

Non-Linear Discharge of Human Motor Units During Linear Time-Varying Contractions Across Motor Pools

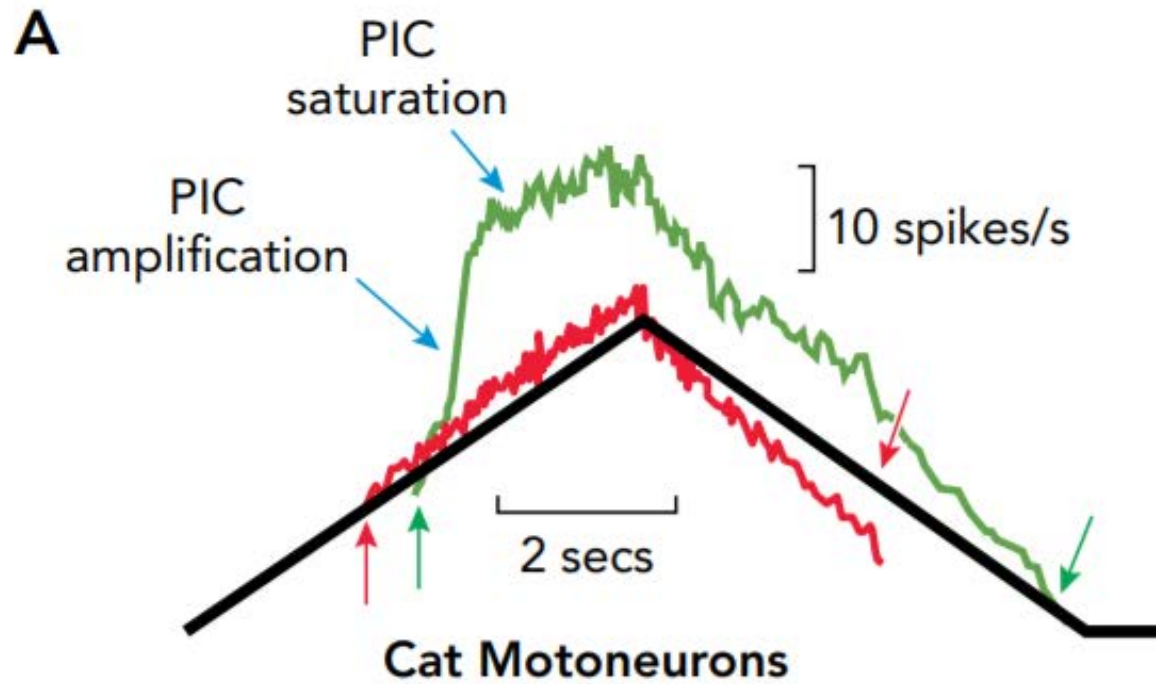
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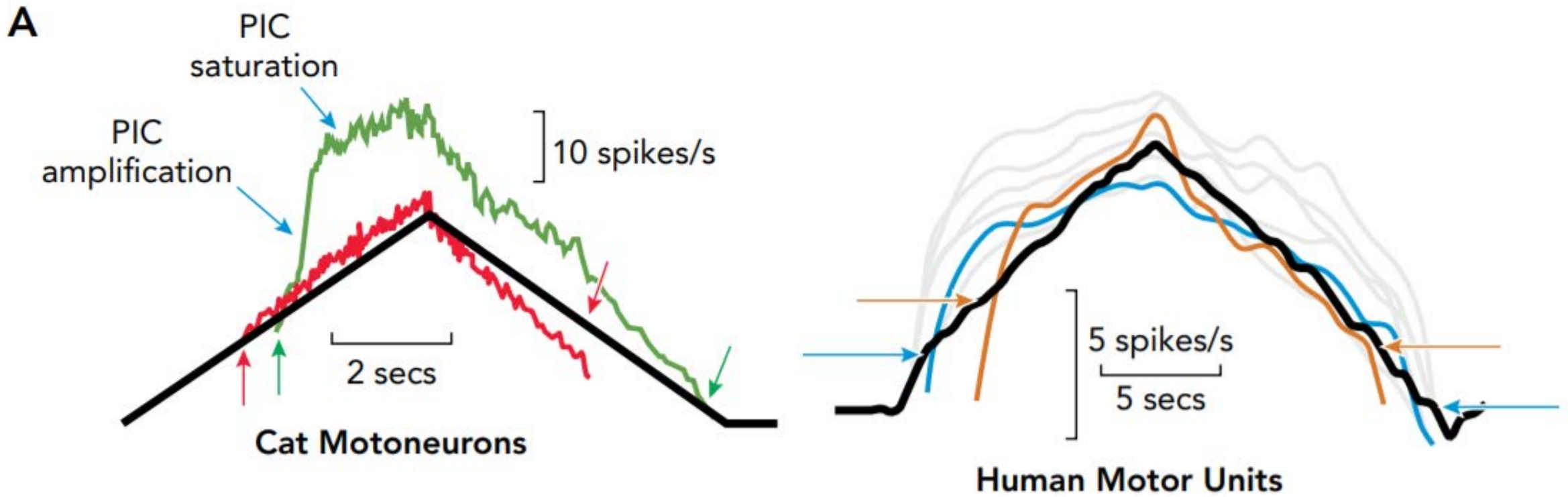


Background





Background



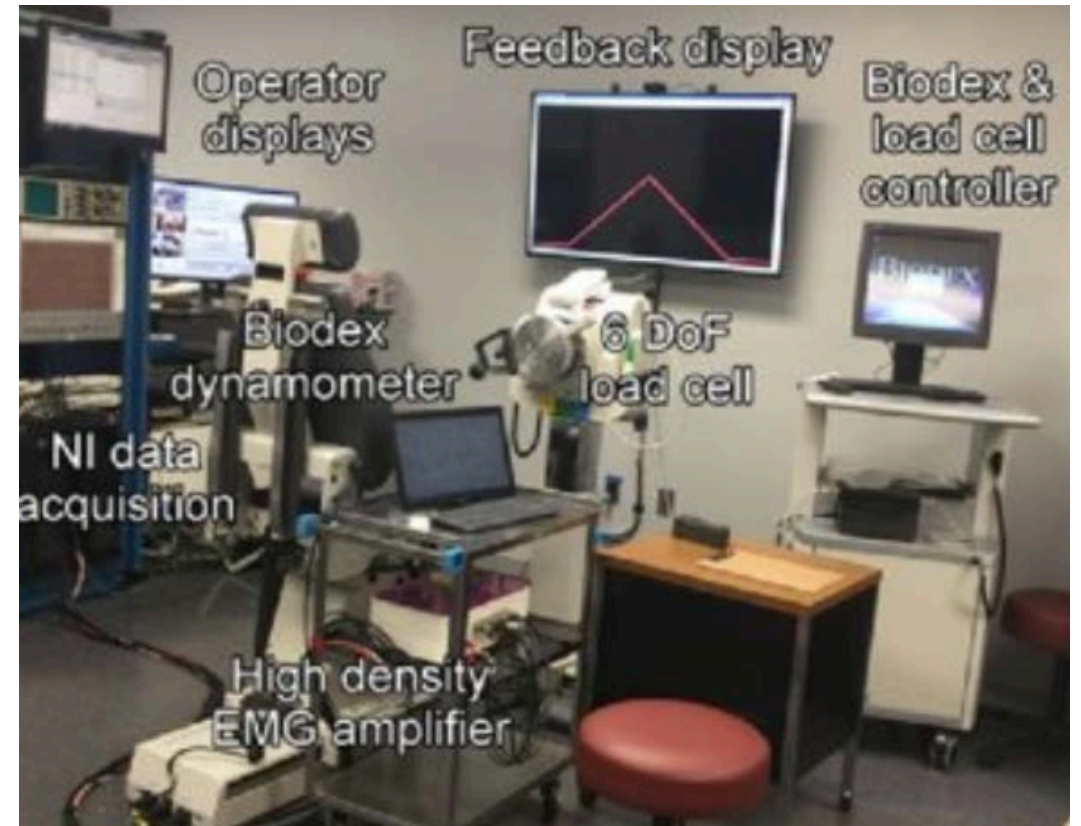
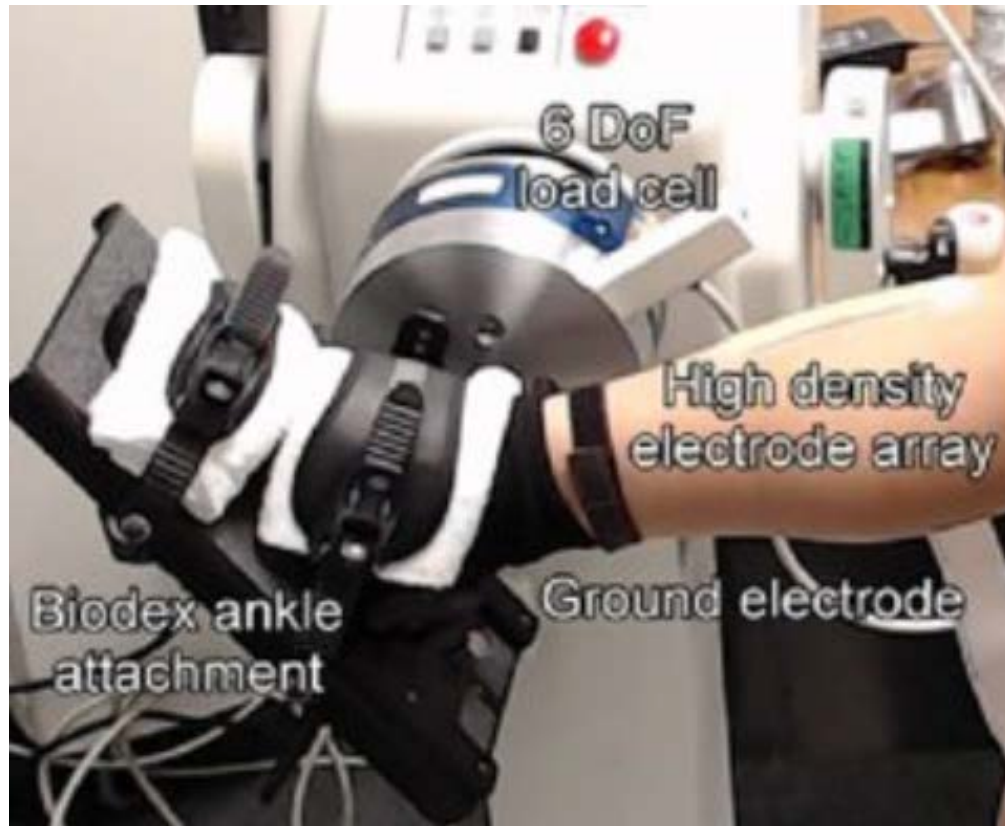


