

## **Project C05: Verbal fluency as a window into the mechanisms of creative language production**

**Project leaders:** Johanna Kissler, Martin Wegrzyn

### **Project Summary**

Creative language production is traditionally characterised as being both original and effective. One powerful way to measure these two aspects of creativity is by using verbal fluency tasks. In such a task, a person has to generate as many exemplars of a semantic category (e.g. “animals”) as possible. Next to traditional verbal fluency for semantic categories, recently emotional word fluency, i.e. the ability to generate words relating to emotion and emotional subcategories has attracted scientific interest as a new measure related to psychological functioning and creativity.

Using different semantic and emotional categories, which place stronger demands on vocabulary (e.g. “metals”, “emotions”) or on creativity (e.g. “vessels”, “positive things”), we will measure various facets of creative language use. We will use computational methods to characterise how speakers move from one word to another, determining their semantic network representations. To better understand the inter-individual and situational variability of creative language production, we will relate verbal fluency to various other measures. These will include cognitive tasks, especially those measuring executive functions, cognitive flexibility and divergent thinking. Non-cognitive factors will be investigated by employing mood inductions, tests of affect and emotional intelligence, as well as personality. The verbal fluency task will also be expanded to more naturalistic discourse situations, where dyads of interactants perform the task together. Thus, we will explore how individuals influence each other and the conditions under which dyads arrive at the most creative products and are most effective. By combining behavioural tasks with functional MRI, we will relate the different metrics of the fluency task to activity patterns in the brain’s networks for language, emotion, executive functions and domain-specific knowledge. By analysing distributed patterns of brain activity, we will explore which brain networks are involved in which aspects of the creative process.

Overall, the project aims to characterise the cognitive, linguistic and cerebral resources that play a role in successfully performing the verbal fluency task, thereby elucidating the underlying processing principles.

### **Open Positions**

#### **PhD position 1 (75%)**

*Profile:* The ideal candidate has a master in psychology or a related field, with a focus on experimental methods and affective and social neuroscience, including fMRI. Ideally, the person is familiar with computational modeling using R or

Python.

*Main research focus within the project:* The PhD thesis will focus on emotional verbal fluency tasks, the effects of emotion and mood on performance, and the role of brain networks for affective information processing.

**PhD position 2 (75%)**

*Profile:* The ideal candidate has a master in psychology or a related field, prior experience in programming (e.g. Python), computational modeling and fMRI data acquisition and analysis (e.g. Representational Similarity Analysis).

*Main research focus within the project:* The PhD thesis will focus on semantic verbal fluency tasks, the effects of task demands and of executive functions on performance, and on the relationship between behavior and brain activity, as measured with fMRI.

**For further information please contact the project leaders:**

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