

NEWS

Community newsletter: Theory of mind, using historical control data for animal research

BY CHELSEY B. COOMBS

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Hello, and welcome to this week's community newsletter! I'm your host, **Chelsey B. Coombs**, *Spectrum's* engagement editor.

This week, we're beginning with a thread from **Kevin Tan**, a graduate student at the University of California, Los Angeles, and study investigator on a pre-print posted to Research Square, titled "**Human electrocorticography reveals a common neurocognitive pathway for mentalizing about the self and others.**"

New preprint: "ECoG reveals a common neurocognitive pathway for mentalizing about the self & others"

We probed mentalizing's intracranial electrophysiology for the 1st time! **@ppinheirochagas @KieranCRFox @josef_parvizi @social_brains**<https://t.co/sj5sMnvSxt>

— Kevin Tan (@neurokev) **March 2, 2021**

Mentalizing, also known as **theory of mind**, describes the ability to understand other people's desires, intentions and beliefs. Previous research suggests that this ability is impaired in some autistic people. The new study used electrocorticography (ECoG) to record what regions of the default mode network (DMN) activate during mentalizing in neurotypical people.

Tan wrote on Twitter that functional magnetic resonance imaging (fMRI) has shown that mentalizing occurs in the default mode network, but it's been difficult to pinpoint the functions of various regions of the DMN because of the "low temporal resolution of fMRI, which cannot resolve millisecond-scale neurocognitive dynamics."

Countless fMRI studies implicate the DMN in mentalizing... Yet the functions of individual DMN regions remain largely unknown

Why might this be?

One reason may be the low temporal resolution of fMRI, which cannot resolve millisecond-scale neurocognitive dynamics pic.twitter.com/RrYtJPXhqe

— Kevin Tan (@neurokev) **March 2, 2021**

But ECoG revealed that mentalizing about the self and others activated areas in the visual cortex, then the temporoparietal DMN regions, and finally, regions in the medial prefrontal cortex. "Critically, regions with later activations showed greater functional specificity for mentalizing, greater self/other differentiation, and stronger associations with behavioral response times," the researchers wrote.

The study gained a lot of attention from researchers on social media.

Uta Frith, emeritus professor of cognitive development at University College London in the United Kingdom, who co-created one of the **earliest tests to assess theory of mind**, tweeted, "Great stuff!"

Great stuff! <https://t.co/EdsEMMesxC>

— Uta Frith (@utafrith) **March 2, 2021**

Oscar Woolnough, a postdoctoral researcher at UTHealth in Houston, Texas, added, "The 'other' area you show in the PFC in sub-parietal sulcus lines up quite nicely with areas active during face naming and cued recall of information about familiar people."

Very nice study! The 'other' area you show in the PMC in sub-parietal sulcus lines up quite nicely with areas active during face naming (<https://t.co/sytPvFAPb3>) and cued recall of information about familiar people (<https://t.co/5ZgllpLnO3>)

— Oscar Woolnough (@OWoolnough) **March 2, 2021**

João Guassi Moreira, another graduate student at the University of California, Los Angeles, tweeted, “This type of work is *invaluable* to the field.”

check out this insanely cool study by my UCLA colleague and friend. This type of work is *invaluable* to the field <https://t.co/eMlg1YsUwP>

— João Guassi Moreira (@C_Shamballa) **March 2, 2021**

Jonathan Wynn, a health science specialist at the Greater Los Angeles Healthcare System in the Department of Veterans Affairs, said he needs to reread the “fantastic and fascinating work ... again and again and share with our lab.”

This is fantastic and fascinating work. I need to reread again and again and share with our lab.

— Dr. Jonathan Wynn (@DrJonWynn) **March 3, 2021**

The next thread comes from **Valeria Bonapersona**, a graduate student at UMC Utrecht in the Netherlands, whose new study, “**Increasing the statistical power of animal experiments with historical control data**,” was published in *Nature Neuroscience*. Bonapersona began her thread by saying that for animal researchers, this is a “must-read on a sensitive topic: statistical power of **#animalresearch** and of the number of animals used.”

To *animal researchers*, a must-read on a sensitive topic <https://t.co/JC0BYLrork>: statistical power of [#animalresearch](#) and of the number of animals used. A thread of why-do-I-like-this-paper or watch a 10-min video <https://t.co/g1xCJhUKTS> @NatureNeuro <https://t.co/LhFdWpUeKm>

— Valeria Bonapersona (@VBonapersona) **February 19, 2021**

Bonapersona and her colleagues show statistically that “including data from control groups of previous studies could halve the minimum sample size required to reach the canonical 80% power or increase power when using the same number of animals.”

In 2019, the group also published a pre-print on *bioRxiv* on their **open-source tool called RePAIR**, which enables other scientists to make use of historical control data.

Bonapersona concluded her thread by saying, “I dream of the day when animal research won’t be necessary anymore, but this might well be not in my lifetime. For now, we can be creative with analytical techniques to reduce animal experimentation.”

I dream of the day when animal research won’t be necessary anymore, but this might well be not in my lifetime. For now, we can be creative with analytical techniques to reduce animal experimentation.

— Valeria Bonapersona (@VBonapersona) **February 19, 2021**

Mathias Schmidt, research group leader at the Max Planck Institute of Psychiatry in Munich, Germany, and contributor to the RELACS Consortium, and whose data helped validate the method, tweeted, “If you are working with animals in research, you should drop everything you are doing right now and read this thread!”

If you are working with animals in research, you should drop everything you are doing right now and read this thread! And then the paper! Congrats @VBonapersona to this great work, it was a real pleasure for us to contribute. <https://t.co/rJ4Xlr8SOw>

— Mathias Schmidt (@MathiasVSchmidt) **February 19, 2021**

Jelle Knop, a graduate student at UMC Utrecht, tweeted the method “could literally save innumerable animal lives while improving statistical power of animal studies.”

Check out the amazing RePAIR project by **@VBonapersona**, could literally save innumerable animal lives while improving statistical power of animal studies. So so cool!
<https://t.co/BApVpLKNi7>

— Jelle Knop (@JelleKnop) **February 19, 2021**

Leonardo Restivo, chief science officer of the Neuro-Behavioral Analysis Unit at the University of Lausanne in Switzerland, wrote, “I’m picking up a lot of signals showing that the field is ready to go Bayesian.”

This is *really really* important. I’m picking up a lot of signals showing that the field is ready to go Bayesian. I’ll see if my ‘controlled dictionary’ for behav exp can be used for computing the ‘index’ :-)
<https://t.co/BLpBqLFofd>

— Leonardo Restivo (@ScipleNeuro) **February 21, 2021**

Although he thought the paper presented a “clever solution,” **Nathan T. Fried**, assistant teaching professor of biology at Rutgers University-Camden in New Jersey, tweeted, “The lab-to-lab variability, genotype-to-genotype variability, even experimenter-to-experimenter variability within a single lab combined with the continued dearth of methodological details in rodent papers makes this nearly impossible.”

...The lab-to-lab variability, genotype-to-genotype variability, even experimenter-to-experimenter variability within a single lab combined with the continued dearth of methodological details in rodent papers makes this nearly impossible.

Cool concept though.

— Nathan T. Fried, PhD (@NeuronNate) **February 19, 2021**

That's it for this week's edition of *Spectrum's* community newsletter. If you have any suggestions for interesting social posts you saw in the autism research sphere this week, feel free to send an email to me at chelsey@spectrumnews.org. See you next week!