Purpose

To characterize the magnitude and prevalence of nonlinear fit in the descending limb of motor neurons



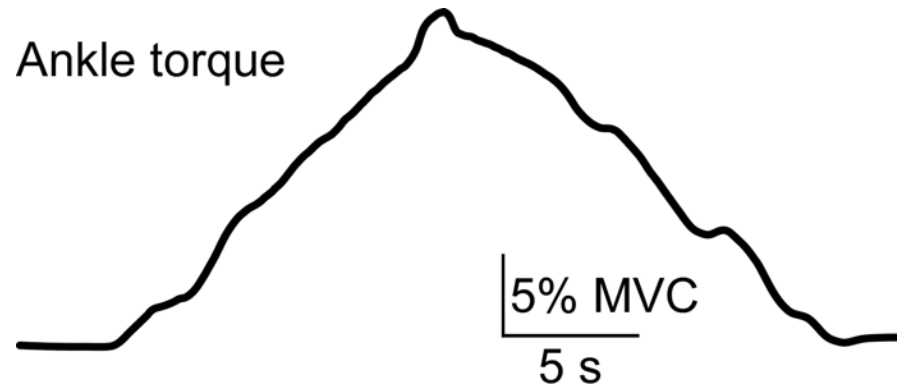
Methods- Collection



Purpose · Background · **Methods** · Results · Discussion

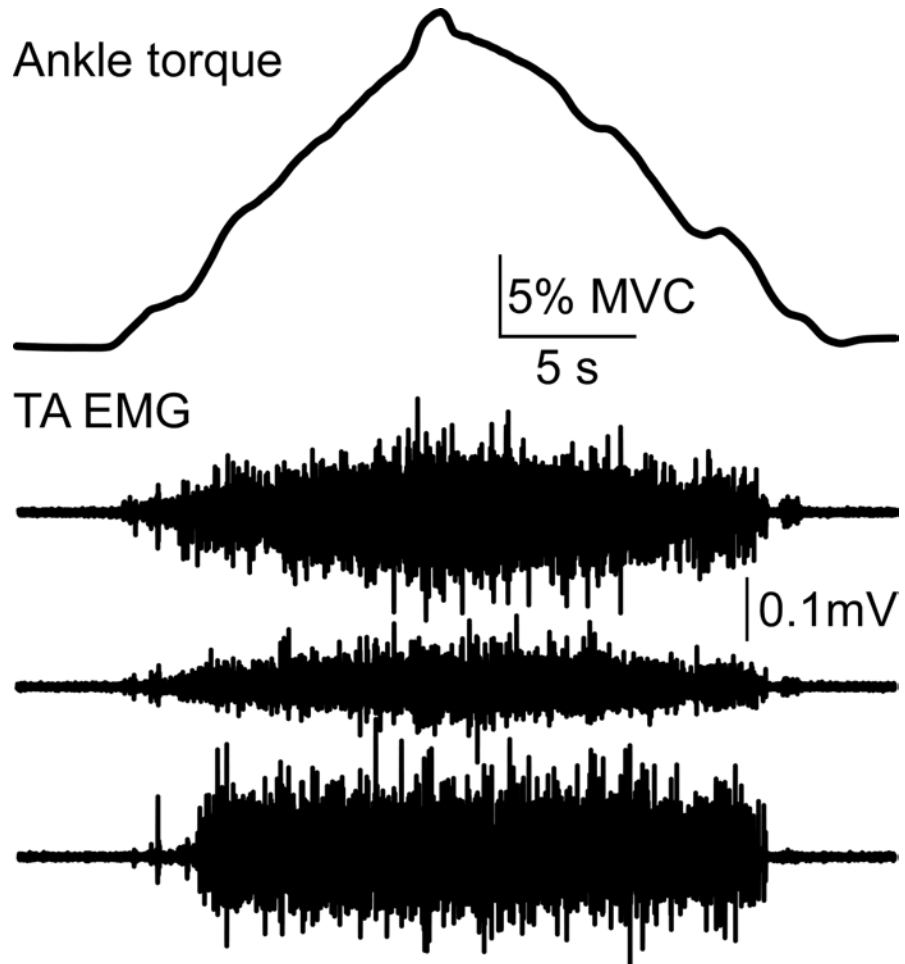


Methods- Collection





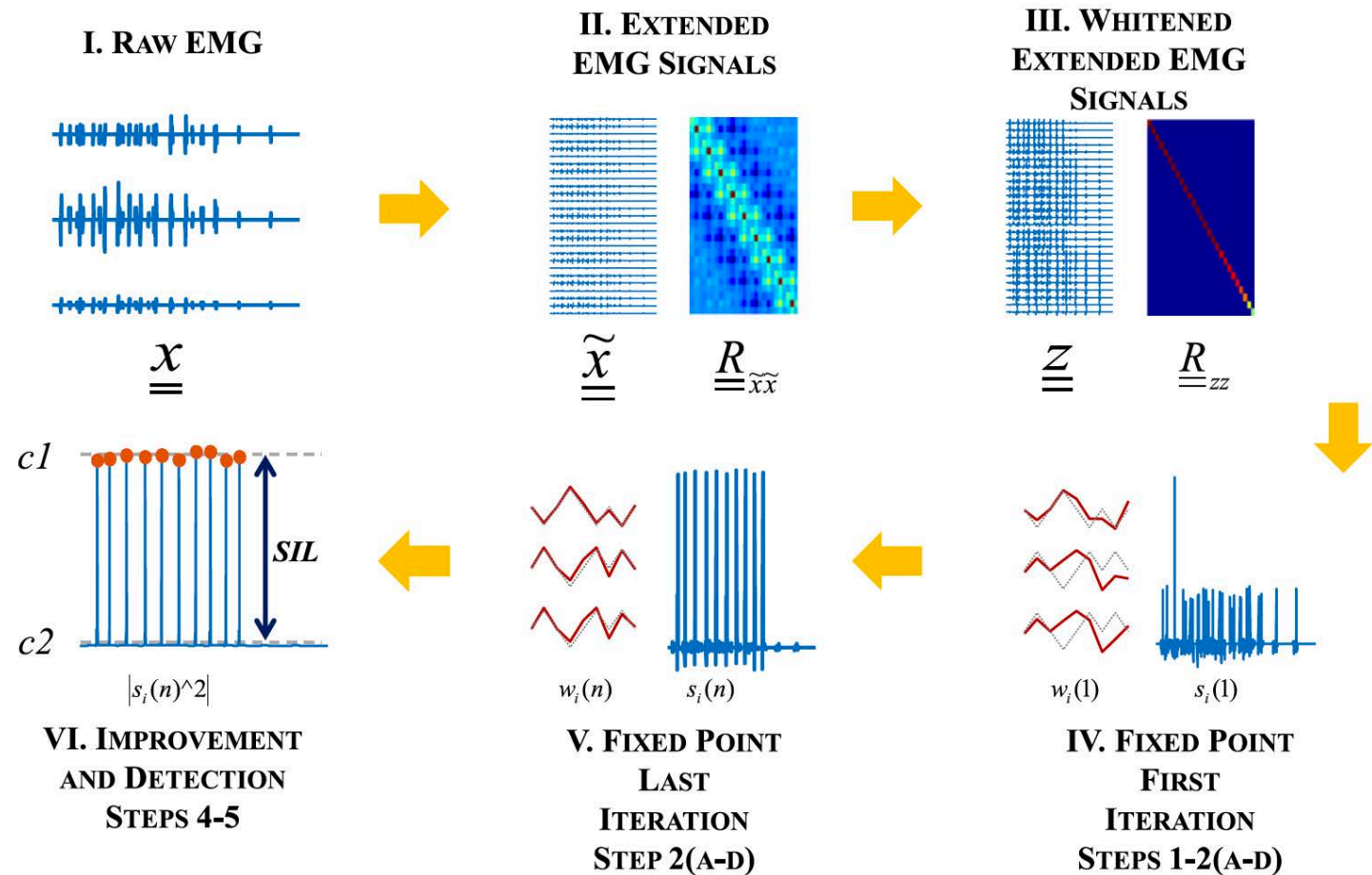
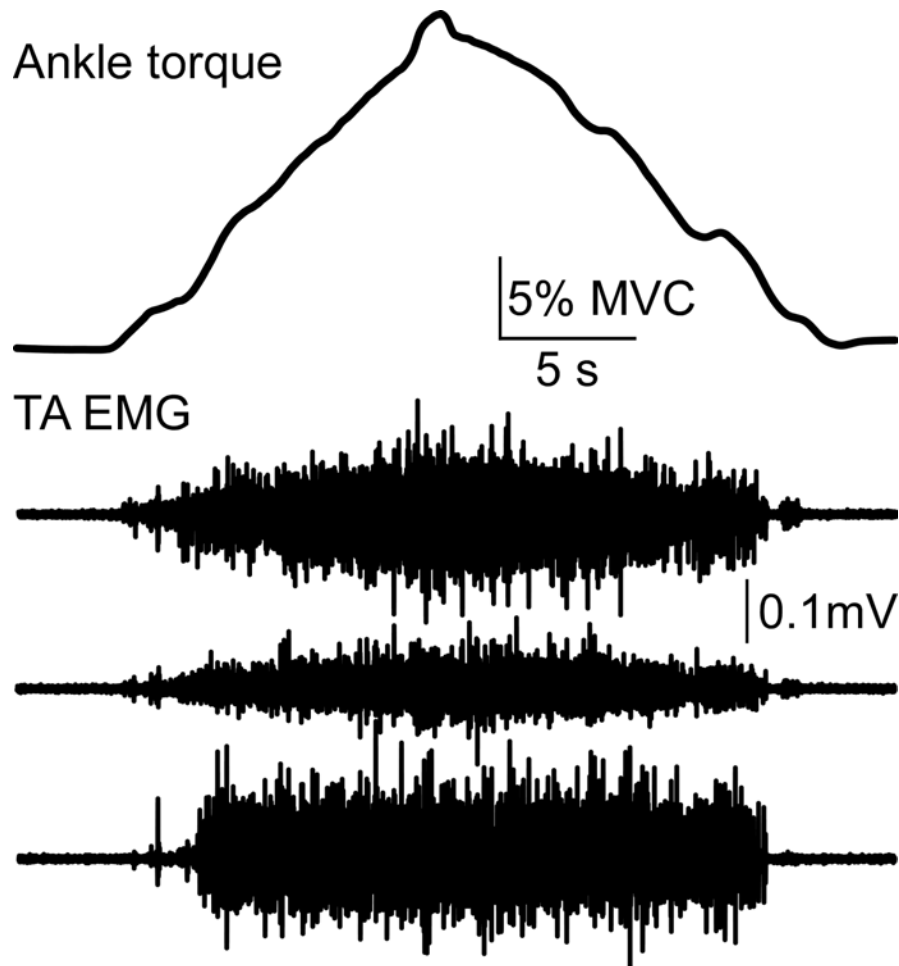
Methods- Collection



