Individual differences of brain plasticity in early visual deprivation and sight restoration

Ella Striem-Amit\(^1\), Sriparna Sen\(^1\), Ningcong Tong\(^2\), Xiaoying Wang\(^3\)\(^,\)\(^4\), Smadar Ovadia-Caro\(^3\), Tapan Gandhi\(^5\), Vidur Mahajan\(^6\), Shlomit Ben-Ami\(^6\), Sharon Gilad-Gutnick\(^7\), Yanchao Bi\(^3\)\(^,\)\(^4\) and Pawan Sinha\(^8\)

GEORGETOWN UNIVERSITY
Georgetown University Medical Center

Questions

- Is brain plasticity consistent across individuals, or idiosyncratic?
- Is there visual plasticity following late-onset sight restoration?
- Can individual differences in plasticity inform rehabilitation?

Approach

Resting state functional connectivity seeding from V1 (external retinotopic localizer)

Study 1:

- Blind (n=25) Cohort A
- Sighted (n=31) Cohort B

Study 2: Children-to-young adults who first gain high-acuity sight after early childhood (n=10, operation age 7-20)

Longitudinal fMRI: pre-operative, 3-6 months after operation

Results (1): Individual differences increase in blindness

RSFC variability is increased in blindness

Different variance between the groups

Variability: (blind - sighted)

Results (2): Plasticity following late sight-restoration

V1-RSFC increases after sight restoration

Pre-operative V1-RSFC to VAN correlates to postoperative acuity gains

Conclusions

Sensory experience contributes to brain RSFC consistency across individuals. Plasticity in blindness generates more variable RSFC patterns, leading to individual plasticity profiles. Plasticity in visual networks is possible when high-acuity sight begins past the critical periods. Pre-operative RSFC can inform the success of sight-restoration outcomes.

Questions?

- Get in Touch!
  Ella.StriemAmit@georgetown.edu

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