### Behavioral Space Structure of the TOR1A Model of Dystonia Under Trihexyphenidyl

EMC UNIVER

Ahmad Abdal Qader<sup>1</sup>, Yuping Donsante<sup>3</sup>, Jeffrey E. Markowitz<sup>1</sup>, Hyder A. Jinnah<sup>4,5</sup>, Chethan Pandarinath<sup>1,2</sup> and Ellen J. Hess<sup>3,4</sup>

<sup>1</sup>Wallace H. Coulter Dept. of Biomedical Engineering at Emory Univ. and Georgia Inst. of Tech, Atlanta, GA, USA; <sup>2</sup>Dept. of Neurosurgery, Emory University, Atlanta, GA, USA; <sup>3</sup>Dept. of Pharmacology and Chemical Biology, Emory University, Atlanta, GA, USA <sup>4</sup>Dept. of Neurology, Emory University, Atlanta, GA, USA; <sup>5</sup>Depts. of Human Genetics and Pediatrics, Emory University, Atlanta, GA, USA







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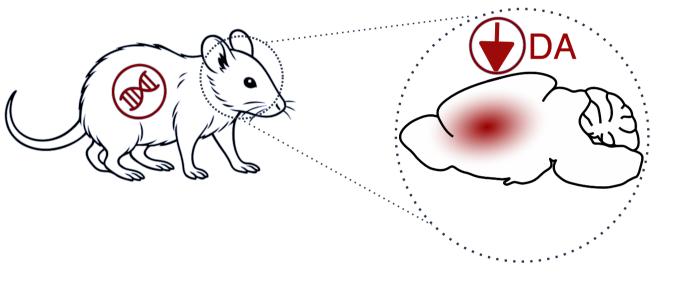
# Generalized dystonia: a hyperkinetic movement disorder that has been recapitulated by many animal models

Dystonia is characterized by involuntary muscle contractions causing twisting movements. Its heterogeneity has led to the creation of many animal models attempting to recapitulate its symptoms.



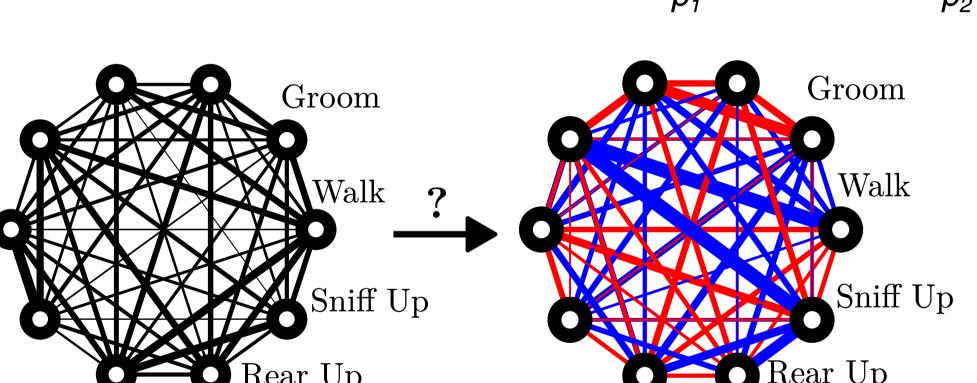


TOR1A knock-in mouse model of dystonia does not show an overt behavioral phenotype despite significant neurological defects



But striatal defects are observed. So the behavioral phenotype could arise as a disruption in action sequencing rather than execution