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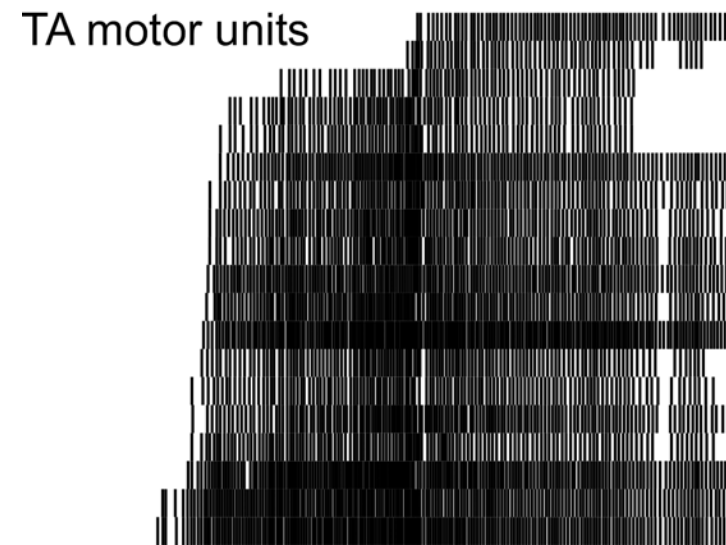
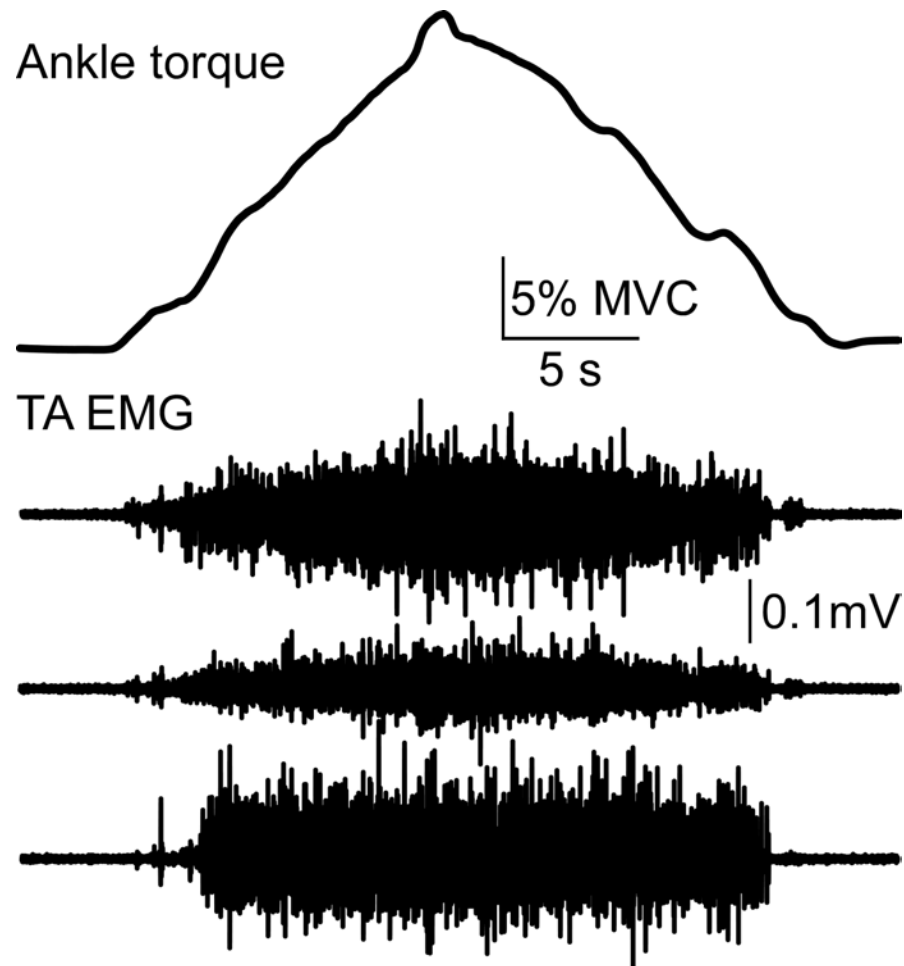
Methods- Decomposition



Purpose · Background · Methods · Results · Discussion

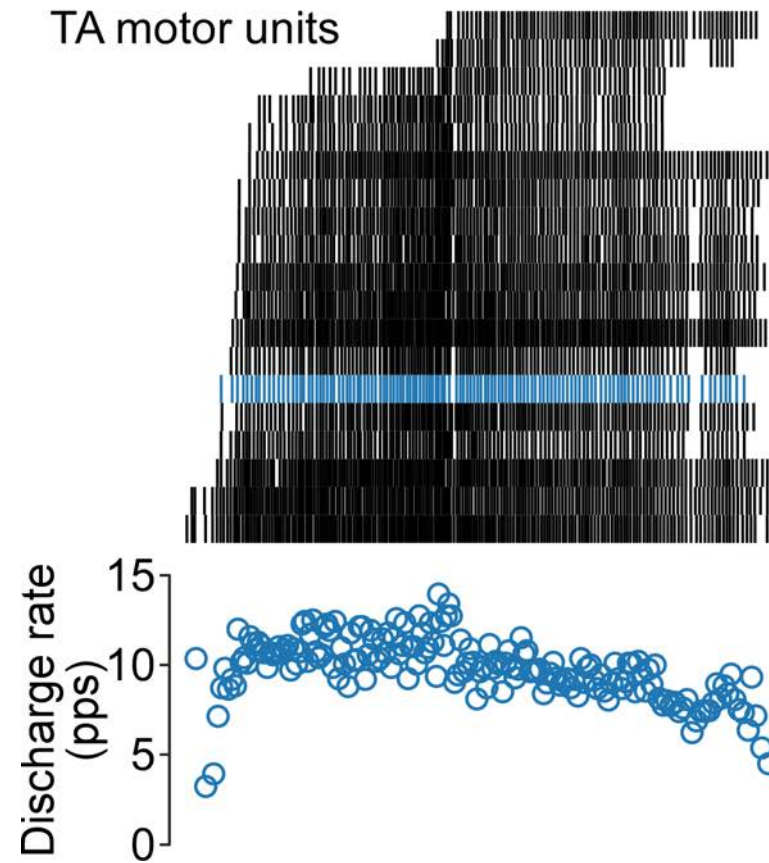
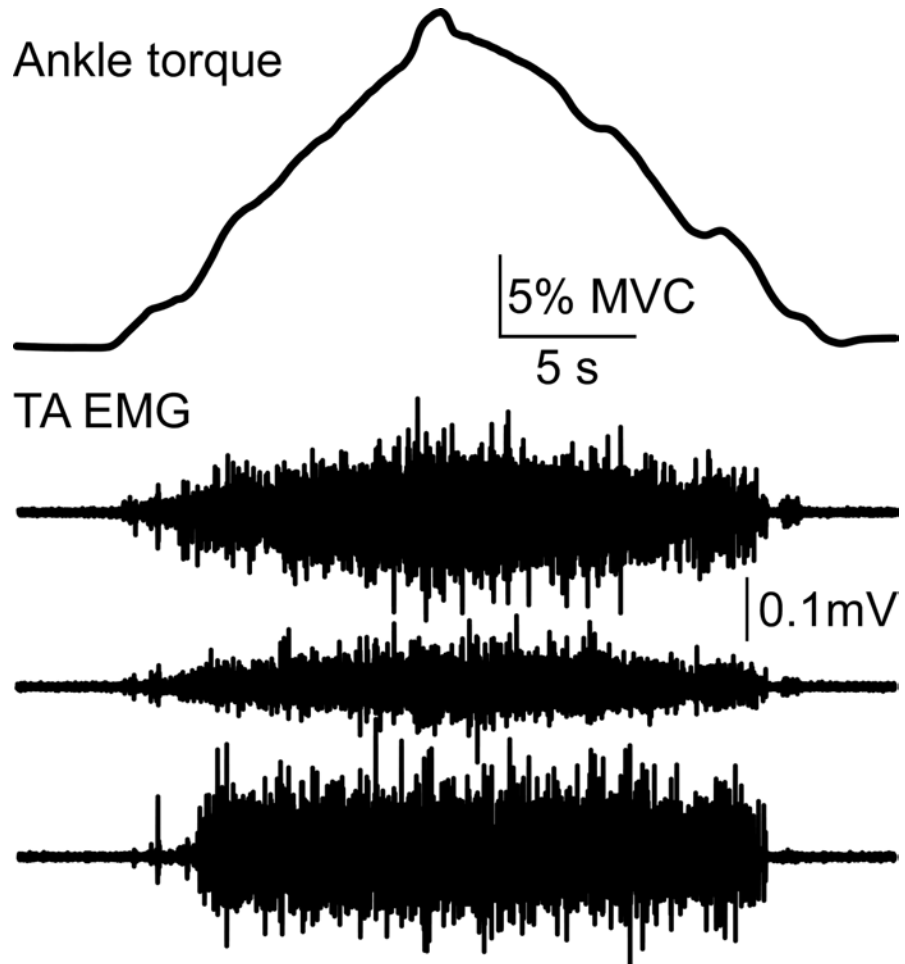


