Acknowledgements

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At the very beginning of my PhD Simon Hanslmayr and Bernhard Staresina invited me to a meeting discussing which dataset should be used to investigate “Index Neurons”. I was unrecoverably lost which found its peak when Bernhard understood some implications before Simon finished his sentence. That was the only time I doubted myself.

I soon recovered my excitement for research although often stumbled on unseen ground. I am very grateful to Simon, my *Doktorvater* for his guidance and his trust in me even when I was hard stuck on a particular problem for weeks or head over heels down a rabbit hole. For me, Simon embodies coolness and a keen mind in equal parts. I would also like to thank my second supervisor Howard Bowman. I find your intuitive grasp on mathematics inspiring and thoroughly enjoy our long conversations about neuroscience and all other things.

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Include a figure showing the LFP with AP

Episodic memories:

Tulving & markowitch 1998)

Nadel & Moscovitch 1997: even highly overlapping episodes are all unique.

We use the hilbert transform which assumes sinusoidality of the signal.

Other methods (e.g., linear interpolation methods: doi.org/10.1152/jn.00273.2019; empirical mode decomposition) do not have that assumption and might be more adequate.

During a spatial navigation task neural spiking locked to oscillations in the LFP of the microwire at which they were recorded, particularly at theta and gamma (josh 2007 paper). Locked to various phases in the theta range

Single neuron firing has been known to lock to the ongoing phase of theta (Josh 2007 paper xx). This spike-field code has been used to decode the position of an animal in relation to specific locations (okeefe place cell/phase precession) and stronger spike-field coupling has been shown to predict successful memory (rutishauser nature 2010).