Deriving universal neural representational space of objects

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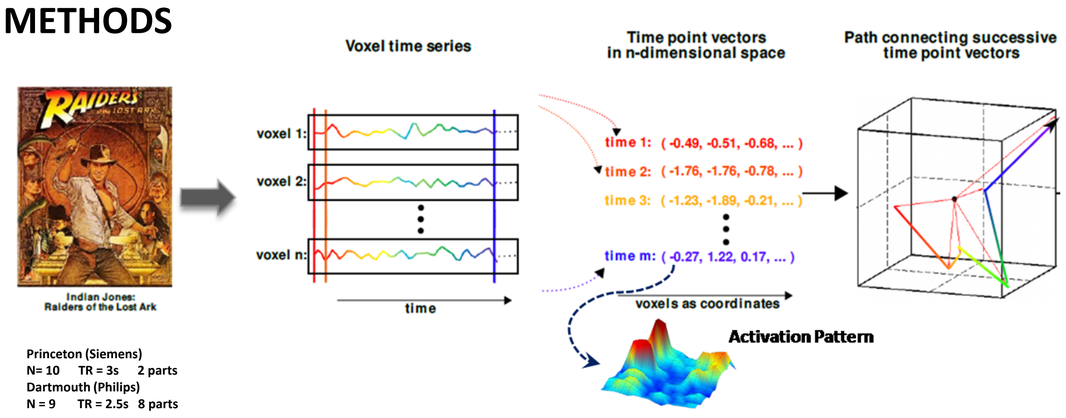
INTRODUCTION

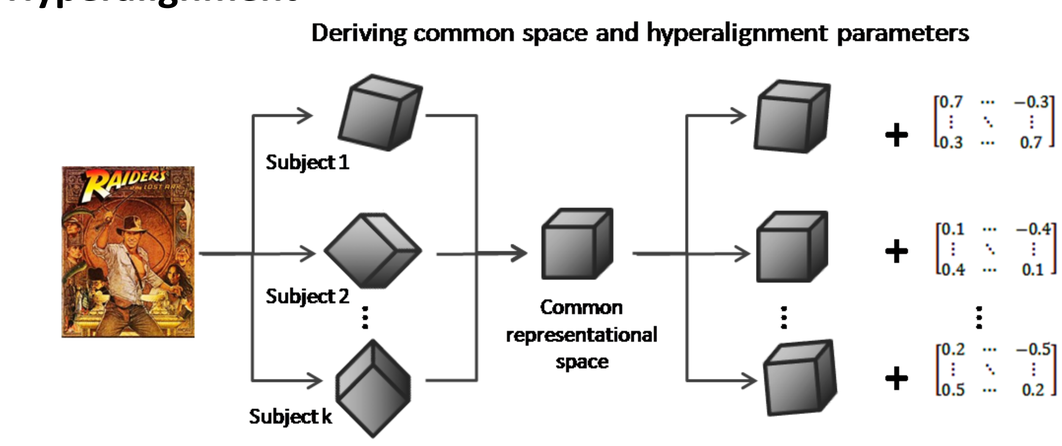
- Category information represented in activation patterns can be decoded using multivariate pattern (MVP) analysis[1] of fMRI measures.
- Anatomical registration cannot align the underlying representational spaces of this category information across subjects.
- Hyperalignment aligns the underlying representational spaces across subjects.
- Moreover, we derived a low-dimensional representational space that seem to capture the categorical information present in the VT cortex.

