

Neurodiversity & Education

What, Why and How ? [for Physics people]

Cip Pruteanu 12th October 2022

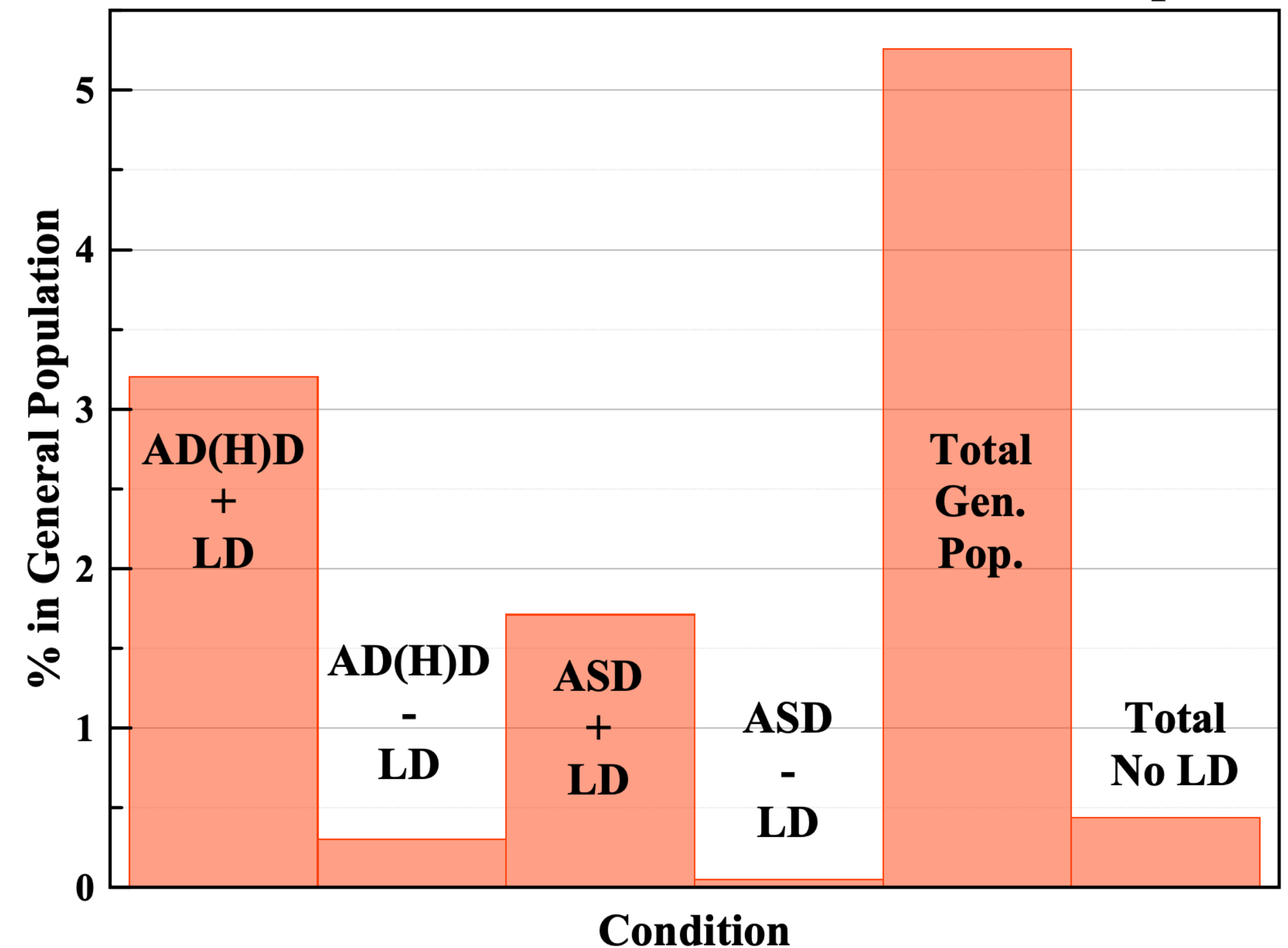
What is Neurodiversity ?

- Human brains are wired differently from one another (obviously), leading to extreme variations in their functioning
- Neurodiversity includes (but is not limited to):
 - Autism - ASD
 - Attention Deficit (Hyperactivity) - AD(H)D
 - Dyslexia
 - Dyscalculia
 - Dyspraxia

What is Neurodiversity ?

