

Workshop on methodology: Experimental design and control, control groups, and single case statistics.

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1. Revisit discussion points missed on previous seminars (day 1 and 2)
2. Task in class - group assignment: Select a cognitive function that may be affected following brain injury. Find a research question that can be addressed using a single case approach. Discuss possible ways to address this question (experimental setup). Brief group presentation during class.

Please consider point 2 before this class

Discussion points from previous classes:

The universality assumption (Caramazza & Coltheart, 2006):

“there is no qualitative variation across neurologically intact people in the architecture of the cognitive system that these people use to perform in a certain cognitive domain.

This allows us to infer that, although patient X and patient Y currently have very different systems as a consequence of their brain damage, they had the same system premorbidly, and it is about that system that we want to make inferences from studying patients X and Y.”

How likely do you find this assumption?

Try to come up with one argument for and one against it.

Discussion point

Fodor (1983) states that modular systems must—at least to "some interesting extent"—fulfill certain properties:

- Domain specificity: Modules only operate on certain kinds of inputs—they are specialised
- Informational encapsulation: Modules need not refer to other psychological systems in order to operate
- Obligatory firing: Modules process in a mandatory manner
- Fast speed: Probably due to the fact that they are encapsulated (thereby needing only to consult a restricted database) and mandatory (time need not be wasted in determining whether or not to process incoming input)
- Shallow outputs: The output of modules is very simple
- Limited accessibility (from higher order / conscious processes)
- Characteristic ontogeny: There is a regularity of development
- Fixed neural architecture.

Discuss: How many of these properties does reading have?

Workshop:

1. Select a cognitive function that may be affected following brain injury.
2. Find a research question that can be addressed using a single case approach.
3. Discuss possible ways to address this question:
 - Who will be tested (what type of patient?) (How many) Controls?
 - What will be the experiment?
 - How can possible results be interpreted?

Note: This does not have to be a study that noone has ever done – the important thing is to consider and discuss possibilities and problems with the approach you select.

4. Brief group presentation during class.
5. Make list of contributors (names) in group: Briefly list topic / cognitive function, ideas for experiment; discussion points. Send to RS by end of class.

Illustration of some of Crawford's methods (next time)

- 1) Comparing a single case to controls: Is there a deficit?
- 2) Comparing two cases with reference to controls: is there a dissociation between patients?
- 3) Comparing a patient's results on two tests, with reference to controls: Is there a dissociation between tasks?

Next time:

Monday 14th 10.30-13.30: Case studies and case series: Examples from the study of developmental prosopagnosia.

- Hereunder group comparisons vs single case data; interpreting data from both sources.

Suggested readings:

- Schwartz, M. & Dell, G.S. (2010). Case series investigations in cognitive neuropsychology. *Cognitive Neuropsychology*, 6; 477-494.
- Gerlach, Klargaard & Starrfelt (2016). On the Relation between Face and Object Recognition in Developmental Prosopagnosia: No Dissociation but a Systematic Association. *PLOS One*, 11(10):e0165561
- Klargaard, Starrfelt, Petersen, & Gerlach (2016). Topographic processing in developmental prosopagnosia: Preserved perception but impaired memory of scenes. *Cognitive Neuropsychology* (7-8): 405-413.
- Starrfelt, Klargaard, Petersen, & Gerlach (2018). Reading in Developmental Prosopagnosia: Evidence for a Dissociation Between Word and Face Recognition. *Neuropsychology*, 32; 138-147.