From: jeffrey E. <jeevacation@gmail.com>
Sent: Sunday, August 23, 2015 11:35 PM
To: Nowak, Martin
Subject: Re:

would have been easier to say " I dont know"
=/div>

On Sun, Aug=23, 2015 at 7:21 PM, Nowak, Martin [redacted]

his 2nd paragraph is in answer to your question

but it seems to me that one does not really know
so you stumbled on something great!

(winrich is a neurobiology professor at rockefeller)

Begin forwarded message:

From: [redacted]

Subject: Re:

Date:

To: [redacted]

Hi Martin, it is funny you should write. I was in Boston for a weekend=seminar and wants to ask you about social cognitive evolution. Has anyone =ried to describe the cognitive arms race that might have happened in prima=e evolution. I am thinking of the following scenario: when an agent interacts with the world, she will profi= form better cognitive abilities. But the world will not change that fast.=So, if there is increased ability to make tools that is great. But I think=the social domain, where agent A wants to predict agent's B behavior, A is up against B's cogniti=e ability, i.e., there seems to be some positive feedback in the sense tha= the social environment is changing, too, and thus increases social pressu=e. Not sure if I make sense, but it seems hat certain social systems are more prone to this kind of evolution than o=hers, and I would find it fascinating to think how those social structure =ight make social cognitive evolution more probable, and how social cogniti=e abilities might structure societies. So I guess I have two questions.

The quick answer to your question is that the two parts of the brain t=at in primates expand in size he most, cortex cerebri and cortex cerebelli= are both cortex, sheet-like structures. So they do not increase very much=in depth. The basic circuit in depth would likely not scale well, but our understanding there is not that=deep. Ok, assume that for a small area of this cortex you can only do a ma=imal number of computation (one student in my lab actually wants to quanti=y that - super difficult), then you will need more of area to do so. However, volume is also important. If=you compare the mouse and the human brain, arguably he biggest difference,=is hat he human brain has many more connections and more complex ones than=the mouse has. This might be in part a side-effect of the increase in area, if you want more computa=ional depth you will need to wire one piece of cortex with another, so you=have some price to pay, but in addition the human brain gains a lot of com=lexity that way, possibly dynamical constellations of activity as in a Glasperlenspiel that the mouse cannot g=t. There are other factors that matter. Bottom line, we do not understand =hese things very well, but as a short answer I would say that both surface=Rea and volume matter.

Ganz liebe Grüße,Winrich

On Aug 23, 2015, at 5:04 PM, Nowak, Martin [redacted] > wrote:

dear Winrich,

i hope all is well.
would be good to catch up!

i have a quick question:
why does the brain need a large surface area?
why is the computational power not just linked to volume?

best wishes
martin

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please =ote