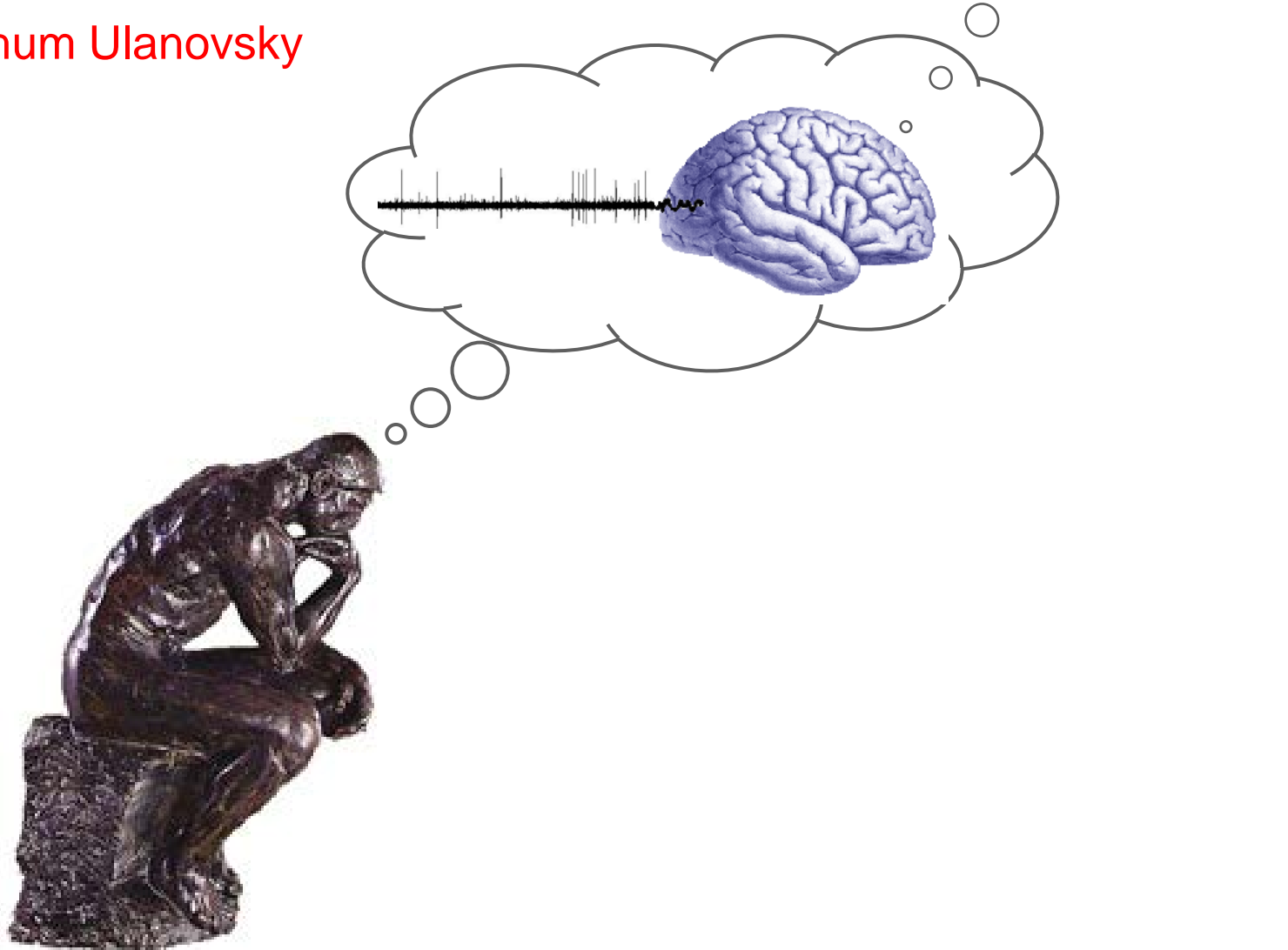


Critical Thinking in Neuroscience: A (sort-of) SUMMARY

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Some common types of problems that recurred in many papers that we've read, or: "The devil is in the details"

- Inclusion criteria of data were unclear / unjustified
- Bias in data analysis
- Selection bias (sampling bias) when performing experiments: e.g. recording mostly large neurons, etc.
- Drift (instability) in recordings: Need a separation of time-scales between data-collection method and the neural phenomenon of interest
- Normalization unclear / unjustified
- Not enough raw data / examples
- Not enough population analysis
- Robustness of analysis methods: Need to report on alternative methods; and/or report alternative analysis parameters for the same method.
- A large number of weak pieces of evidence is less convincing than one strong piece of evidence

Take home messages

- When reading papers: Beware of these (and many other) problems = be critical ! Remember that *most* papers have problems in them.
- When writing papers: Some of these problem that we encountered may not have been real problems, but could possibly reflect bad writing / writing which is not detailed enough. So, when writing *your own papers*, it is always a good idea to give an advanced draft to read to friends which are *outside* your immediate research fields: Their comments, and (most importantly) the things that they did not properly understand, will help you to “debug” your own writing and to clarify your explanations!