Formal vs Functional Linguistic Competence

- LLMs only infer the form of the language but not the meaning: while they are able to generate grammatically correct, humanlike language — they still lack the conceptual understanding
- Neuroscience provides evidence that even human processes the form and the meaning of the language differently [6]
- *Formal linguistic competence* — the knowledge of rules and statistical regularities of language, vs *functional linguistic competence* — non-language-specific cognitive functions that are required when using language in real-world circumstances

Formal vs Functional Linguistic Competence

- LLMs exhibit (near) human-level formal competence (at least in English) but „patchy“ functional competence [6]
- In human brains, the *language network* is responsible for formal linguistic competence — it responds when people comprehend or generate sentences, but not when they perform reason about people’s mental states, process non-verbal communicative information etc.
- The functional linguistic competence is supported by different regions of the brain: among others, by *multiple demand network* that is reliable for logic, reasoning, and a lot more, and by *default network* that tracks both linguistic and non-linguistic narratives over a long period of time (the *language network* in humans does not appear to track structure above the clause level)
- For example, despite the nearly complete loss of linguistic abilities, persons with severe aphasia can have normal non-linguistic cognitive abilities [6]