Moving forwards not backwards: heterogeneity in autism spectrum disorders

Hobson, H.[1*], & Petty, S. [1,2]

[1]Department of Psychology, University of York, UK

[2]North Yorkshire NHS Adult Autism and ADHD Assessment service, The Retreat York

*Corresponding author. Email contact: Hannah Hobson, hannah.hobson@york.ac.uk

The article by Mottron and Bzdok[1] argues that heterogeneity in autism is artefactual, and that returning to a "prototypical" autism would benefit clinical practice and research endeavours. We note that the authors do not define what they mean by "prototypical" autism and thus it is left for the reader to interpret who would and would not be included under the authors' revised definition. However, from our reading, we argue that, though perhaps unintended, the suggestion is for a return to a rather stereotyped understanding of autism, one which is no longer fit for purpose and that research does not support: we offer our insights from both clinical and academic practice.

A move away from the (assumed) prototypical approach to autism proposed by Mottron and Bzdok[1] has, in fact, only recently taken place. One familiar autistic presentation – that of young males of mid-intellect without neurodevelopmental or mental health comorbidities - has been consistently favoured and has repeated from the original clinical observations of autism[2] to contemporary research sampling; for example, individuals with comorbid intellectual disability, who have mental health comorbidities, or who are female are consistently left out of research samples[3, 4]. This approach maintains a narrow lens of what autism looks like. It may offer a simpler scientific case, but it is biased, only examining a subsection of the autistic population, and is ultimately invalid. Indeed, the authors' suggestions, if ever implemented, would likely lead to even poorer rates of identification for women and adults who did not have the opportunity to be diagnosed in childhood. A definition that incorporates data from females[5,6], adults, people with mental health comorbidities and comorbidity with conditions such as ADHD would contribute to an updated description, and not a less accurate description. Importantly, these updated definitions[7] provide the basis for better clinical care through the design and refinement of updated interventions, such as for anxiety and depression[8].

Indeed, the current evidence does not support the notion that narrowing our focus will resolve the question of the biological underpinnings of autism. Three previous subtypes of autism under the DSM-IV, PDD-NOS, autistic disorder and Asperger's Syndrome, have more in common in their genetic underpinnings than differences[9]. This does not support the authors' view that one previous subtype is muddying the waters. This also comes in the context of a broader genetic picture, in which evidence suggests shared genetic factors between neurodevelopmental conditions, as well as within them[10]. Furthermore, Happe and colleagues[11] have demonstrated that the social, communication and repetitive interest symptoms of autism (now considered a dyad of social and non-social impairments[7]) have independent genetic bases, and as such individuals are going to vary along three different continua, leading inevitably to a very heterogeneous population.

Mottron and Bzdok[1] complain of shrinking effect sizes in the field. However, we note that as factors such as sample sizes in research studies increase, the uncertainty around effect size estimates will reduce: while this may appear to suggest a reduction in the effect sizes themselves, it may in fact reflect improving precision and reproducibility[12], qualities we feel supersede effect sizes in importance.

Where we can agree with the authors is that we (as clinicians and researchers) want valid, specific and reliable diagnosis with high predictive accuracy, and a clear diagnostic threshold, which considers functional impairment, and enables discounting differential diagnoses. Such diagnostic practices are in the best interest of individuals, their families and health services offering support. The authors appear to assume this does not happen in the clinic, but in our experience, differential diagnosis and careful clinical judgment leads. And we are not alone: Molloy et al[13] report the diagnostic practices in their clinic and emphasise that quantitative scores generated from standardised assessment tools such as the ADOS may be helpful, but the activities and interactions that such tools scaffold support clinicians to build qualitative impressions: it is these impressions that make key contributions to a diagnostic decision. Unlike the portrayal in Mottron and Bzdok[1], it is simply inaccurate to suggest that people who score above threshold on the ADOS are automatically granted a diagnosis.

