

Evolution of Language 2014

Practice exam

Name & student number:

On this first page you can find important information about the examination Please read it carefully.

Examination:	Foundations of Neural and Cognitive Modelling
Date and time:	26-03-2014, 15h
Duration:	3 hours
Location:	OMHP C2.17

You are obliged to identify yourself with your UvA student card or passport. Please put your identification on the upper right corner of the table.

Fraud regulations *Please note: in the worst case scenario fraud can lead to exclusion from all exams in this academic year*

- Turn off your phone and put it away
- Your bag should be closed and on the floor
- During the exam only one student at a time is allowed to go to the toilet with permission from the supervisor
- You are not allowed to leave the exam room in the first 30 and last 15 minutes
- Authorized aids: none

About this exam

- This exam has 8 questions.
- Make sure you put your student id number on each page of this exam.
- The result of this exam will be announced within 20 working days.

Good luck!

The FoxP2 gene is a gene involved in speech and language, located on chromosome 7 (the location of a gene on the chromosome is called a 'locus'; plural 'loci'). One interesting observation about the gene is that there is very little variation in the human population in the exact nucleotide sequence at that locus. The neighbouring loci show also very little, but slightly more variation. Their neighbours show yet a little bit more variation.

Question 1 *What is that pattern of variation evidence of? Explain why.*

Versions of the FoxP2 gene can be found in all vertebrates. Consider the following *distance matrix* that counts the number of differences (nucleotide substitution) between FoxP2-variants in 6 different species (human, chimpanzee, gorilla, orang utan, rhesus monkey, mouse):

	human	ape1	ape2	ape3	rhesus monkey	mouse
ape1	7					
ape2	6	9				
ape3	14	17	12			
rhesus monkey	18	21	16	10		
mouse	145	148	143	137	137	

Question 2 *Which of the three ape species in the table is the chimpanzee?*

Question 3 *Reconstruct a phylogenetic tree based on this data. Write down all of the steps you take and the relevant calculations/assumptions you make.*

Question 4 *What is sexual selection? Is sexual selection in contrast with natural selection? Give an example of an aspect of language or speech that might have evolved under sexual selection.*

Question 5 *What are the 4 major design features of language, and to what extent is each of them unique to language and unique to humans? Mention findings on animal communication where relevant.*

Question 6 *What are language universals, what types of universals do we distinguish? Give for each type an example (give an hypothetical one if you don't know an actual example).*

Question 7 *What are 3 theories on the evolution of syntax? Describe very briefly which researcher the theory is associated with and how the theories differ from each other.*

Robin Dunbar has proposed a theory of the evolution of language as vocal grooming. On wikipedia his theory is described as follows:

Gossip, according to Robin Dunbar, does for group-living humans what manual grooming does for other primates – it allows individuals to service their relationships and so maintain their alliances on the basis of the principle, if you scratch my back, I'll scratch yours. As humans began living in larger and larger social groups, argues Dunbar, the task of manually grooming all one's friends and acquaintances became so time-consuming as to be unaffordable. In response to this problem, humans invented 'a cheap and ultra-efficient form of grooming' – vocal grooming. To keep your allies happy, you now needed only to 'groom' them with low-cost vocal sounds, servicing multiple allies simultaneously while keeping both hands free for other tasks. Vocal grooming then evolved gradually into vocal language – initially in the form of 'gossip'.

Question 8 *Based on the discussion in the lectures (about requirements on evolutionary scenarios) and the book, give an assessment of this theory.*