Methods- Decomposition



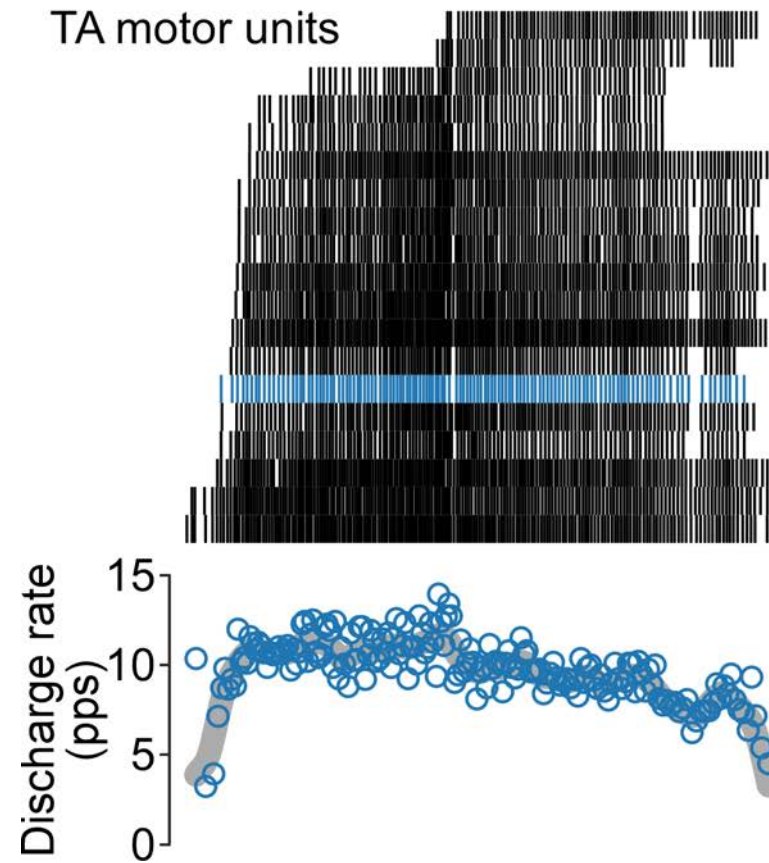
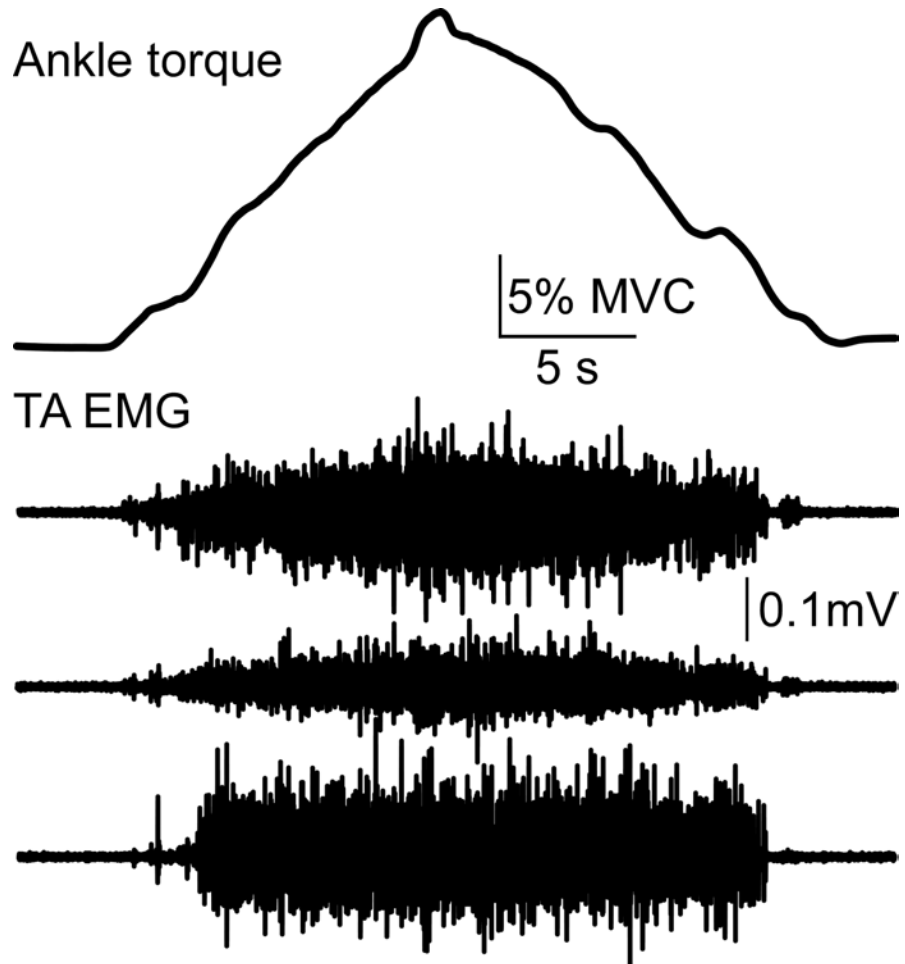


Methods- Decomposition



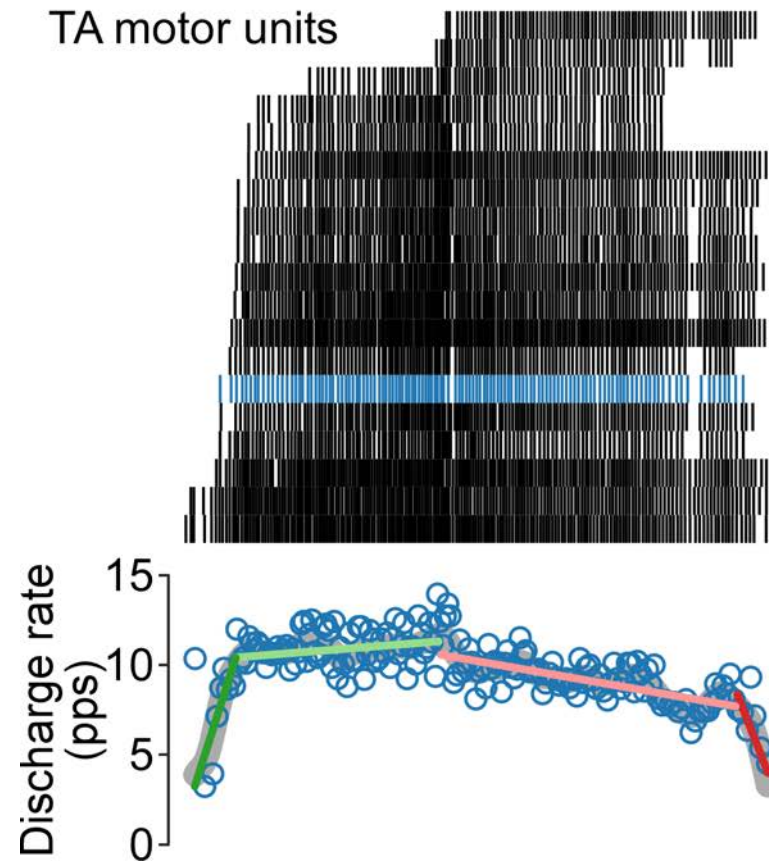
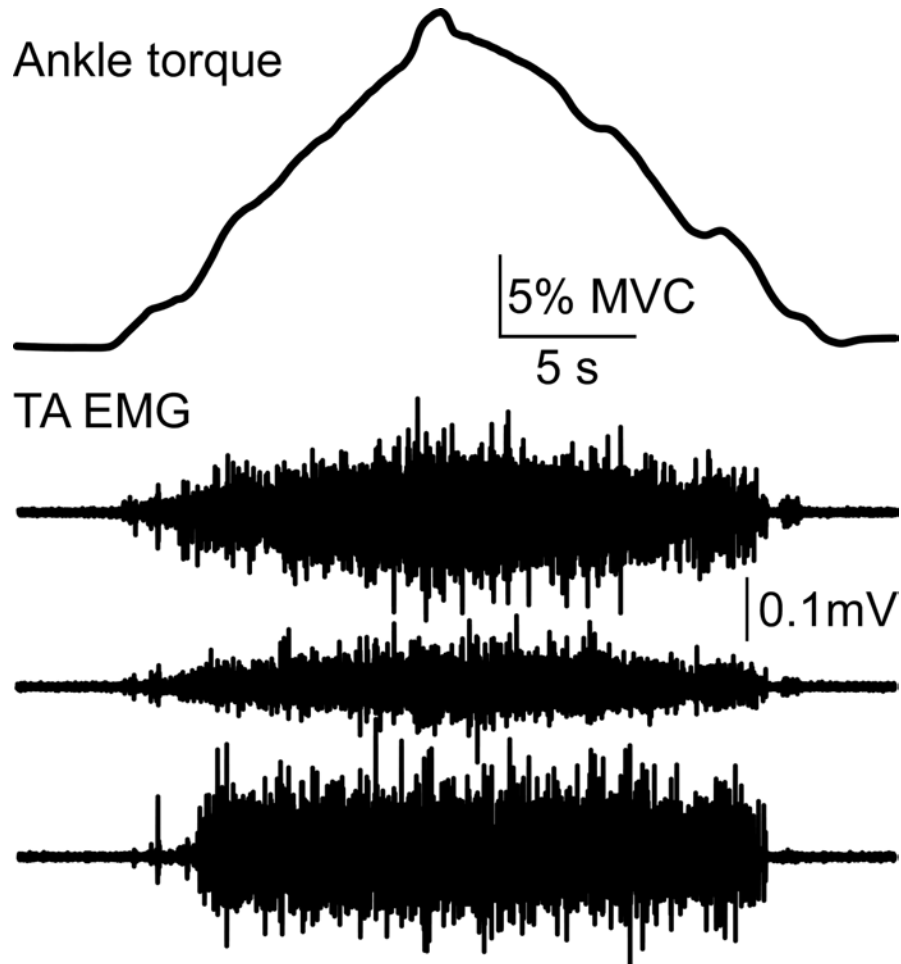


