[REDDIT](#)

Hi reddit, we're Niels and Ujwal and we published a paper in PLOS Biology showing a communication method using a brain-computer interface for paralyzed, locked-in patients – Ask Us Anything!

PLOSSCIENCEWEDNESDAY [R/SCIENCE](#)

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When you guys calibrate the interfaces for patients, do you have to recalibrate them all the time for different people, or are human brains more similar to the point where this process isn't really needed? Also, are brains plastic enough to calibrate themselves to the machines on their own from within?

[Random49251](#)

Each patient is trained separately during which we build the model of their thinking pattern based upon which they are later on provided feedback of their answer, so it is different for different patient. Based on extensive study we found that the hemodynamic response of different patient is different, hence we can confidently state that their brain response or thinking pattern is not similar.

What happens to the locked in patient's brains when they find out they can communicate again?

[Mappinus](#)

Very interesting question, we too want to investigate the neural processes in their brain when they are provided feedback of their answer.

This is remarkable news! Nice work!

Is it possible for locked in patients to ever be discharged (while still locked in), or do they depended on to much medical equipment/care to stay alive? And if they can be discharged, is there potential for this sort of tech to be implemented into a portable/home edition?

Apologies if these questions are ridiculous!

[HerbziKal](#)

Your question is not ridiculous at all, in fact this is what we are working towards, a portable and easy to use communication system which can be used by patient in their home for their daily communication.

As of now two of our patients have their own system and they use it on regular basis, but of course with our time to time assistance.

How do you intend to move on from "yes" or "no" questions to more developed communication with the patients?

joelee0ze

We are working towards the developing of speller system which will let the patients in completely locked-in state to select words and formulate their own sentence.

I feel as though neuroengineering is a field that is starting to really take off. What product do you guys believe will be the first and/or biggest product to be developed by the field and do you think it will happen in industry or academia?

WhackKerouac

Yes we are at the crossroad of an amazing progress in the field of neuro-engineering. The major technological breakthrough in the field will a system which can help paralyzed patient with movement and communication, which has to be developed in collaboration between industry and academia.

Hi! I used to work with EEG-based BCIs (using BCI2000) with ALS patients at Drexel University in Philadelphia, in collaboration with the Wadsworth Center.

We found that while the BCIs worked, most patients preferred eye-tracking tools for using computers for their speed and ease of setup and use.

Do you feel that BCIs offer a significant advantage over these tools?

imVINCE

When patients have control over their eye muscle, they can efficiently communicate augmentative and assistive communication devices, such as eye tracking tools as it is easy to use and does not require placement of electrodes on the head of patient. BCIs which can help patients without any motor channel has natural advantage as the patients can communicate just with their brain.

It's surprising (and great news) that you were able to get positive results with patient W at all, if I read her progression correctly.

I am curious: Where are y'all planning to go from here?

3mpir3

Like, I stated in one of the response above that we are working towards the development of a speller system which will let such a patient to select words and formulate their own sentences.

How does this compare to EEG, like that employed by the Emotiv Epoc? Is it similar in theory? Advantages/disadvantages? Thanks

merlinfire

the WINNOWER

HI REDDIT, WE'RE NIELS AND UJWAL AND WE PUBLISHED A PAPER IN PLOS BIOLOGY SHOWING A COMMUNICATION METHOD USING A BRAIN-COMPUTER INTERFACE FOR PARALYZED, LOCKED-IN PATIENTS – ASK US ANYTHING! : **REDDIT**

As mentioned in the paper, these patients were unable to communicate using EEG system but we want to carefully process the EEG data again using advanced processing technique.

As someone who watched her father die from ALS, I am somewhat skeptical that this technology could really make much of a difference in the lives of the current patient pool (only simple communication, still low quality of life, still only typically a short life expectancy and a plethora of additional physical/mental discomfort). That said, however, I think the technology is incredible and has immense potential. Do you personally see this research as being truly helpful for these patients? Or is it more of a stepping stone on the road to future uses of this technology?

Do you see any moral or ethical risk in the current or future use of this technology? If so, do you have any plan to address it?

hgnomey

We are working towards the system which can be used by such patient for communication thereby improving their quality of life. Yes that is our goal, to help such patients. We do not foresee any moral or ethical risk, except using such a system to ask question of life and death, with 70-80% accuracy of the current system, such a question such be avoided.

This is an awesome subject! I am curious about a few things..

1.Programming Languages
Which ones and why? Do you create everything ground up?

2.Future Libraries
Would you share what you have created to help spread the technology, or patent it for the $.

3. The ability to use this technology on other animals?
I was recently chatting and wondering about the brain-computer technology and if it can be used on Dogs, or if that just will not happen.

N0T_F0R_KARMA

Right now the program is written using Matlab, but we are in the process of changing using Python and Java. We have no intention of patenting the system as we want the system to be easily and widely available.

Hey this isn't related but I have the same name as Ujwal. I have never met anyone with the same spelling as mine. Do people have trouble pronouncing it correctly? And do you have a nickname that your friends and family call you by?

bIUJay007

Hahah, sometimes. Well thank you for stopping by.

In my limited understanding of brain imaging, certain dichotomies like "Move Hand/Move Foot" and "Left side/Right side" produce much more distinguishable signals than higher-level or more conceptual dichotomies like "yes/no".

So my question is, why not calibrate the interface so that users can think "move hand" to indicate

"yes", and "move foot" to indicate "no", for example?

Although such a setup might be a little less intuitive at first for the user, wouldn't it make for a stronger distinction between the two answers, and thus a more robust interface, to which the user could adapt relatively quickly?

Thanks!

(edited to clarify my question after reading more of the article!)

[Iron_Rod_Stewart](#)

Very good question, as we highlighted in the introduction of this article that motor imagery related task failed in such a patients.

ELI5 how your tech works!!

[Soft_Trailmix](#)

Please read chaudhary et al, 2016 Nature reviews Neurology and Chaudhary et al., 2017 PLOS Biology.