From: "jeffrey E." <jeevacation@gmail.com>
To: "Nowak, Martin" <[redacted]>
Subject: Re:
Date: Sun, 23 Aug 2015 23:35:19 +0000

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would have been easier to say " I dont know"

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

> 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:** Winrich Freiwald <wfreiwald@mail.rockefeller.edu>
> **Subject: Re:**
> **Date:** August 23, 2015 5:41:03 PM EDT
> **To:** "Nowak, Martin" <[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 tried to describe the cognitive arms race that might have happened in primate evolution. I am thinking of the following scenario: when an agent interacts with the world, she will profit 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 cognitive ability, i.e., there seems to be some positive feedback in the sense that the social environment is changing, too, and thus increases social pressure. Not sure if I make sense, but it seems hat certain social systems are more prone to this kind of evolution than others, and I would find it fascinating to think how those social structure might make social cognitive evolution more probable, and how social cognitive 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 that 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 maximal number of computation (one student in my lab actually wants to quantify 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 computational 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 complexity that way, possibly dynamical constellations of activity as in a Glasperlenspiel that the mouse cannot get. There are other factors that matter. Bottom line, we do not understand these 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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