Methods- Decomposition



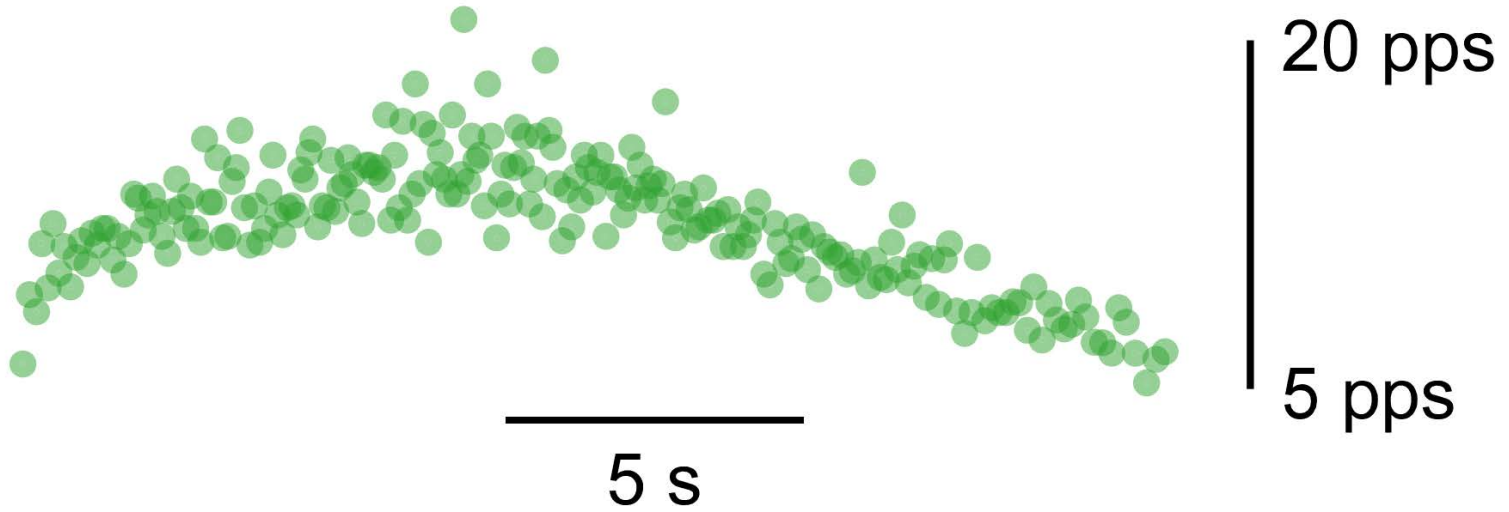


Methods- Decomposition



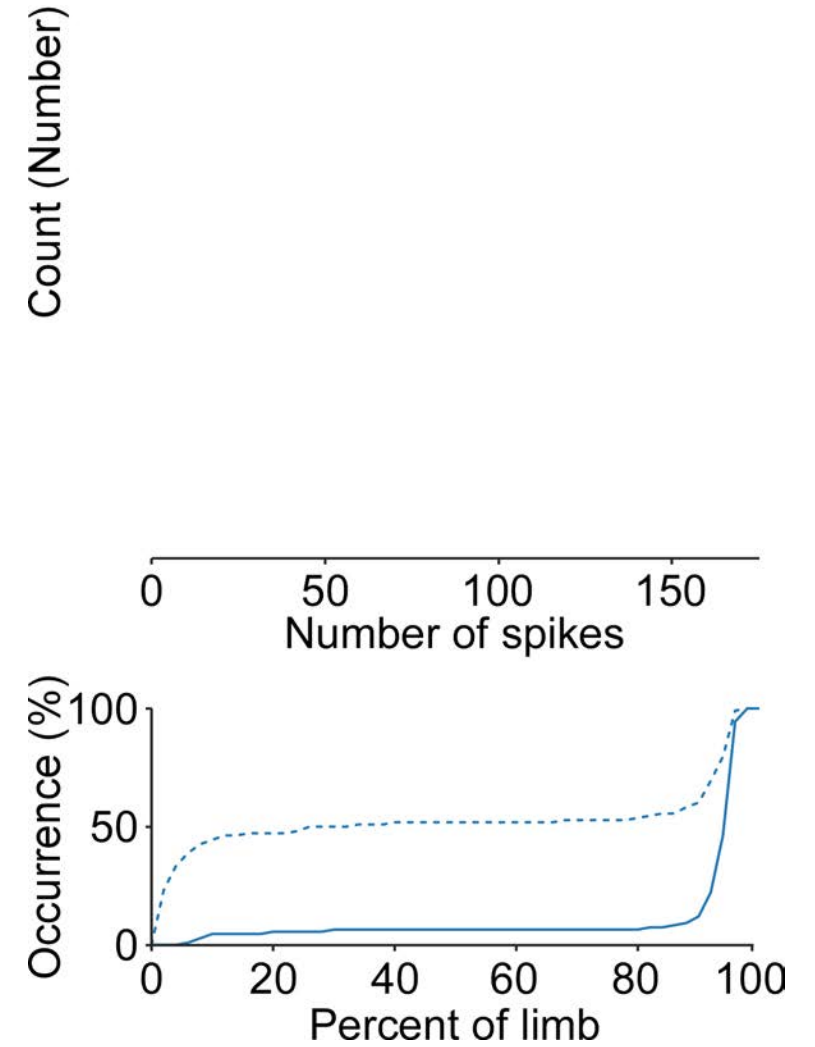
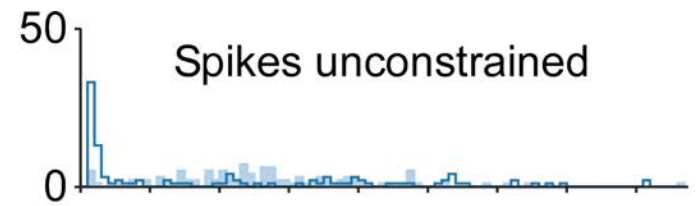
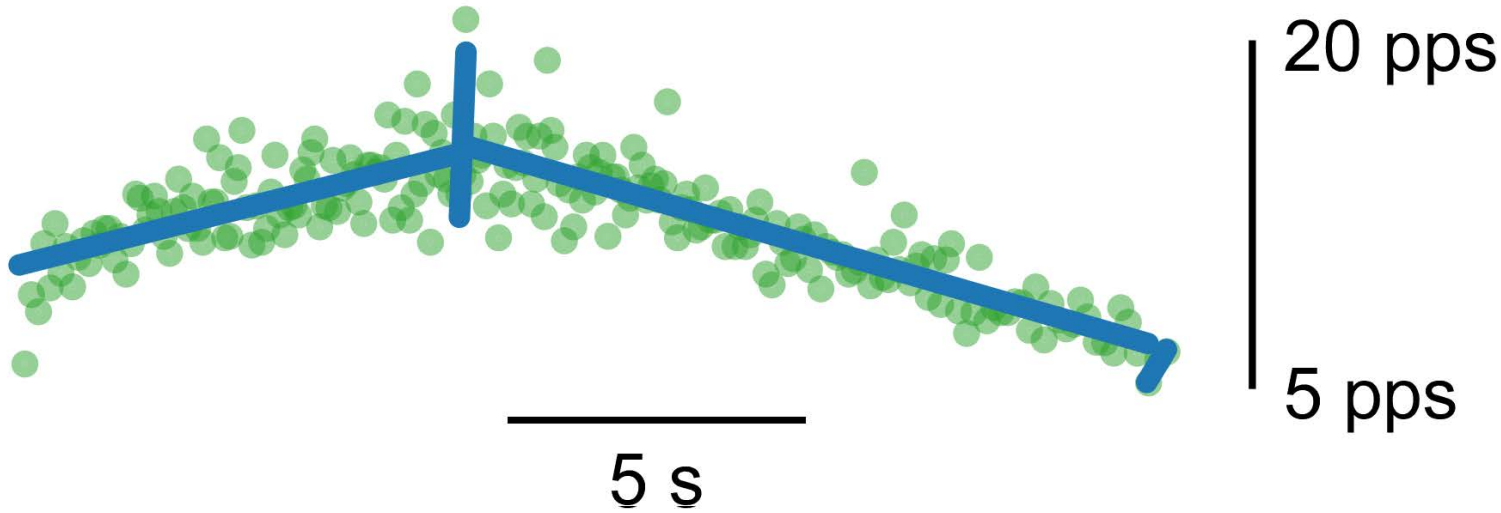


Methods- Analysis



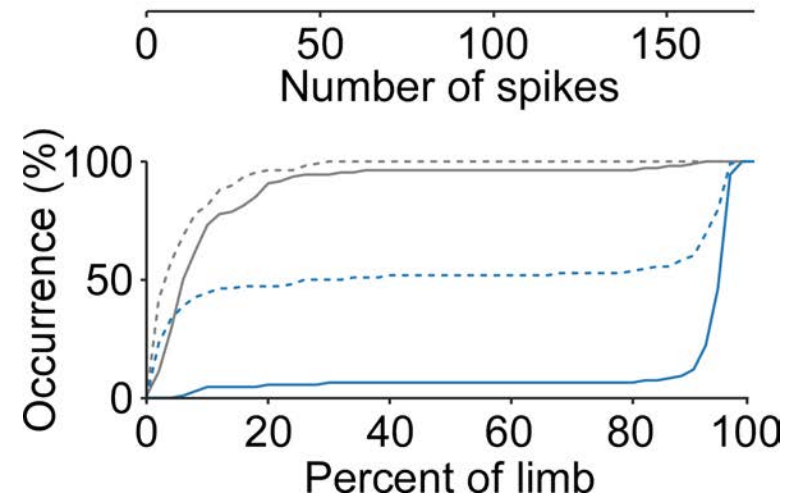
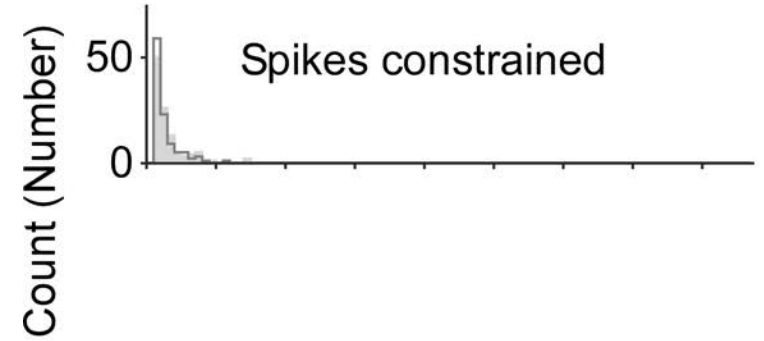
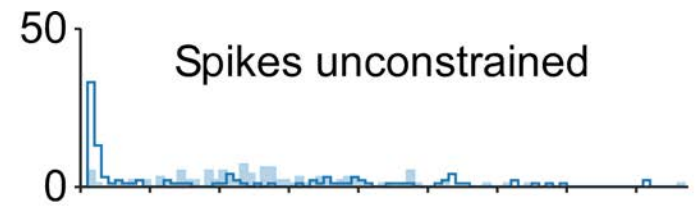
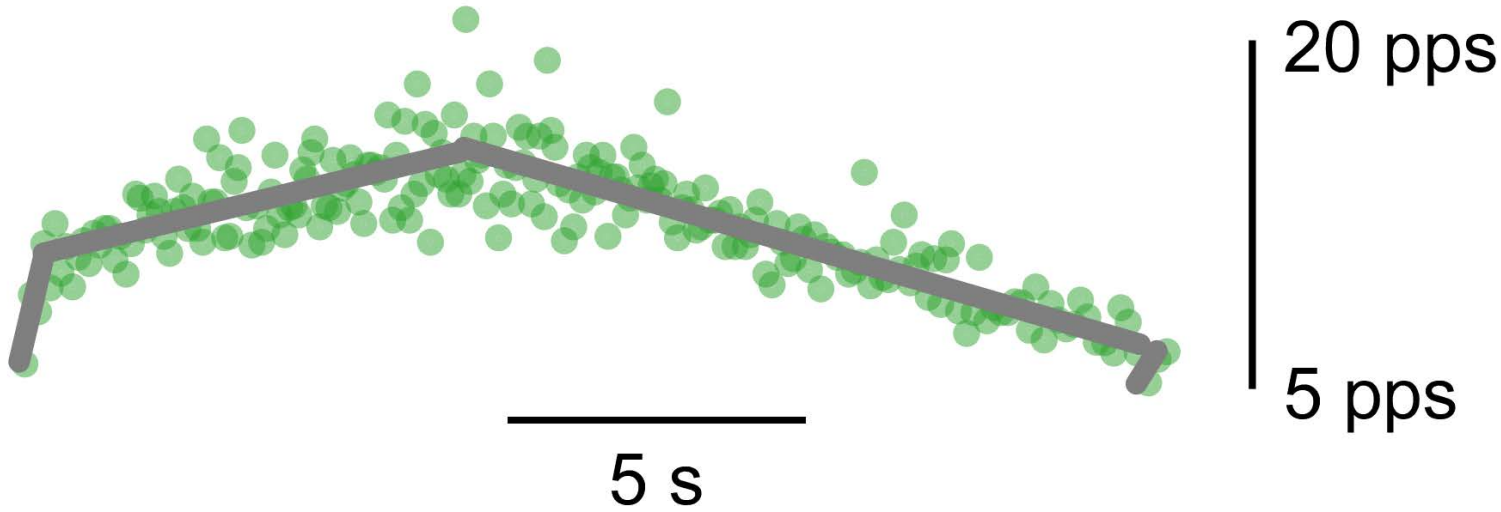