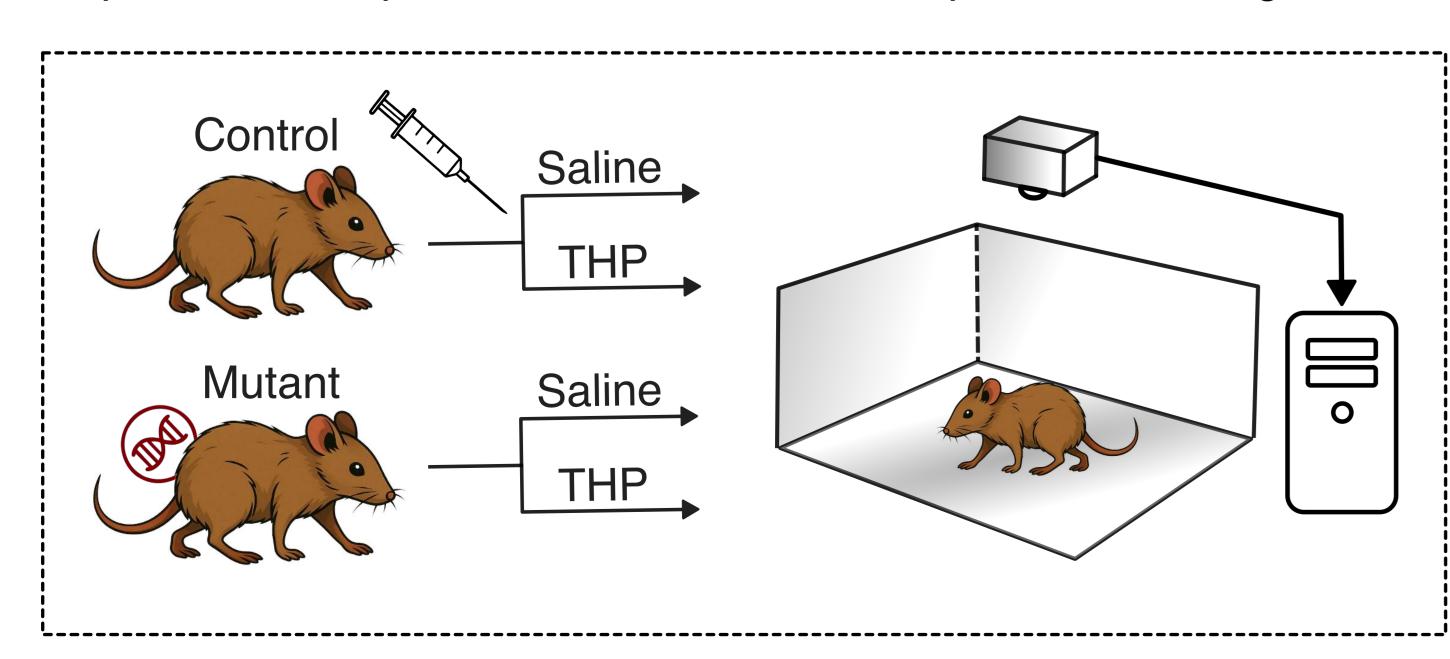
Can a change in action frequency and transition dynamics be detected?

