Working in a pairs, read the paper by Prior, Schwarz and Güntürkün (2008) and answer the following questions:

**Define what a “self” is. What is it like to have a self?**

An individual experiencing phenomena.

Having a sense of individuality

Being distinct from the world

**1. What research question(s) did the authors want to address? [1]**

* *Are magpies self-aware?*
* *Does a sense of self, characterised by social intelligence, follow convergent evolution?*
* *Is a laminated cortex a prerequisite for self-recognition?*

**2. What was the experimental hypothesis used to test their research question? Use the form: “IF ..., then ...”. [2]**

* *IF magpies exhibit self-directed behaviour, i.e. attempt to remove the mark from their bodies,*
* *THEN they exhibit self-recognition.*

**3. Identify the independent [3] and dependent [2] variables in the experiment.**

*Independent (any 3)*

* *Identity of birds (Gerti, Goldie, etc.)*
* *Color of marks*
* *Presence of mirror*
* *Size of cage cell (1 or 2 compartments)*

*Dependent*

* *Contingency behaviour (self-recognition) vs conspecific behaviour (aggressive, social, etc.)*
* *Quantity of self directed behaviour (behavioural activity directed towards the marked region)*

**4. What type of realisations/operationalisations did the authors use to observe the dependent variable? [4]**

*any 4*

* *Measure time spent in mirrored vs unmirrored compartments.*
* *Number of close inspections of the mirror.*
* *Looks behind the mirror.*
* *Contingent vs Social behaviour.*
* *Frequency of spontaneous self-directed (mark-directed) behaviour*

**5. Which variables did the authors identify as potentially confounding factors and how did they control for them? [3]**

*any 2*

* *Exhibit self-directed behaviour without a mirror -> introduce a non-reflective sheet in place of the mirror in control trials*
* *Exhibit self-directed behaviour without seeing the mark -> introduce a black (sham) mark*
* *Operant conditioning -> use small number of trials so the birds don’t become conditioned to the experimental setup and produce biased results.*
* *Handling -> bird’s eyes are shielded from seeing the mark being applied to their bodies.*
* *Influenced by colour of mark -> introduce 3 different colours as well as sham.*
* *General increase in behavioural activity may result in more instances of apparent self-directed behaviour -> measure quantity of behavioural activity in various trials.*

**6. List other potential confounds, that the authors did not control for, that could potentially invalidate their research? [2]**

*any 2*

* *Social upbringing of the birds (Hand raised vs Wild (“natural social conditioning”)).*
* *Experimenter's subjective rulings of displayed behaviours.*
* *Validation through comparison to other study that could potentially be flawed (a.k.a. Ape studies)*
* *Too small sample size to be definitive for a population*
* *Mark could be within magpies visual field.*

**7. Label the design as within- or between group design. [1]**

*Within-group design*

**8. Create an example design matrix, for one subject, that is, a matrix containing one row for each trial of the experiment, and one column each for the independent variable, the control variables and the trial number. [2]**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *Gerti Trials*  *(Color)* | *With Mirror (Blue)* | *Without Mirror*  *(Blue)* | *With Mirror (Black)* | *Without Mirror*  *(Black)* | *With Mirror (Red)* | *Without Mirror*  *(Red)* |
| *1* |  |  |  |  |  |  |
| *2* |  |  |  |  |  |  |
| *3* |  |  |  |  |  |  |

**9. Many children under the age of 2 years old tend to fail the mirror test, what does this indicate about their self-recognition and/or the mirror test? [1]**

* *Self-recognition is a learnt behaviour*
* *Mirror test isn’t a definitive of having a self.*
* *Other good remarks*

**Extra Reading**

<https://www.sciencedaily.com/releases/2008/06/080613145535.htm>

**Do pigeons have a greater sense of self than children?**

<http://www.journalofscience.net/File_Folder/521-532%28jos%29.pdf>

**Self recognition in Ants!**

<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8624.2004.00814.x/pdf>

**Developmental consequences of early parenting experiences: self-recognition and self-regulation in three cultural communities - University of Osnabrueck**

Children raised in different cultures score differently on the mirror test. Societies directed towards individualism have children that score higher. Trained ability. Mirror test as indicator of self-capabilities but not necessarily definitive. Nevertheless, mirror-directed behaviour indicates mirror self-recognition.

The homework is due **December, 2**. Please email me your answers ([marianne.maertens@tu-berlin.de](mailto:marianne.maertens@tu-berlin.de)), together with a text file containing your design matrix including column names. Don't forget to include the names of both partners.

**Maximum marks 20/20**