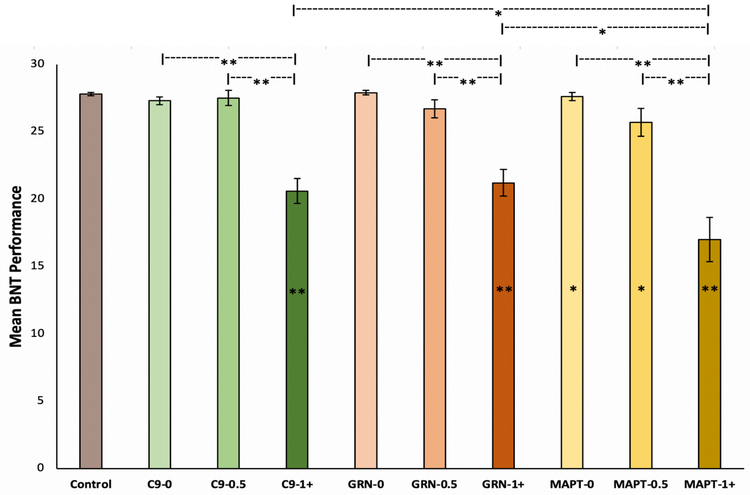


Figure 1. Mean scores and standard error on the BNT for each group. Significant differences from controls are shown with a star in the bar; * p<0.05, **p<0.001.

- All symptomatic groups performed significantly worse than controls, and worse than the prodromal and asymptomatic mutation carriers within the same genetic group.
- The *MAPT* symptomatic group also performed significantly worse than the *GRN* and *C9orf72* symptomatic groups.
- Furthermore, both the *MAPT* asymptomatic and prodromal groups performed significantly worse than controls which was not the case in the other genetic groups.

Results

- The relationship between BNT performance and grey matter volume was assessed using Voxel-Based Morphometry. Genetic groups and scanner types were model factors, whilst age, total intracranial volume and sex were included as covariates.

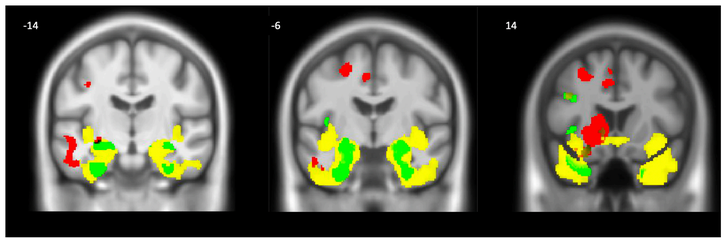


Figure 2. Regions of reduced grey matter volume which correlated with BNT performance for each of the 3 genetic groups (*C9orf72* in green, *GRN* in red, *MAPT* in yellow).

- In *MAPT* mutation carriers, atrophy within the bilateral temporal lobes was associated with BNT performance, including amygdala, hippocampus, entorhinal cortex, temporal pole, inferior temporal gyrus, fusiform gyrus as well as insula.
- In *C9orf72* and *GRN* mutation carriers, reduced grey matter volume related to BNT performance was less clustered within the temporal lobes and included frontal and striatal areas.

Discussion

- *MAPT* mutation carriers show **early deficits** and **more severe** impairments in **naming** which is consistent with previous literature, likely due to impaired **semantic knowledge** affected by **temporal lobe atrophy** (Moore et al., 2020).
- The BNT detects early deficits, allowing **dissociation of *MAPT* mutation carriers from controls and from other genetic groups.**

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