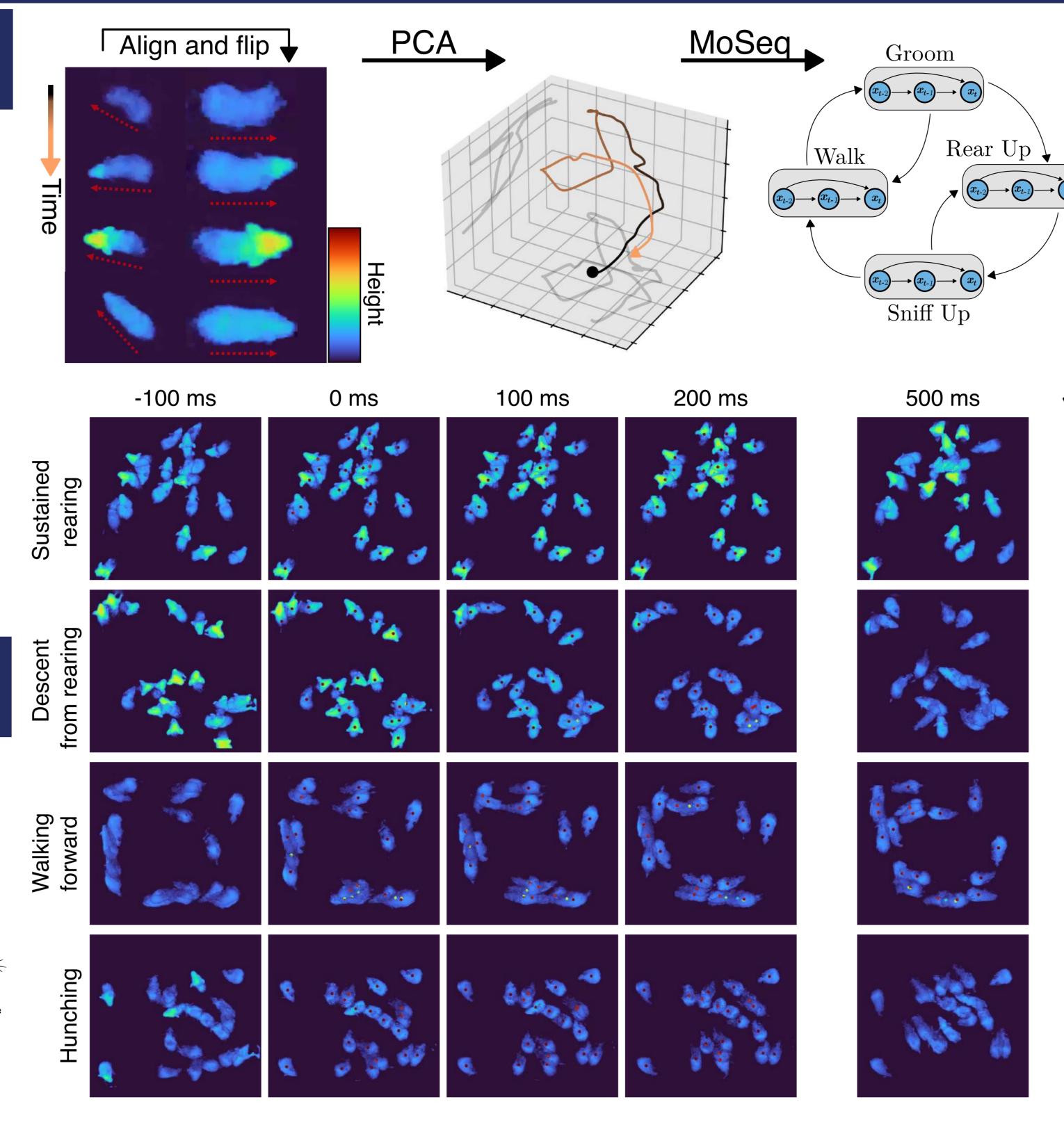


How do antidystonia drugs such as trihexyphenidyl (THP) influence these dynamics?