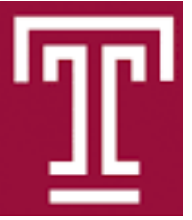
Methods- Analysis



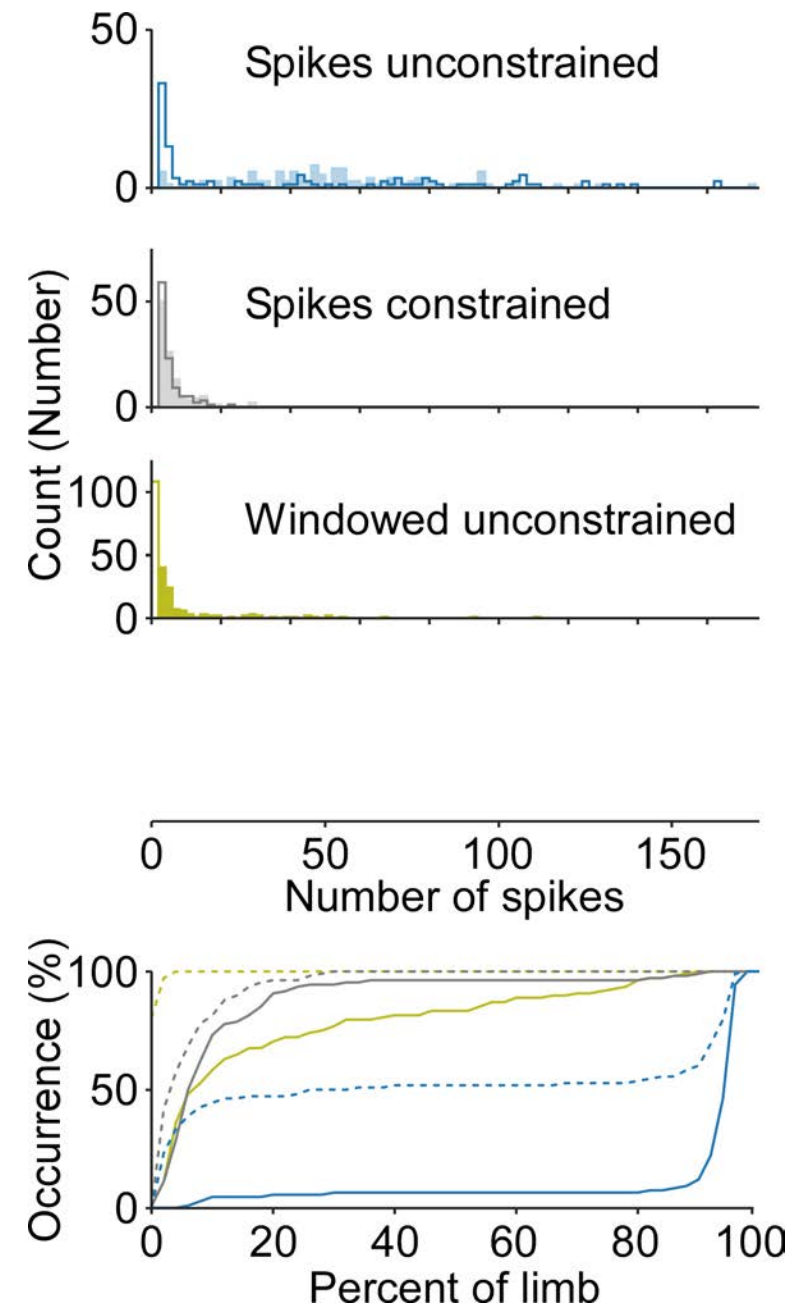
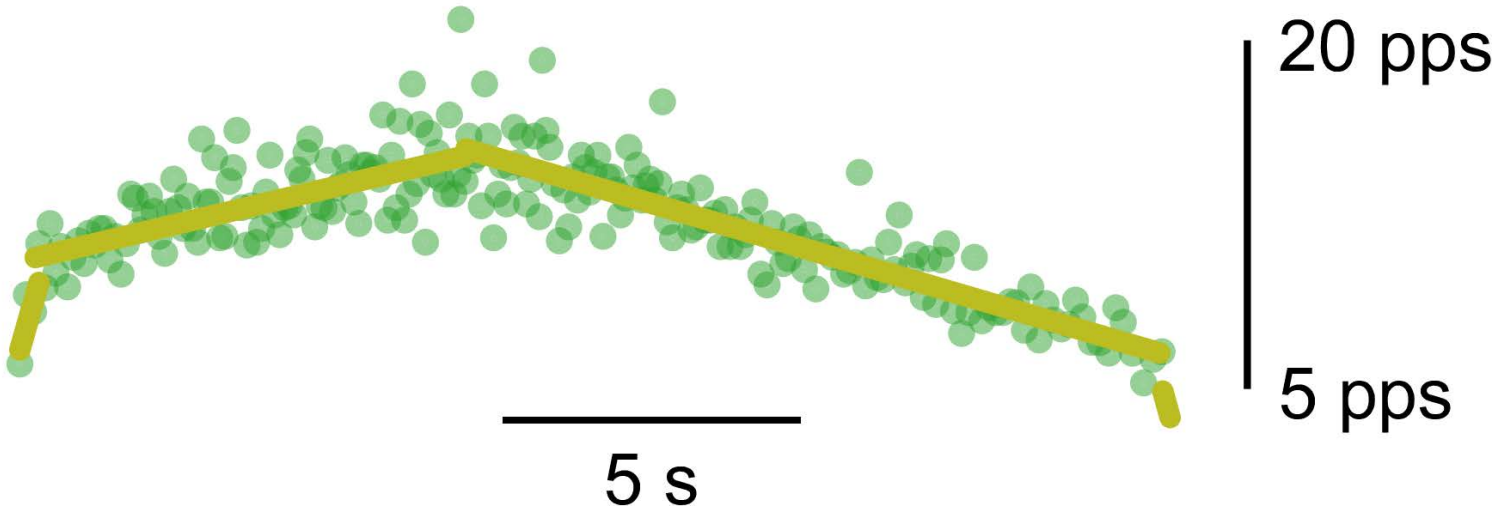