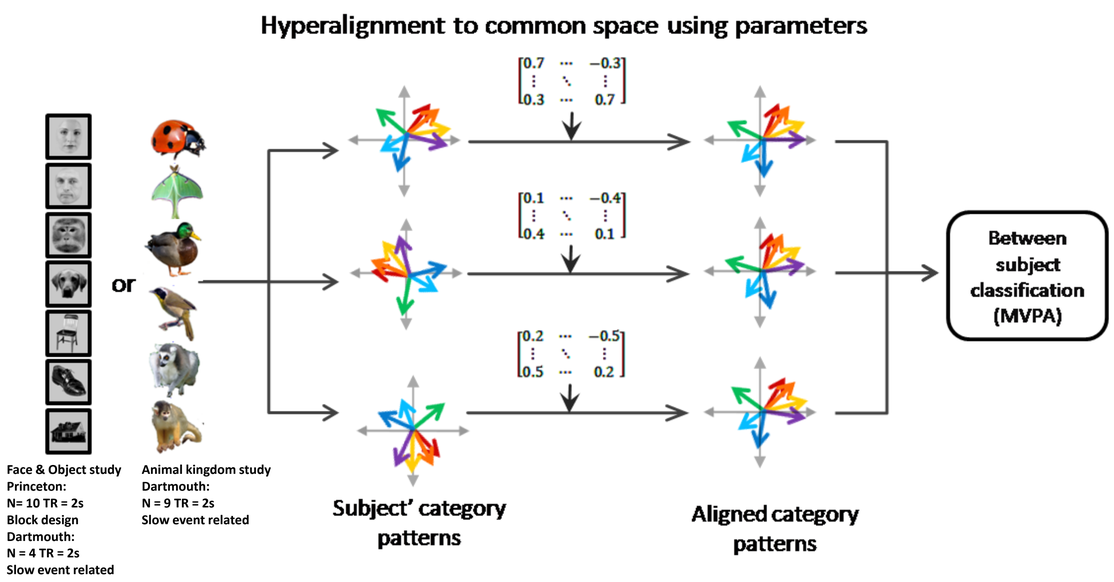
METHODS



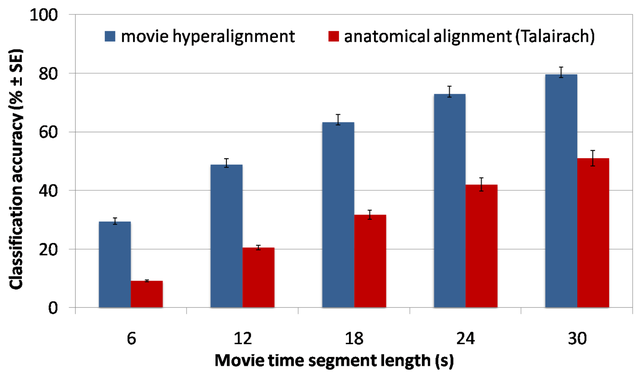
Princeton (Siemens)
N= 10 TR = 3s 2 parts
Dartmouth (Philips)
N = 9 TR = 2.5s 8 parts