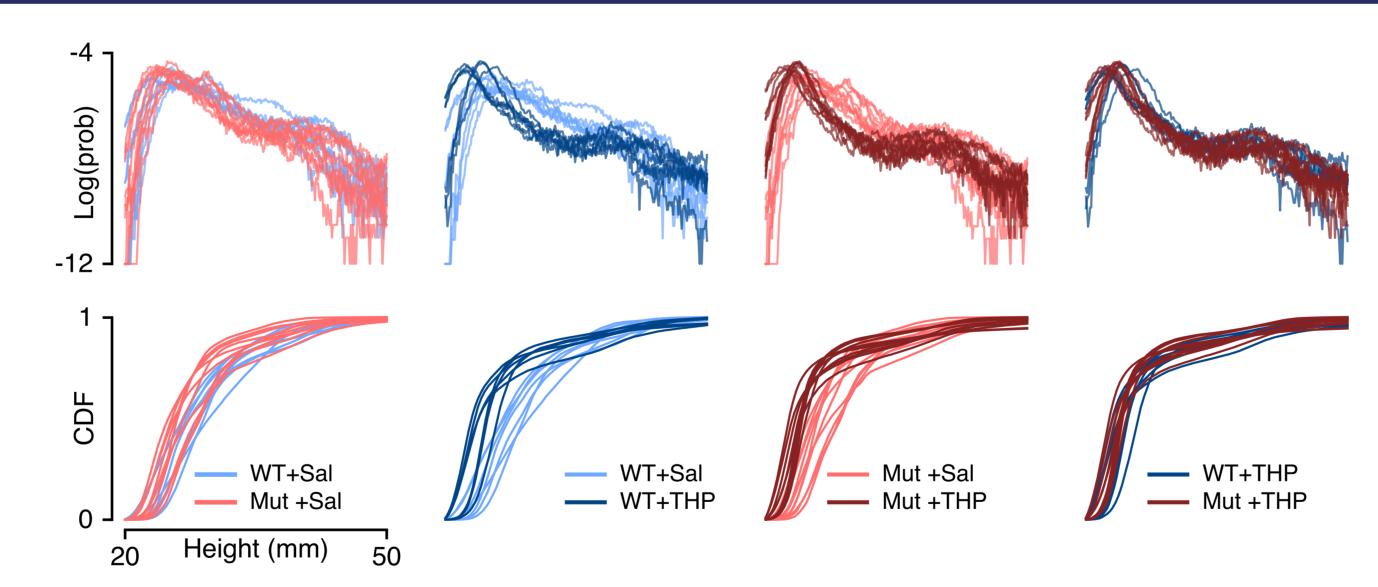
# Segmenting continuous spontantous behavior through an unsupervised assay enables access to subsecond behaviors

We recorded 3D pose dynamics during spontaneous behavior via a top-mounted depth sensor in a crossover experimental design.

