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Measuring cognitive change in subjects with prodromal Alzheimer’s disease

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Figure 1: Conceptualization of the nonlinear mixed model involving a latent process to model cognition from several neuropsychological tests.

(a) A linear mixed model describes the change over time in the latent cognitive process and evaluates the common effects of covariates on this latent cognitive trajectory.

(b) Test-specific measurement models relate each administration of the psychometric tests with the latent cognitive process, by accounting for and describing the metrological properties of the tests and test-specific associations with covariates.

(c) Overall effect of a covariate on each specific test is calculated by adding together the effect of the covariate on the latent cognitive process (a) and the test-specific effect (b).
Figure 2: Diagram mapping the administration of the neuropsychological tests and the occurrence of AD during the three-year follow-up (FU) of the study.

212 MCI subjects underwent the battery of cognitive tests at baseline and were included in the analysis

- 9 AD converters at 6 months*

203 MCI subjects underwent the battery of cognitive tests at 1 year

- 13 lost to follow-up
- 14 AD converters at 1 year
- 15 AD converters at 18 months*

161 MCI subjects underwent the battery of cognitive tests at 2 years

- 25 lost to follow-up
- 10 AD converters at 2 years
- 4 AD converters at 30 months*

122 MCI subjects underwent the battery of cognitive tests at 3 years

- 5 AD converters at 3 years

* In the event of a suspected conversion, the patient underwent an additional neuropsychological evaluation 6 months later.
**Figure 3:** Mean annual change for each neuropsychological test according to the occurrence of AD during the follow-up (in latent cognitive process units).

Mean annual change with 95% confidence interval for each neuropsychological test (in latent cognitive process unit) for a 71.8 year-old woman with a low level of education. *denotes a significant difference (adjusted for age, sex and level of education) between Prodromal-AD and MCI Non-AD (p<0.05), ** for p<0.01. Baddeley Mü was not represented in this figure because of its high level of individual variability; this test did not significantly change over time in any group and was not different between groups.
Figure 4: Metrological properties of the thirteen neuropsychological scores used in the study

*Neuropsychological tests with high sensitivity to changes due to prodromal-AD*

- FCSRT: free recall score
- FCSRT: total recall score
- FCSRT: free delayed recall score

*Neuropsychological tests with medium sensitivity to changes due to prodromal-AD*

- Verbal fluency category fruit
- DENO100
- SDOT

*Neuropsychological tests with low sensitivity to changes due to prodromal-AD*

- Verbal fluency letter R
- TMT A
- BVRT
- WAIS DST

*TMT B
- WAIS similarities
- Baddeley'Ml

*according to the previous results display in figure 3*