



# Autism is not a spectrum

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## ABSTRACT

Autism Spectrum Disorder is a diagnosis applicable to a vast range of presentations. However, there are disadvantages to theorizing and communicating about autism as a single spectrum. This paper suggests an alternative or supplementary multi-dimensional approach for diagnosticians and educators – an approach that more accurately reflects our understanding of autism.

## 1. Introduction

The DSM-5<sup>1</sup> has replaced the previous designations of “autism” and Asperger’s” with “autism spectrum disorder.” However, conceiving, representing, theorizing, and communicating about autism as a spectrum is misleading and has the potential for ongoing undesirable consequences.

Autism is a developmental disorder characterized by a group of traits. One receives a diagnosis of autism when one exhibits several of these traits, each to a degree. In other words, there are *multiple relevant spectrums*. Theorizing and communicating about autism in terms of a single spectrum invites unnecessary confusion.

For example, if someone experiences challenges with integrating sensory inputs, they may be diagnosed with sensory processing disorder (SPD). There will be more and less severe cases of SPD. However, some degree of severity (high or low) of SPD does not alone qualify one for a diagnosis of ‘mild’ autism. The same is true for other individual characteristics such as restricted and repetitive behaviors (RRBs), language deficiencies (e.g., DLD, SLD), or motor and coordination issues (e.g., dyspraxia, DCD), etc.

The main diagnostic criteria for autism spectrum disorder are, “persistent deficits in social communication and social interaction across multiple contexts” and “restricted, repetitive patterns of behavior, interests, or activities.”<sup>2</sup> Diagnosticians are directed to specify the severity of each. However, there are at least three potential worries with this approach.

1. Aspects which fall under the description of each criterion may vary in their severity, and thus lumping them together is rather unhelpful (e.g., differences in verbal communication and the understanding of social relationships or “hypereactivity to sensory input” and narrow, fixated interests).<sup>3</sup>
2. Considering the nuanced range of presentations clinicians observe, it is not a settled matter which traits should be considered comorbidities as opposed to traits that characterize autism (e.g., lack of coordination, deficits in fine motor control, or propensity to self-harm).

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<sup>1</sup> American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders* (2013) 5th ed Arlington American Psychiatric Association.

<sup>2</sup> DSM V, F84.0.

<sup>3</sup> DSM V, F84.0.

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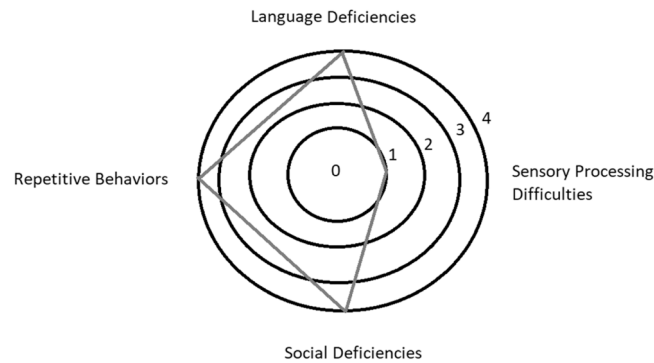


Fig. 1. Represents one individual with autism.

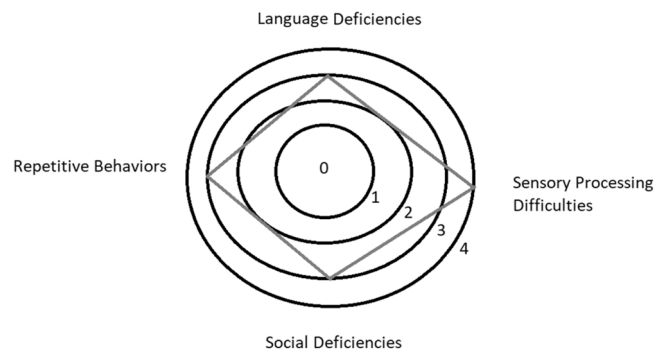


Fig. 2. Represents a second individual with autism.

- While diagnosticians are directed to specify overall severity in terms of one of three levels of support required due to the patient's condition, the descriptions of each 'level' combine several traits, with the severity of the *group of traits* decreasing in tandem with descending levels (from three down to one). It is unclear what theoretical justification there is for glossing over otherwise preservable nuance in various presentations (i.e., even if there is some bureaucratically practical benefit to doing so, e.g., allocating funds based on a clean distinction in levels).

## 2. Methods: multi-dimensional models

Autism is better represented with multi-dimensional models. The examples below present us with 'shapes' or 'spaces' of autism, which emerge from the integration of *multiple spectrums*.<sup>4</sup>

Figures 1 and 2 show simple 4D models representing a diagnostic 'score' of two hypothetical autistic individuals, exhibiting four traits to a degree represented here as a rating between 0 and 4 (absent and severe, respectively), moving out in concentric circles ordinally. The four traits depicted are not meant to be exhaustive, nor does the representation say anything about the relative 'weighting,' or lack thereof that theorists and practitioners may wish to attach to a consideration of one trait over another.