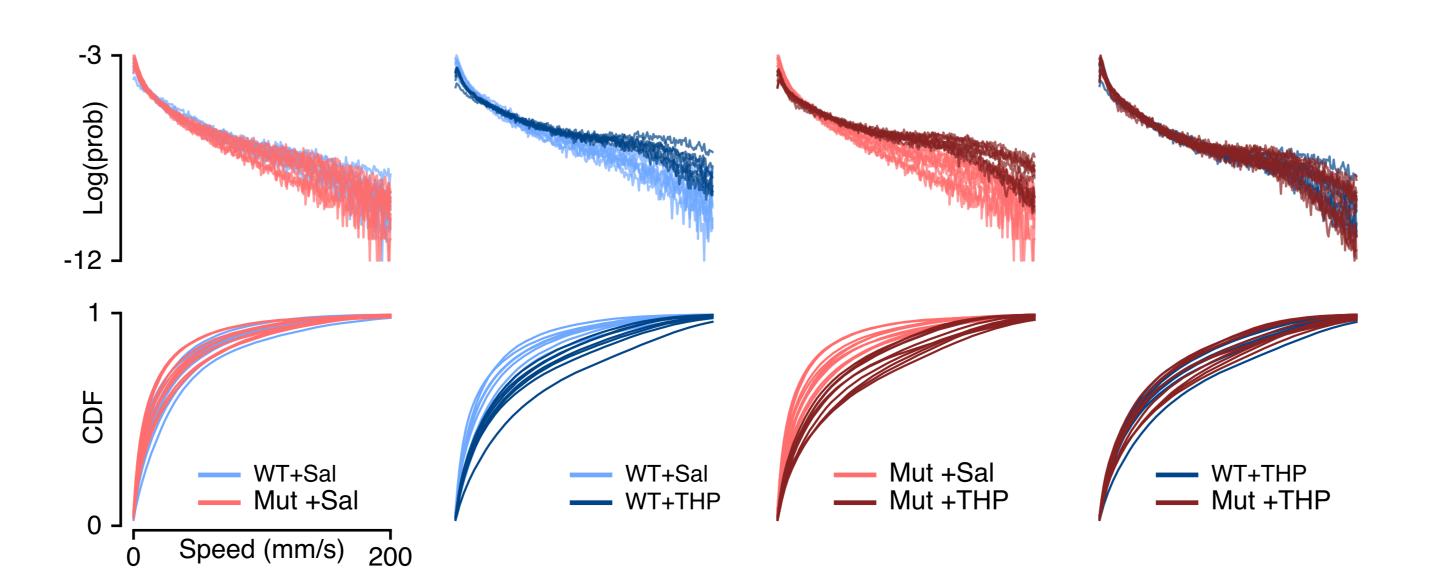


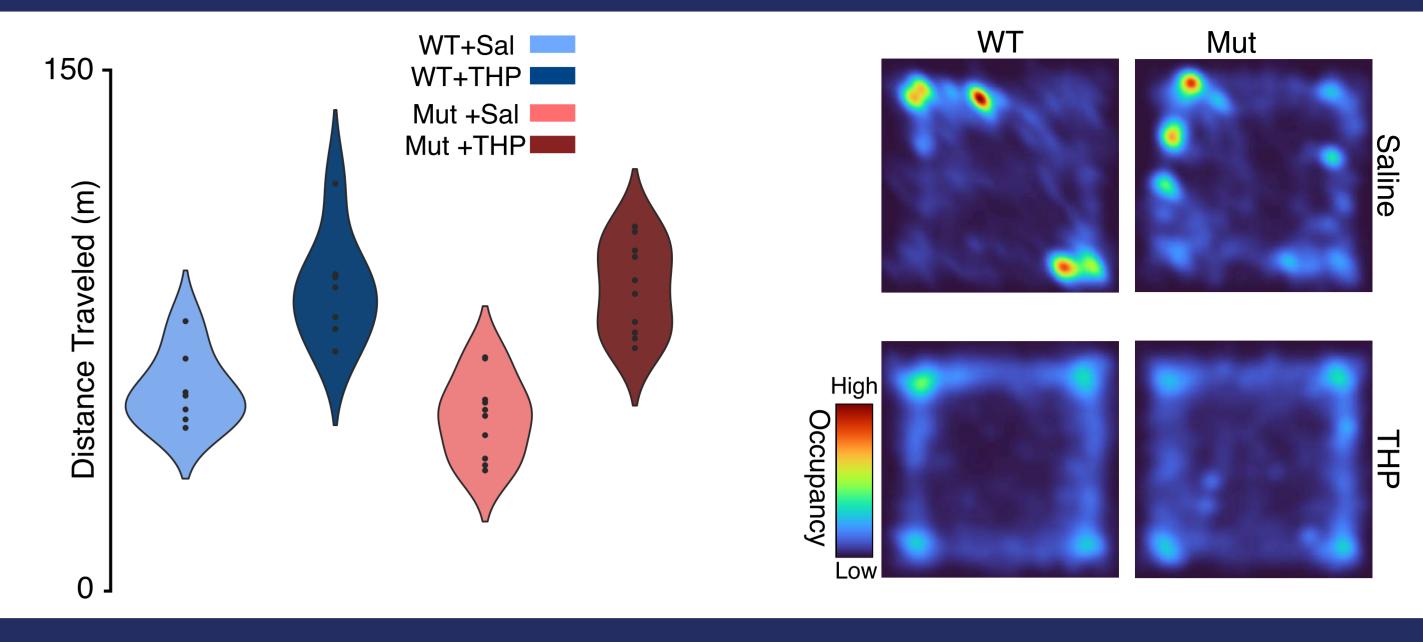


On the aggregate kinematics level, THP had similar effects on both genotypes, with no detectable baseline genotype differences

