By the Numbers: Machine learning, dementia link, antipsychotics while pregnant

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16 SEPTEMBER 2021

Welcome to this month's edition of the By the Numbers Newsletter. At *Spectrum*, we do our best to summarize the latest autism research findings — and sometimes the best summary comes in the form of a chart or map. In this newsletter, we boil down interesting new research that is conveyed most succinctly by way of data visualizations.

Let us know what you think of the newsletter, or tell us about your own data-rich work, at **news@spectrumnews.org**.

Machine learning and neuroimaging

Machine-learning models may be better at spotting signs of autism in brain scans if the **datasets include women**, according to a new analysis of data from 44 studies.

"We want to improve the data that is used for machine learning because, you know, 'garbage in, garbage out,'" says lead investigator **Sotirios Bisdas**, a neuroradiologist at the National Hospital for Neurology in London, England. The goal of the new study, Bisdas says, was "to understand whether there are systemic biases that affect the data quality and, downstream, may affect results."

The answer, it turned out, is yes: Some types of neuroimaging data, such as electroencephalography, are potentially better than others for training machine-learning models to identify autism, the study shows. Including women and data from multiple imaging technologies may also improve the sensitivity and specificity of some machine-learning algorithms.

Machine learning is unlikely to aid autism diagnosis any time soon. There is wide variability in how autism **shows up in boys and girls**, **how the condition is diagnosed**, how **neuroimaging is performed**, and in the machine-learning algorithms used to **draw conclusions from data**.

To improve the accuracy of machine learning algorithms, Bisdas says, researchers should first standardize imaging methods.

"It doesn't make sense to wait for more imaging data if we don't standardize its collection," Bisdas says. "Yes, we need more data, but we need more quality data."

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