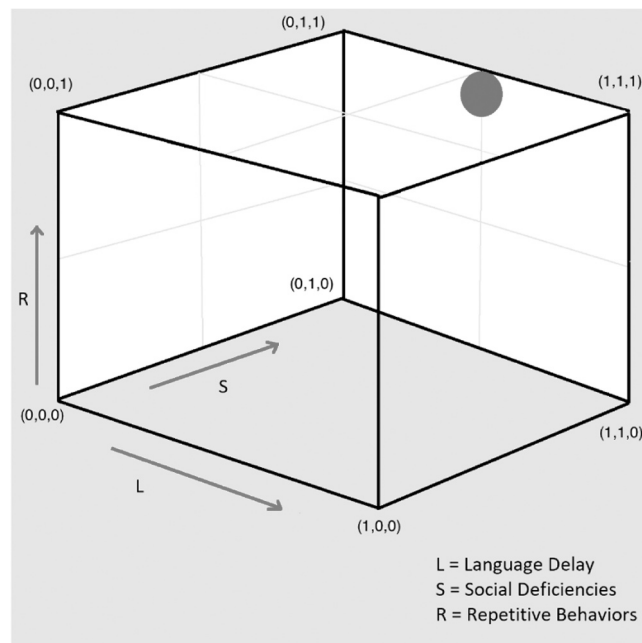
A range of different  $n$ -dimensional models might be used. For example, instead of the images in Figs 1 and 2 which depict various 'shapes' of autism using the imagery of concentric circles, we might instead represent characteristics three at a time (i.e., a 3D model), with individuals represented as occupying a 'space' within a cube. Furthermore, degrees of various properties need not be ranked using whole numbers as in Figs. 1 and 2. We can instead use values between 0 and 1, as in Fig. 3.

## 3. Discussion: injunction to reframe ASD with an explicit appeal to multi-dimensional models

Some are proposing novel nuanced categories to capture differences that 'autism spectrum disorder' often elides, such as those with not only several co-morbidities, but 'high scores' on each co-occurring trait.<sup>5</sup> In other words, what some are calling for is precisely what a multi-dimensional approach is best suited for: providing the theoretical means for increased categorical complexity to preserve

<sup>4</sup> We should recognize the historical contingency of this term's prominence within the field. One may use terms other than "spectrum" to denote a property or concept that admits of degrees (e.g., "continuum", "gradient", or "dimension").

<sup>5</sup> Lord et al. (2022).



**Fig. 3.** Represents a third individual with autism. The sphere towards the top of the cube shows the ‘position’ of the individual being evaluated (at Height:1; Depth:1; Length: 0.5), in this case exhibiting a maximal level of repetitive behaviors, severe social difficulties, and moderate language delay. Inspiration for this style of multi-dimensional representation comes from its usage in the philosophy of science, e.g., [Godfrey-Smith \(2009\)](#), [Mitchell \(2000\)](#).

distinctions that matter for those concerned. With such an approach we can better preserve the appreciable differences among multiple aspects at a finer grain, such that we are better able to address a more nuanced range of presentations. Multi-dimensional models can be used both to fold in traits currently considered comorbidities as well as preserve more nuance in the various aspects which fall under existing criteria.

Future work in this area could make use of multi-dimensional models to generate revisionary diagnostic categories.<sup>6</sup> Empirical work can further guide categorization efforts by identifying patterns (frequent or notable co-occurrences of clustered traits, degrees of traits, etc.) and combining them with other advances in the field to offer a new corrective framework that can mitigate the confusion which often arises from conceiving of and communicating about autism as a spectrum.

#### CRediT authorship contribution statement

**David Kelley:** Conceptualization, Formal analysis, Investigation, Methodology, Software, Writing – review & editing.

#### Declaration of Competing Interest

No conflicts of interest to declare regarding “Autism is Not A Spectrum.”.

#### Data availability

No data was used for the research described in the article.

#### References

- American Psychiatric Association: Diagnostic and statistical manual of mental disorders* (2013). 5th ed. Arlington.
- Godfrey-Smith, Peter (2009). *Darwinian populations and natural selection*. Oxford University Press.
- Lord, Catherine, Charman, Tony, Havdahl, Alexandra, Carbone, Paul, Anagnostou, Evdokia, Boyd, Brian, Carr, Themba, et al. (2022). *The Lancet Commission on the future of care and clinical research in autism*. *The Lancet*, 399(10321), 271–334.
- Mitchell, Sandra D. (2000). Dimensions of scientific law. *Philosophy of Science*, 67(2), 242–265.

<sup>6</sup> While offered as a set of research principles rather than as a guide to diagnosis, one framework that could be developed along these lines is the “Research Domain Criteria Initiative” (RDoC), which emphasizes a recognition of “degrees of dysfunction” and highlights how comorbidities increase the heterogeneity and complexity of presentations.