Methods- Analysis



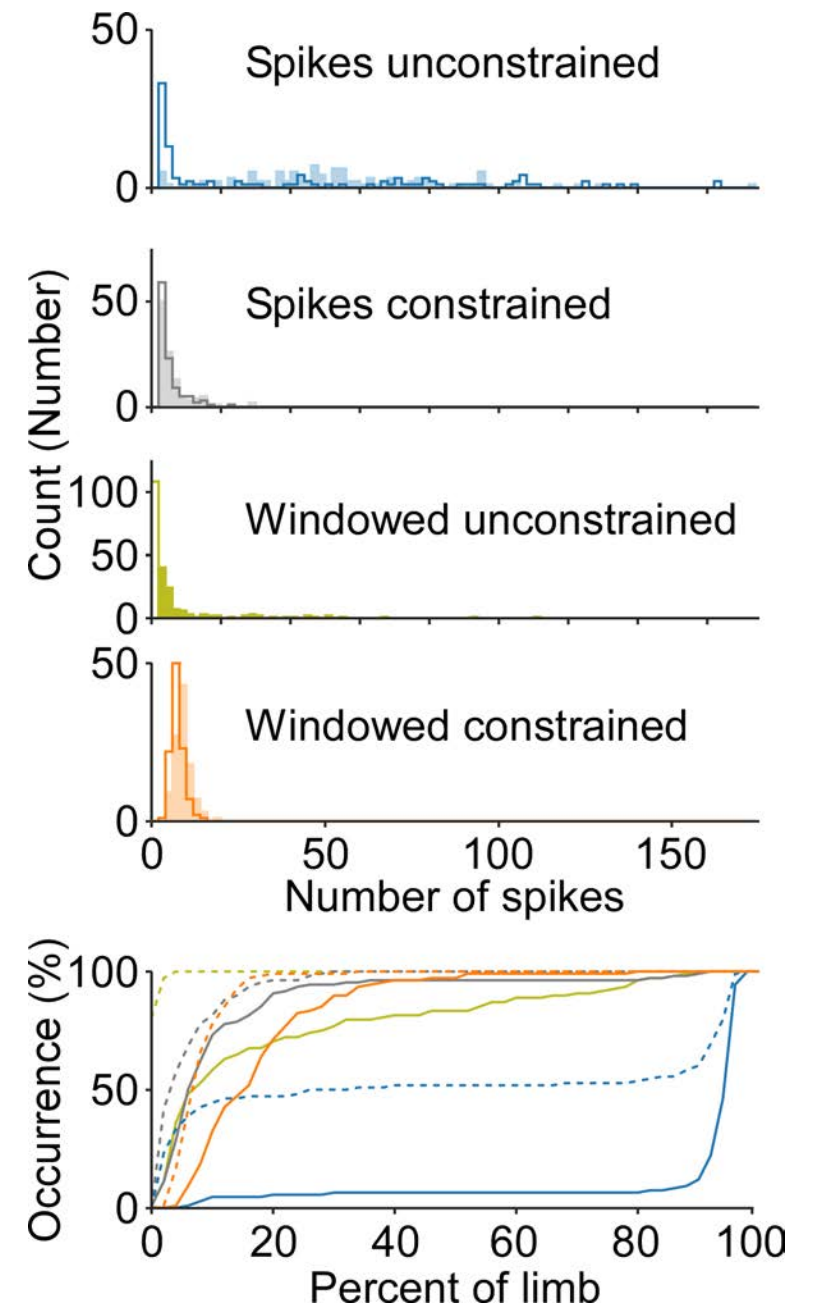
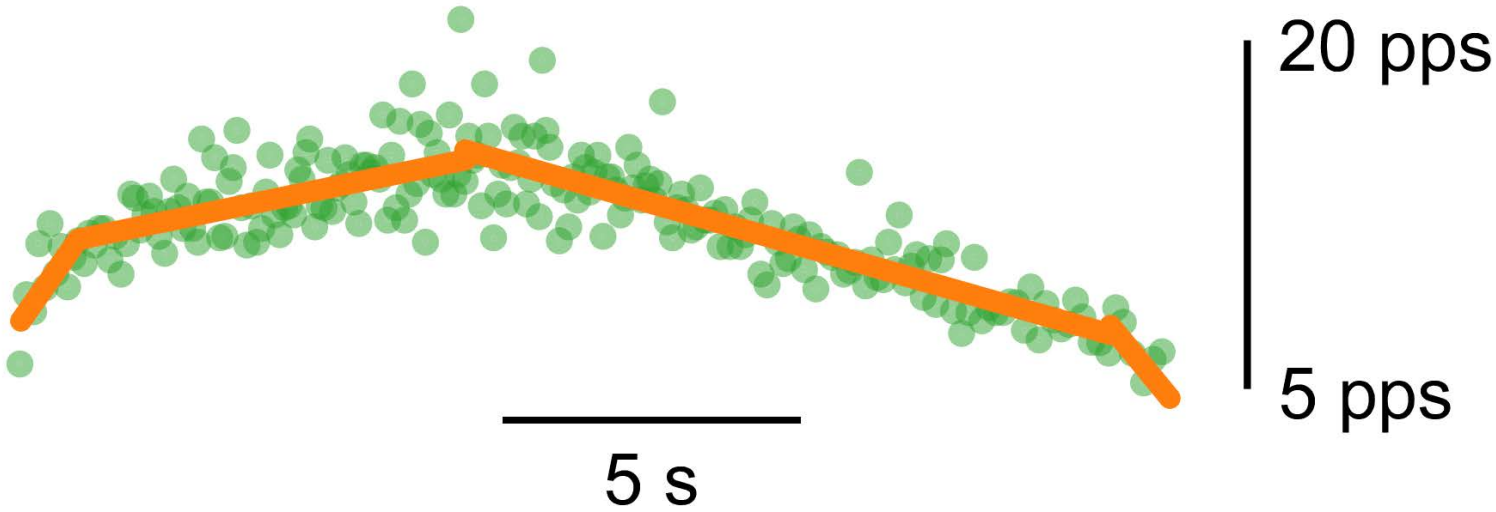


Methods- Analysis



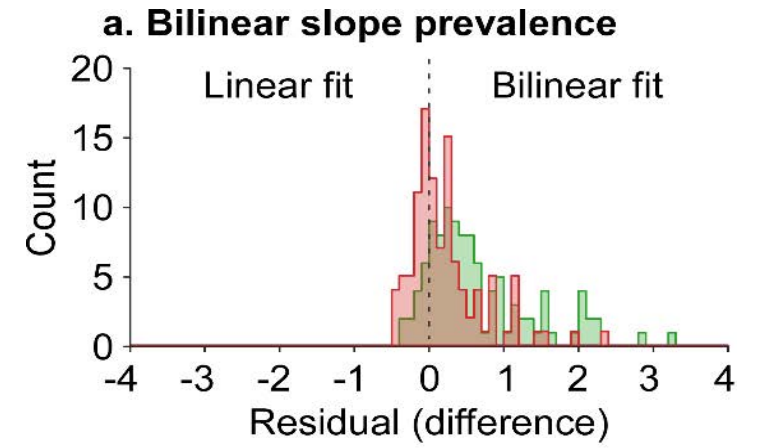
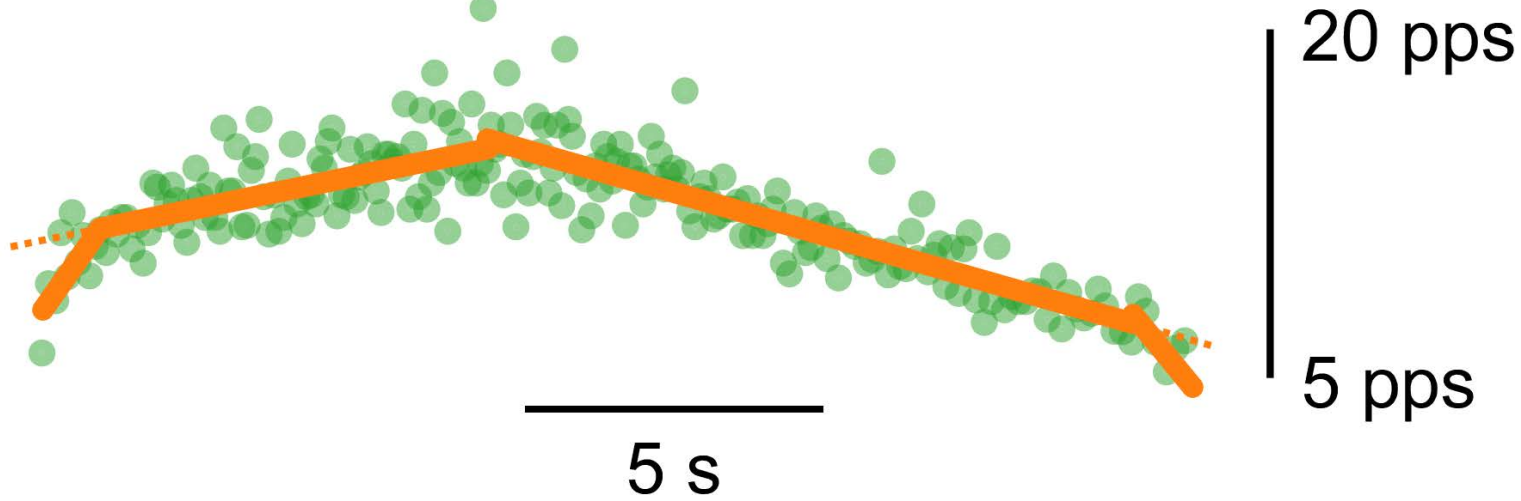


Methods- Analysis



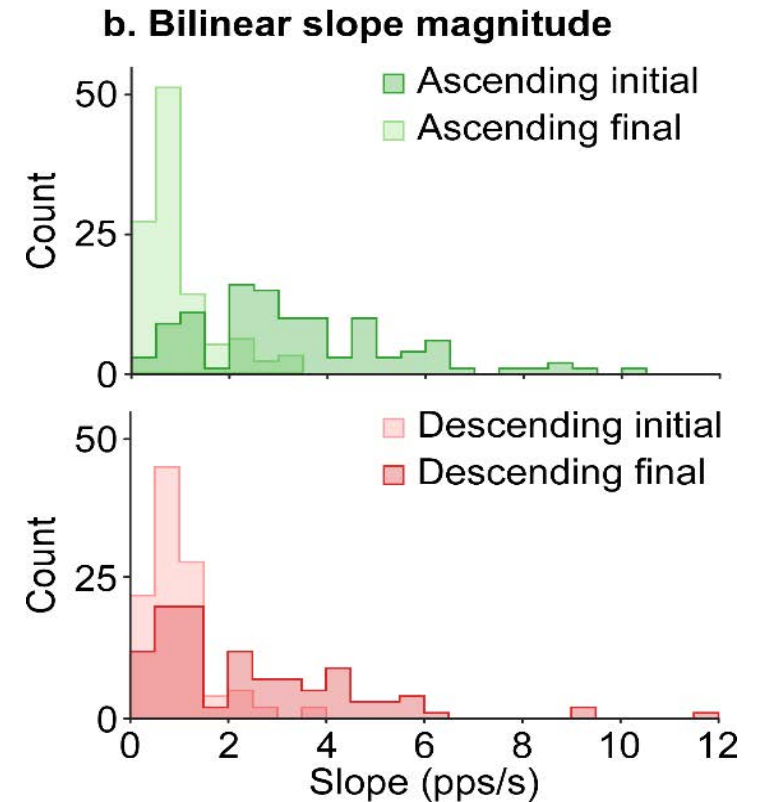
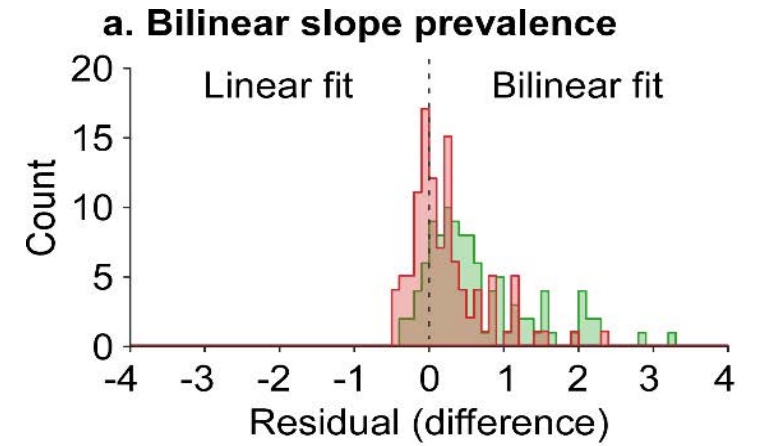
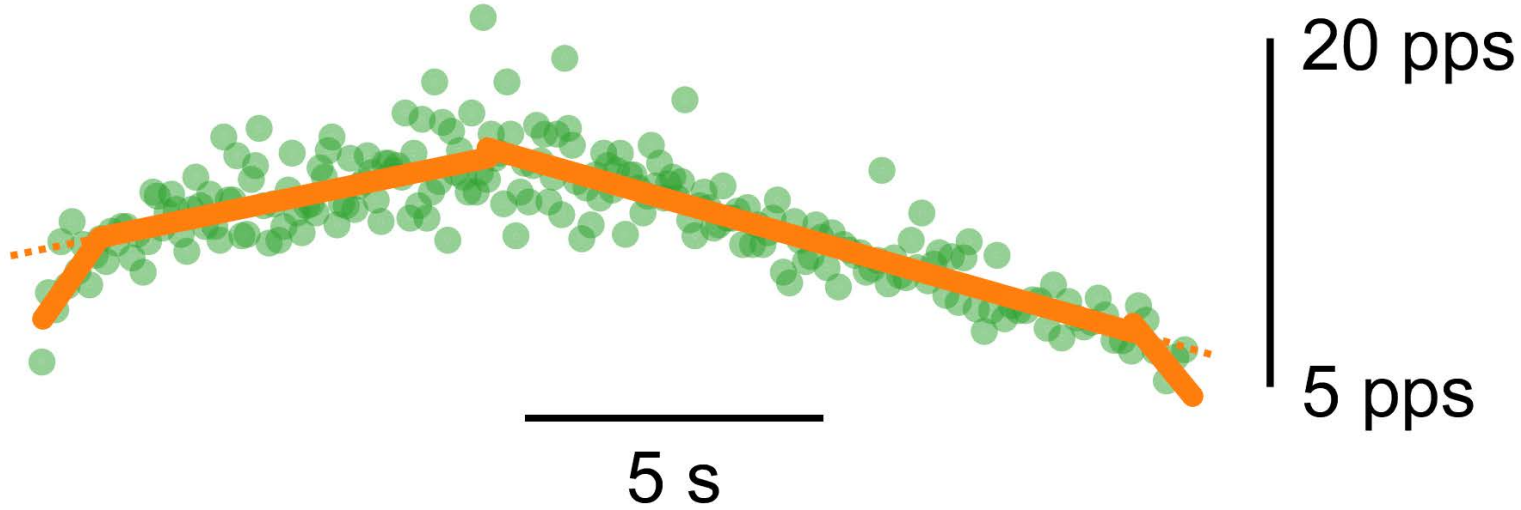