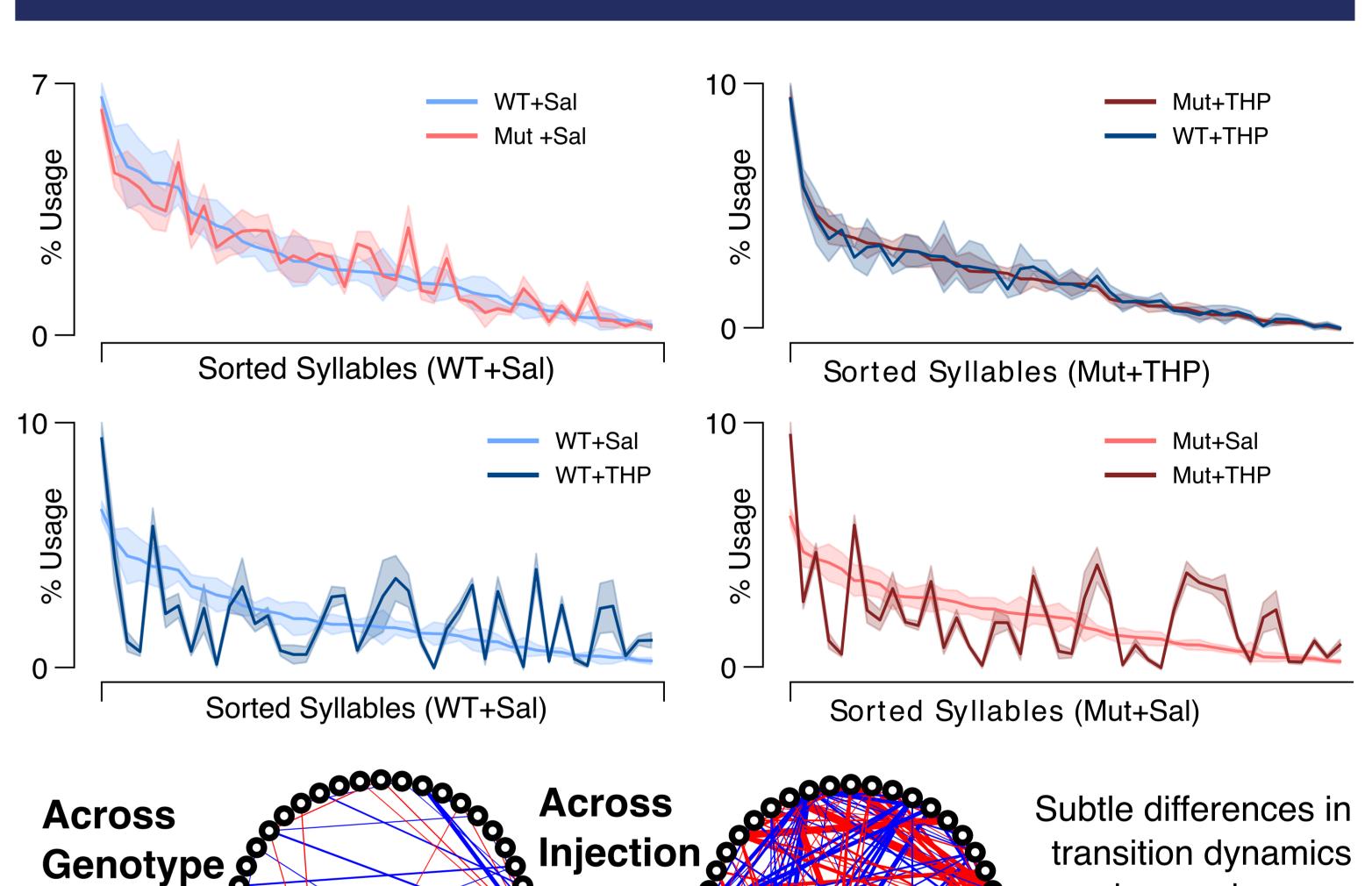


Only subtle differences in kinematics were observed across genotype, but substantial across injections





Transition dynamics only slightly differed across genotype but showed a consistent robust shift across treatments





- Unsupervised continuous behavioral segmentation reveals complex antidystonic drug effects that could enable discovery of therapeutics.
- Normal and DYT1 mice display subtle differences in their behavioral space structure
- Behavioral profile differed substantially by treatment and across sex

### Acknowledgements

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