- Due to increasingly better identification methods, the prevalence (of all traits) appears to be increasing every year.
- Several advocacy & support groups (National Autistic Society, ADHD UK [nice online self-screening tool], Autistic UK, The Brain Charity, British Dyslexia Association)
- Current guidance based on the Social Model of Disability -> **not the health condition itself, but lack of accommodations lead to one being functionally disabled**
- Note: Current neurodiverse discourse stems from Autism-related movements, often heavily dominated by 'high-functioning types', so may not be inclusive enough/address all the issues relevant

Most Common Neurodiverse Conditions in General Population



Note: ASD-LD occurs at 0.05 % in General Population

Autism Spectrum

“The thinking patterns of individuals with ASD are markedly different from the way in which 'normal' people think. Because of this, too much emphasis is placed on what they 'can't do.' While impairments and challenges do exist, greater progress can be made teaching these individuals when parents and teachers work on building the child's strengths and teach in a manner that is aligned with their basic pattern of thinking.”

- **Visual Thinkers**

often love art and building blocks, such as Legos. They get easily immersed in projects. Math concepts such as adding and subtracting need to be taught starting with concrete objects the child can touch. Broadening emerging skills helps the child to be more flexible in his thinking patterns. Keep in mind that **verbal responses can take longer to form, as each request has to be translated from words to pictures before it can be processed, and then the response needs to be translated from pictures into words before it is spoken.**

- **Music and Math Thinkers**

Patterns instead of pictures dominate the thinking processes of these children. Both music and math is a world of patterns, and children who think this way can have strong associative abilities. They like finding relationships between numbers or musical notes; some children may have savant-type calculation skills or be able to play a piece of music after hearing it just once.

- **Verbal Logic Thinkers**

These children love lists and numbers. Often they will memorize bus timetables and events in history. Interest areas often include history, geography, weather and sports statistics. Parents and teachers can use these interests and talents as motivation for learning less-interesting parts of academics. Some verbal logic thinkers are whizzes at learning many different foreign languages.

Attention Deficit (Hyperactivity)