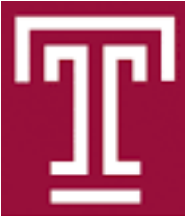
Results: Bilinear Prevalence



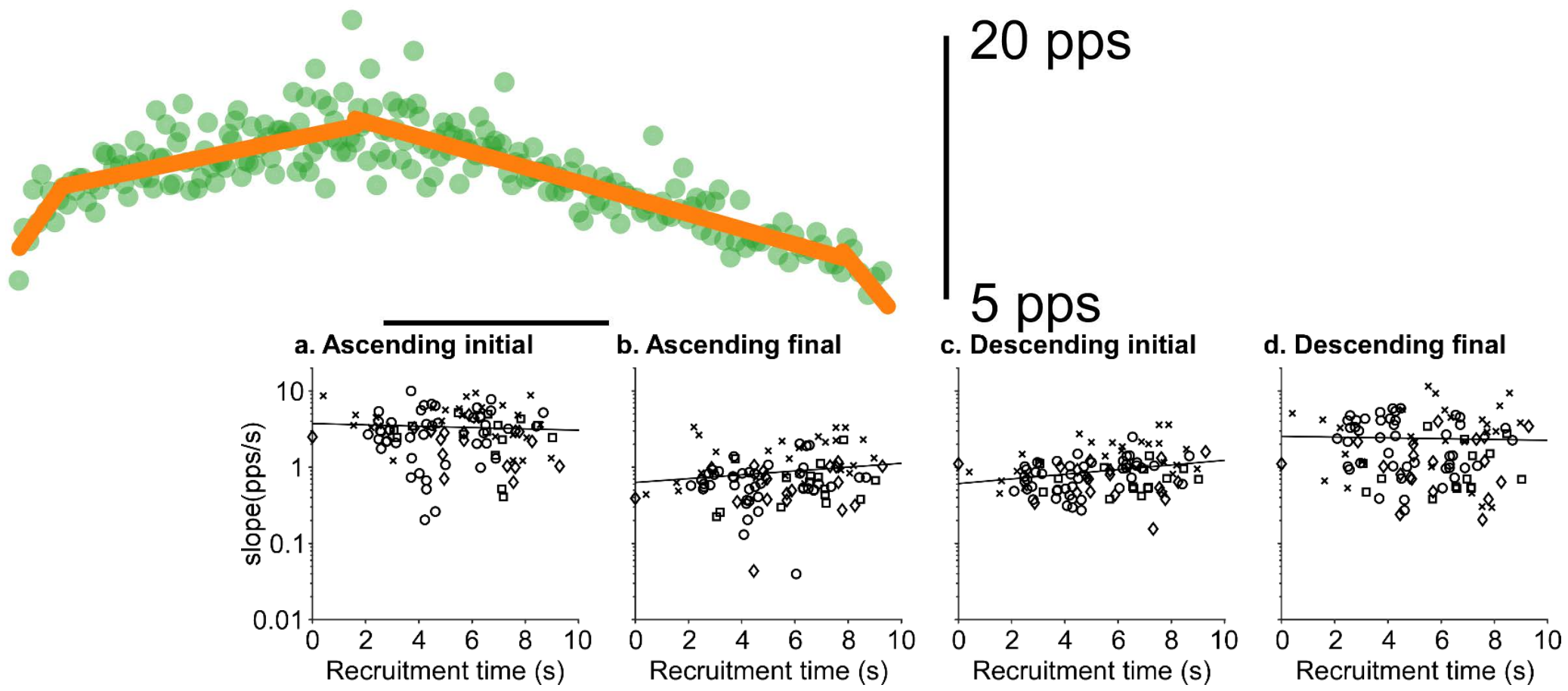


Results: Bilinear Magnitude



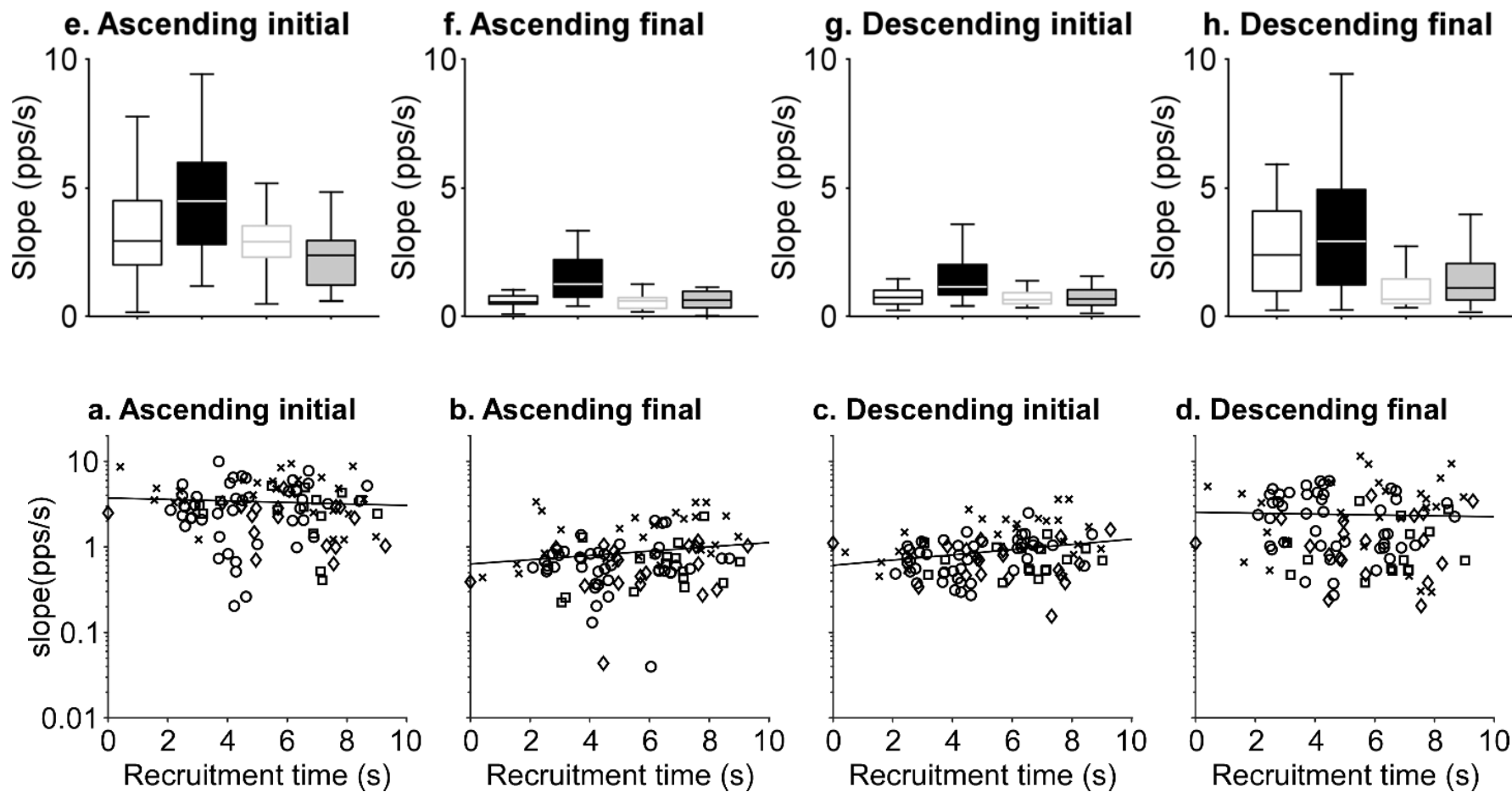


Results: Motor Unit Characteristics





Results: Motor Unit Characteristics





Discussion

- Understanding nonlinear characteristics of motor unit firing rates is important when assessing synaptic drive and excitability of motoneurons
- The prevalence of motor units with a bilinear fit is 87% during the ascending limb and 61% during the descending
- Initial ascending and final ascending limbs are significantly different slopes
- Initial descending and final descending are significantly different slopes
- The slopes do not mirror each other despite mirrored force generation
- Sustained firing of PICs could decrease the amount of synaptic excitability needed to maintain the same force output in recruitment and de-recruitment limbs
- PIC vulnerability to inhibition during the de-recruitment limb could contribute to the non-identical firing rate slopes.



Thank you!

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Christopher Taylor

Tyler Kmiec

Participants in the study

Spinal Neuromotor Lab

Temple Department of Health and Rehabilitation sciences

Funding: NIH (NS098509 to CKT)



Questions?

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