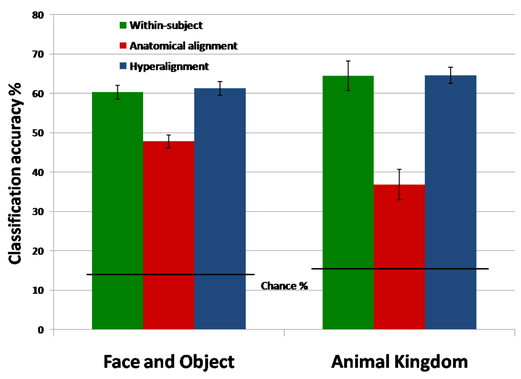
Hyperalignment

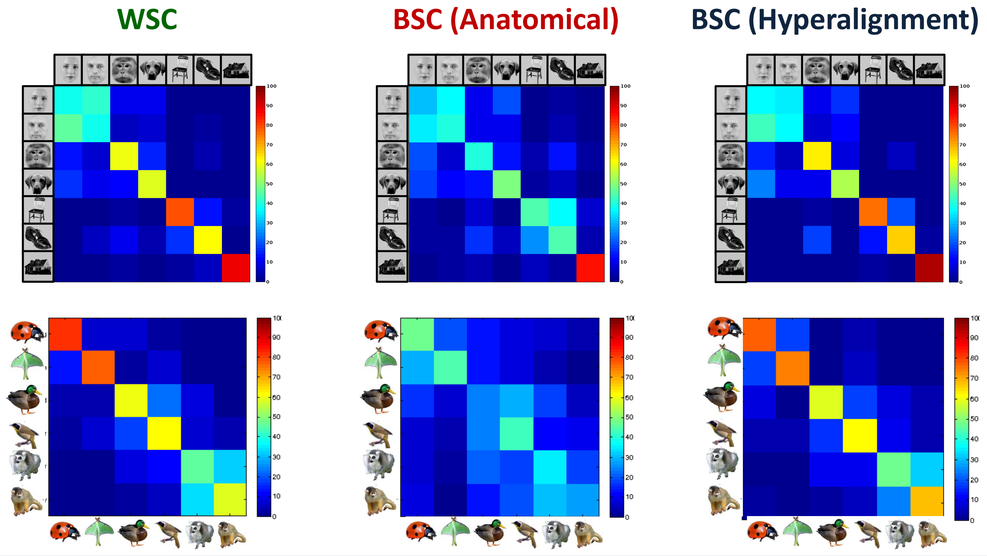




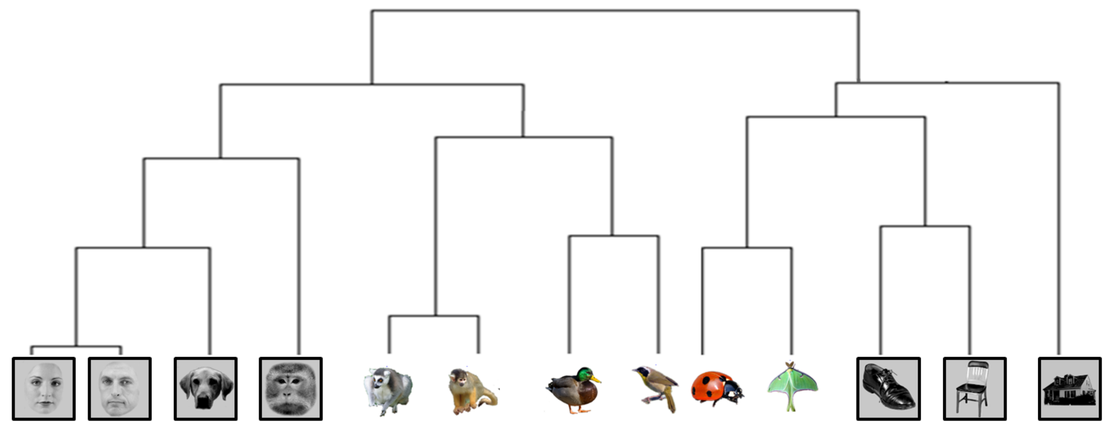
RESULTS



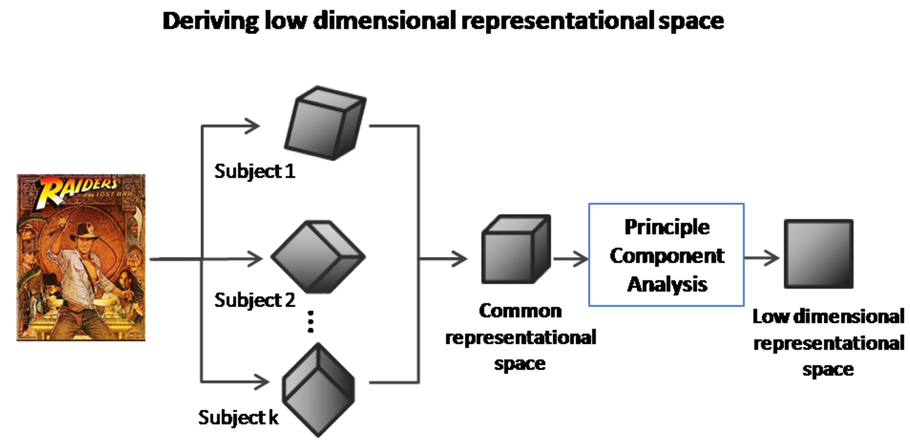


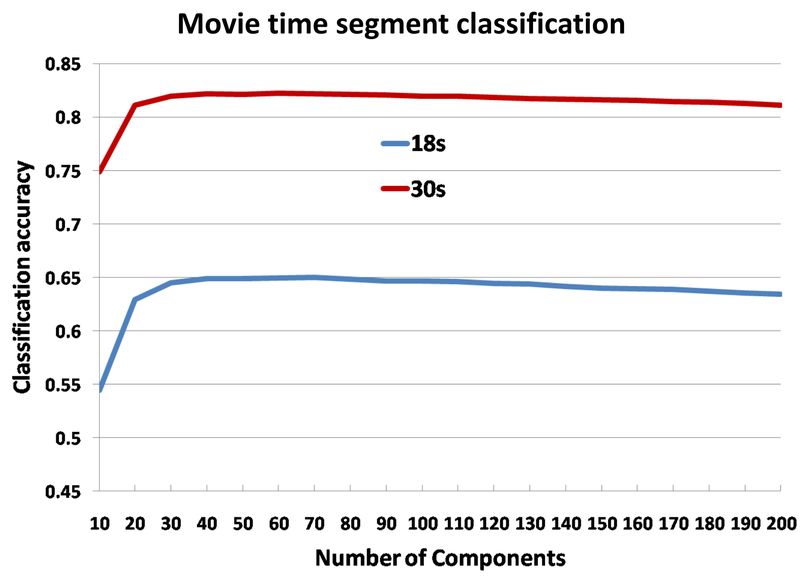


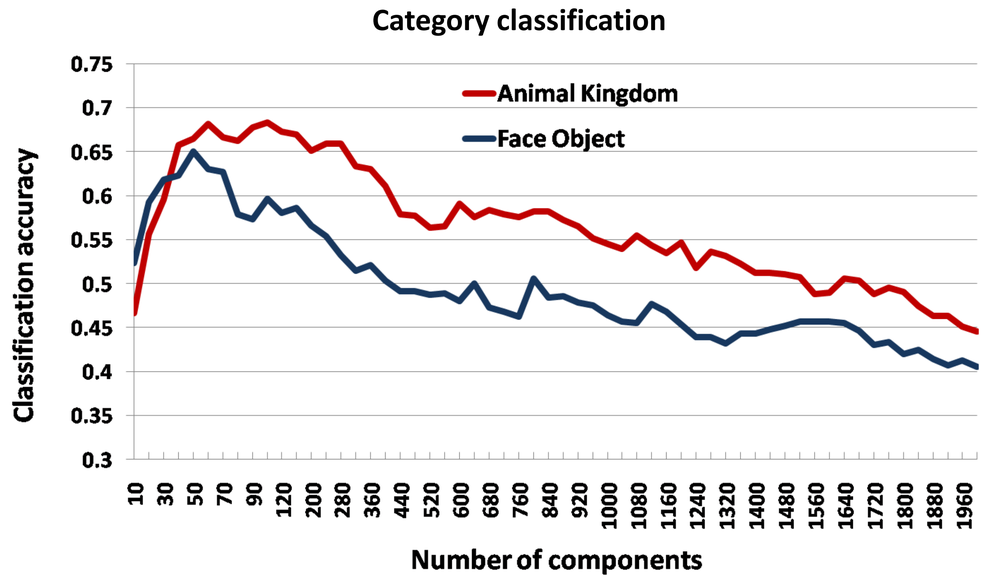
Combined similarity structure



Representational space







CONCLUSIONS

- **Hyperalignment reveals** a higher level of **commonality in the** underlying **neural codes** across subjects**.**
- **Hyperalignment allows us to derive a common neural representational space that captures the information represented in VT cortex.**

References

1. Haxby, J.V., Gobbini, M.I., Furey, M.L., Ishai, A., Schouten, J.L., Pietrini, P. Distributed and overlapping representations of faces and objects in ventral temporal cortex. *Science* **293**, 2425-2430 (2001).
2. Sabuncu, M.R., Singer, B.D., Conroy, B., Bryan, R.E., Ramadge, P.J., Haxby J.V. Function-based intersubject alignment of human cortical anatomy. *Cereb. Cortex*, doi:10.1093/cercor/bhp085.