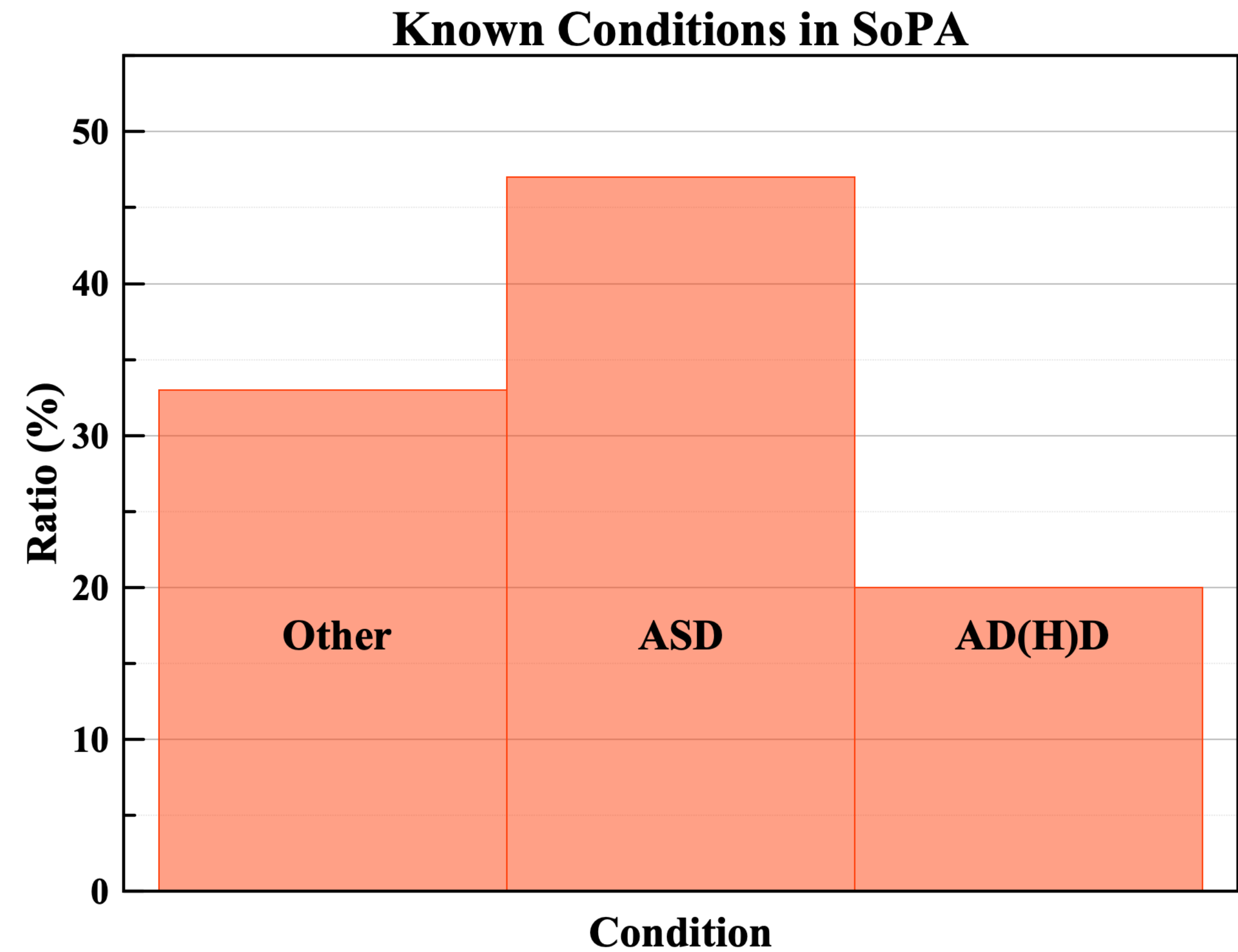
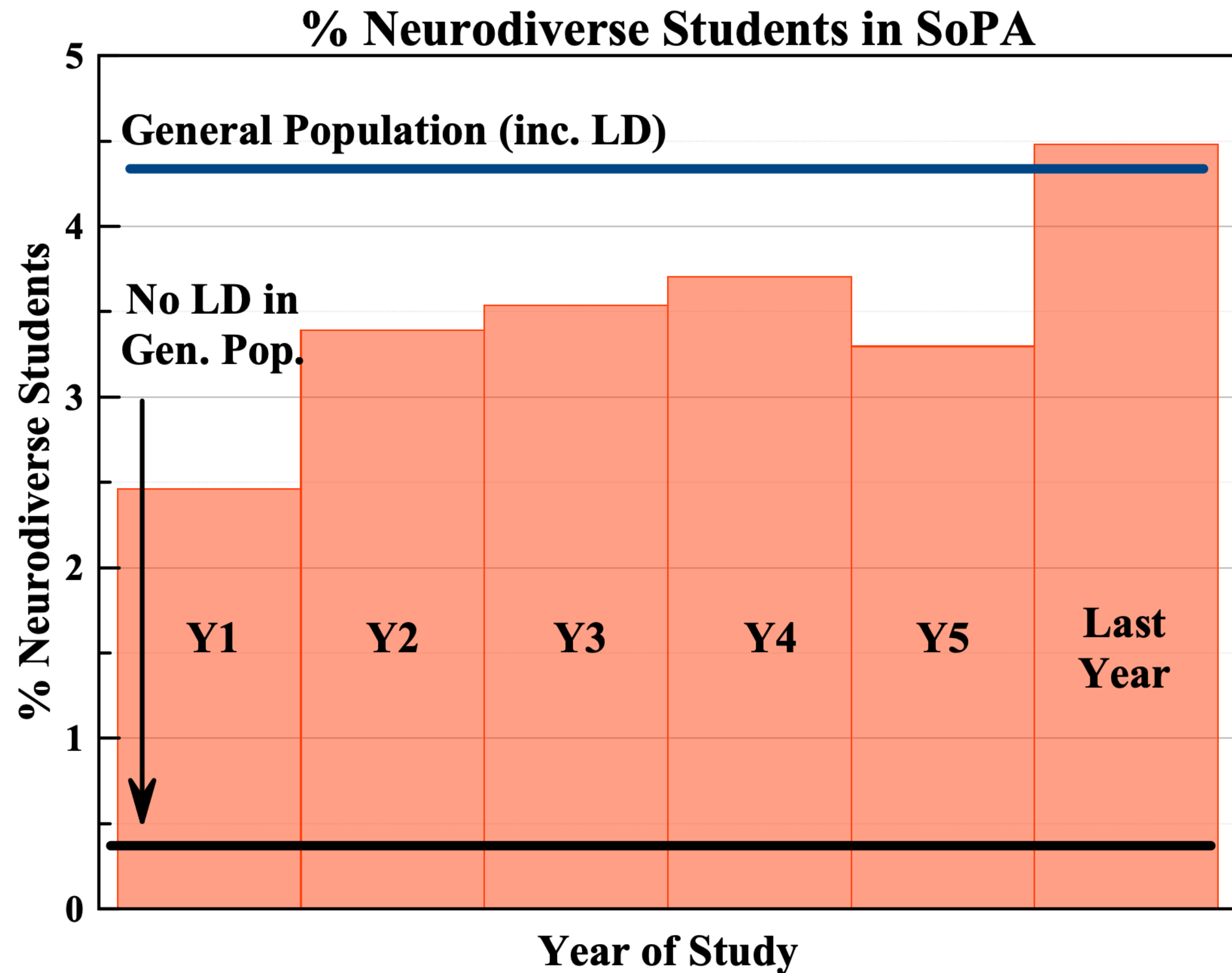
- **Inattentiveness**