Nonetheless, used as a laboratory test, misclassifications via the ADOS may occur. Here, we argue that assessments used for research purposes only do need to be treated with caution: autism researchers who have limited or no clinical experience may well not have the expertise to make differential diagnoses, and misclassification may have ramifications for the autism samples included in research studies. Perhaps the weight of the dilemma rests within research sampling rather than clinical practice. One suggestion would be for researchers to ensure that their autistic samples have a diagnosis given by an appropriate clinic (for example as done by Underwood and colleagues[14]). Of course, such studies may replicate the biases and barriers faced by certain groups in achieving an autism diagnosis: an alternative would be to look to population-based studies with more representative real-world sampling (e.g. meta-analyses of clinic and population-based studies suggest many women who meet the clinical threshold for autism do not proceed to clinical services for diagnosis[15]). The tensions of ensuring classification accuracy and representation in research will need ongoing discussion in our field. We also recommend that researchers give fuller descriptions of their samples, such as functional ability, mental health cooccurrence, and medication status – to name just a few important variables along which there is much heterogeneity in the autistic population - to help inform future clinical care and scientific understanding.

We sympathise with the frustrations that come with the heterogeneity of autism, and a desire to reduce the complexity surrounding its presentation and aetiologies. But we argue that we should not sacrifice validity for the sake of simplicity, particularly at the personal cost of many people who already face significant barriers to being diagnosed, nor should we assume that the field had autism right the first time: while a prototype is the original, it is also by definition preliminary.

Conflicts of interest

The authors declare no conflicts of interest.

References

1 Mottron L, Bzdok D. Autism spectrum heterogeneity: fact or artifact?. ***Mol Psychiatry.*** 2020 Apr **30**:1-8.

2 Kanner L. Autistic disturbances of affective contact. ***Nervous child.*** 1943 Apr;**2**(3):217-50.

3 Shefcyk A. Count us in: addressing gender disparities in autism research. ***Autism.*** 2015 February **19**(2):131-132.

4 Russell G, Mandy W, Elliott D, White R, Pittwood T, Ford T. Selection bias on intellectual ability in autism research: a cross-sectional review and meta-analysis. ***Mol Autism.*** 2019 Dec **1**;10(1):9.

5 Beggiato A, Peyre H, Maruani A, Scheid I, Rastam M, Amsellem F, et al. Gender differences in autism spectrum disorders: Divergence among specific core symptoms. ***Autism Res.*** 2017 Apr;**10**(4):680-9.

6 Hull L, Petrides KV, Mandy W. The female autism phenotype and camouflaging: A narrative review. ***Rev J Autism Dev Disord.*** 2020 Jan **1**:1-2.

7 American Psychiatric Association, American Psychiatric Association. DSM 5. **American Psychiatric Association.** 2013 May 27;70.

8 Lever AG, Geurts HM. Psychiatric co-occurring symptoms and disorders in young, middle-aged, and older adults with autism spectrum disorder. ***J. Autism Dev. Disord.*** 2016 Jun **1**;46(6):1916-30.

9 Li J, Hu S, Zhang K, Shi L, Zhang Y, Zhao T, et al. A comparative study of the genetic components of three subcategories of autism spectrum disorder. ***Mol Psychiatry.*** 2019 Nov;**24**(11):1720-31.

10 Antshel KM, Russo N. Autism spectrum disorders and ADHD: Overlapping phenomenology, diagnostic issues, and treatment considerations. ***Current psychiatry reports.*** 2019 May;**21**(5):1-1.

11 Happé F, Ronald A, Plomin R. Time to give up on a single explanation for autism. ***Nat Neurosci.*** 2006 Oct;**9**(10):1218-20.

12 Brand A, Bradley MT. The precision of effect size estimation from published psychological research: Surveying confidence intervals. ***Psychological Reports.*** 2016 Feb;**118**(1):154-70.

13 Molloy CA, Murray DS, Akers R, Mitchell T, Manning-Courtney P. Use of the Autism Diagnostic Observation Schedule (ADOS) in a clinical setting. ***Autism.*** 2011 Mar;**15**(2):143-62.

14 Underwood JF, Kendall KM, Berrett J, Lewis C, Anney R, Van den Bree MB, et al. Autism spectrum disorder diagnosis in adults: phenotype and genotype findings from a clinically derived cohort. ***Br J Psychiatry.*** 2019 Nov;**215**(5):647-53.

15 Loomes R, Hull L, Mandy WP. What is the male-to-female ratio in autism spectrum disorder? A systematic review and meta-analysis. ***Journal of the American Academy of Child & Adolescent Psychiatry.*** 2017 Jun 1;**56**(6):466-74.