Analysis of Time Series and Darkness Adaptation

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Data:

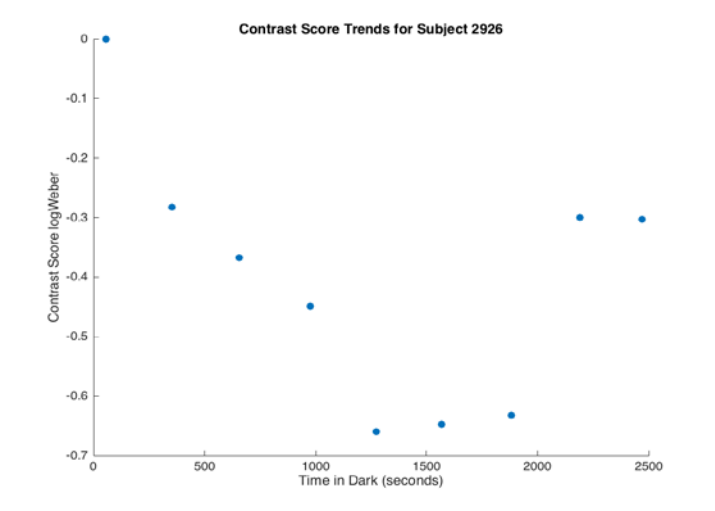
- Time series FrACT contrast and acuity vision scores of 1243 participants as they adjust to the dark.
- Genetic SNP (single nucleotide polymorphisms) data for 294 participants.

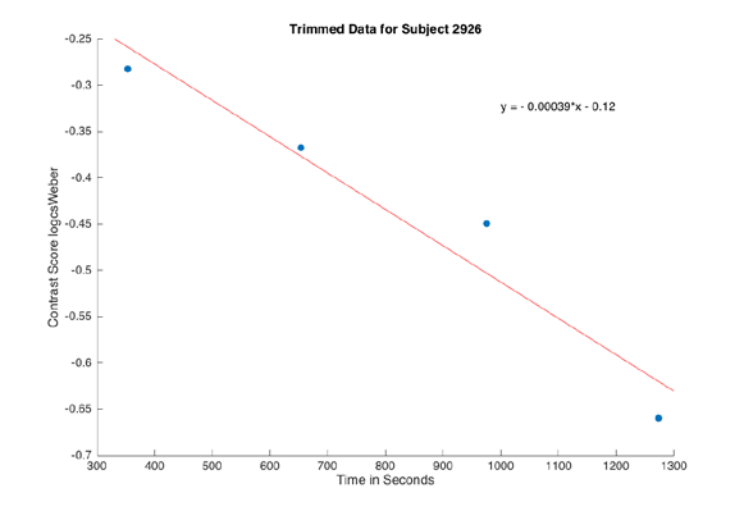
Goals:

- Quantify speed of adaptation.
- Compare adaptation speed to final vision score.
- Conduct genetic analysis to determine genetic factors affecting adaptation speed or end score.

How We Quantified Speed of Adaptation

- **Trimmed Linear Model**
  - Subjects often scored poorly on the first test, since the lights just went out. The test has a ceiling for how bad a person could do. This could not be recorded properly and was trimmed.
  - Points after the minimum score were trimmed as they appeared to be noise.
  - After the full time series for each person was trimmed, Ordinary Least Squares (OLS) method was used to linearly fit the data. Slope of OLS was used as measure of speed.





Speed of Adaptation vs. Endscore

- **Results**
  - Speed of adaptation to night vision was not correlated with end score.
- **Conclusion**
  - Possibly due to variability, the data do not support the hypothesis that speed of adaptation to the dark and end score are related.

- **Repeatability**
  - The slopes were variable within each person so genetic analysis of speed of adaptation could not be completed. This further supports the conclusion that speed of adaption is random. Acuity speeds of initial test vs. re-test data is shown below.