Project 3: Cognitive Loss over Time

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Research Questions

- What is the trajectory of cognitive loss for individuals who did not develop dementia?
- What is the trajectory of cognitive loss for individuals who did develop dementia?
- Is there a period before dementia diagnosis that cognitive loss trajectories change?

Data Summary

Table One: Demographics

Variable	All Patients	Dementia Diagnosis	No Dementia Diagnosis
N	216	71	145
# Obs (mean ± sd)	15.67 ± 8.42	18.73 ± 6.18	14.17 ± 8.97
Sex (n (%))			
Male	42.13 (91)	33.8 (24)	46.21 (67)
Female	57.87 (125)	66.2 (47)	53.79 (78)
SES-Baseline (mean ± sd)	49.1 ± 11.54 (NA = 1)	49.01 ± 12.89	49.15 ± 10.86
Age-Baseline (mean ± sd)	80.05 ± 9.22	84.8 ± 6.07	77.72 ± 9.62
Age at onset (mean ± sd)	90.7 ± 4.93 (NA = 145)	90.7 ± 4.93	NA

216 individuals → 187 individuals for analysis due to missingness
Outcome: Category Fluency for animal test (Animal Score)

Analysis

- Change point identified via likelihood maximization
- Mixed Model with Animal Score as outcome
  - Random Intercept and AR(1) covariance structure
  - Included Age, dementia status, the interaction between age and dementia status, SES, gender and the change point in the model
- Use bootstrapping to get CI around change point and accurate SE for the model estimates.

Results

Males and Non-dementia individuals are the reference group

Table Two: Model Results

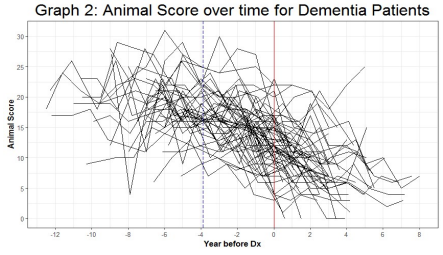
Variable	Estimate	SE	95% CI	P-value
Intercept	24.59	1.3593	(21.926,27.255)	<0.0001
Age	-0.183	0.0251	(-0.232,-0.134)	<0.0001
Change Point	-0.929	0.1503	(-1.223,-0.634)	<0.0001
Gender	-0.562	0.4649	(-1.473,0.349)	0.2269
SES	0.039	0.0181	(0.003,0.074)	0.0314
Dementia	-4.348	2.5773	(-9.4,0.703)	0.0916
Interaction (Dementia and Age)	0.005	0.0816	(-0.155,0.165)	0.9486

Age is adjusted (age – 59)

- Change Point: Estimated at -3.9 (approximate 4 years prior to diagnosis)
- Gender, Dementia and Interaction not significant
- Age, SES, and Change point significant
  - Age: change in animal score for 1 year increase in age
  - SES: change in animal score for 1 unit increase in SES
  - Change Point: change in slope 4 years and onward after diagnosis

Results

Graph 2: Animal Score over time for Dementia Patients



Conclusions/Limitations

- For non-dementia and dementia patients (4+ years prior to diagnosis)
  - 1 year increase in age, there is on average a 0.183 point decrease in animal score
- For dementia patients (less than 4 years prior to diagnosis and onward)
  - 1 year increase in age is now associated with a 1.112 point decrease on average in animal score
- Approximately 4 years prior to dementia in a crucial time for cognitive change.
- Limitations
  - Sample size loss
  - Large CI around change point
  - More data on dementia patients