- having a short attention span and being easily distracted
- making careless mistakes – for example, in schoolwork
- appearing forgetful or losing things
- being unable to stick to tasks that are tedious or time-consuming
- appearing to be unable to listen to or carry out instructions
- constantly changing activity or task
- having difficulty organising tasks

- **Hyperactivity and Impulsiveness**

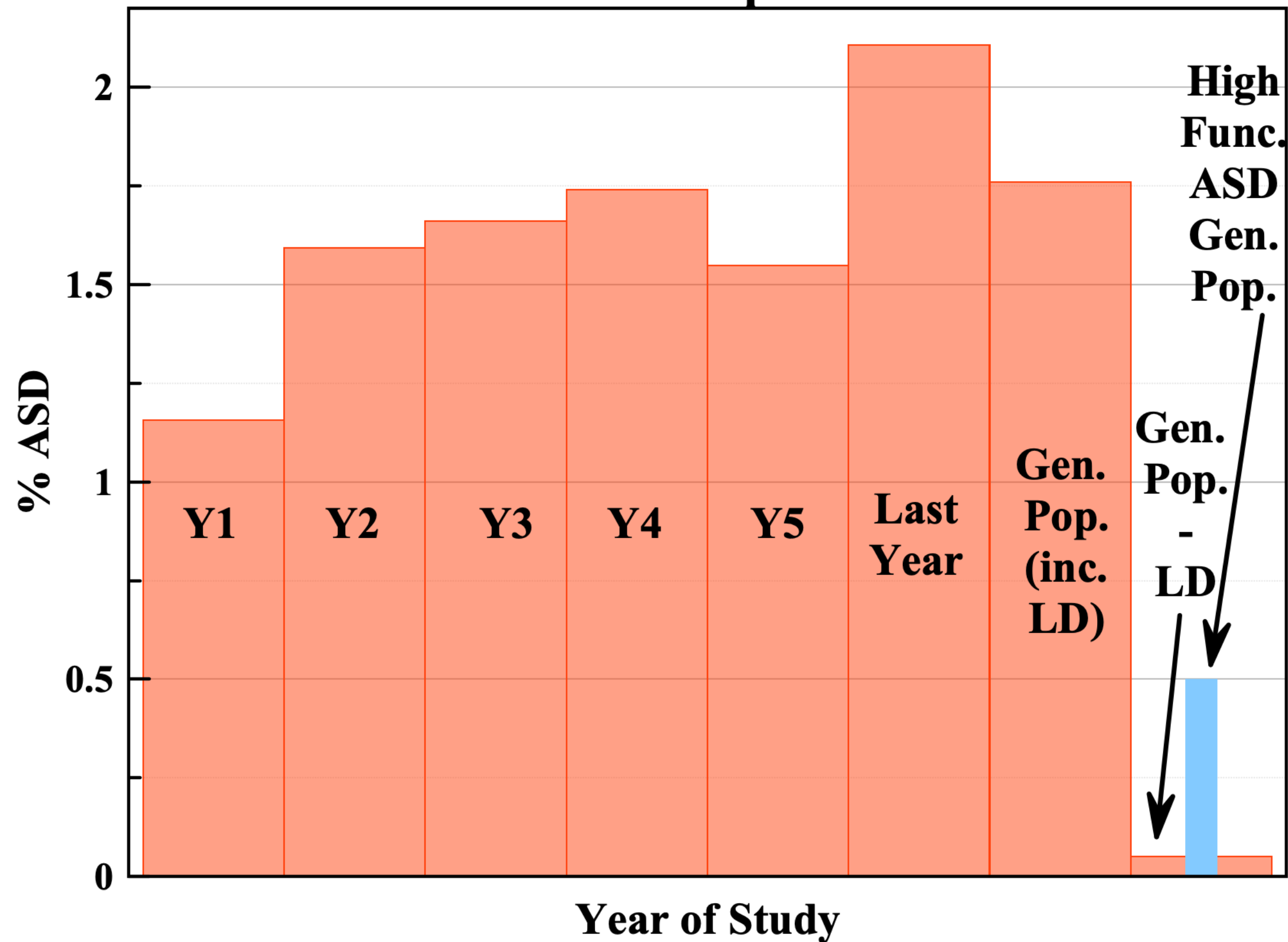
- being unable to sit still, especially in calm or quiet surroundings
- constantly fidgeting
- being unable to concentrate on tasks
- excessive physical movement
- excessive talking
- being unable to wait their turn
- acting without thinking
- interrupting conversations
- little or no sense of danger

Why would we care ?



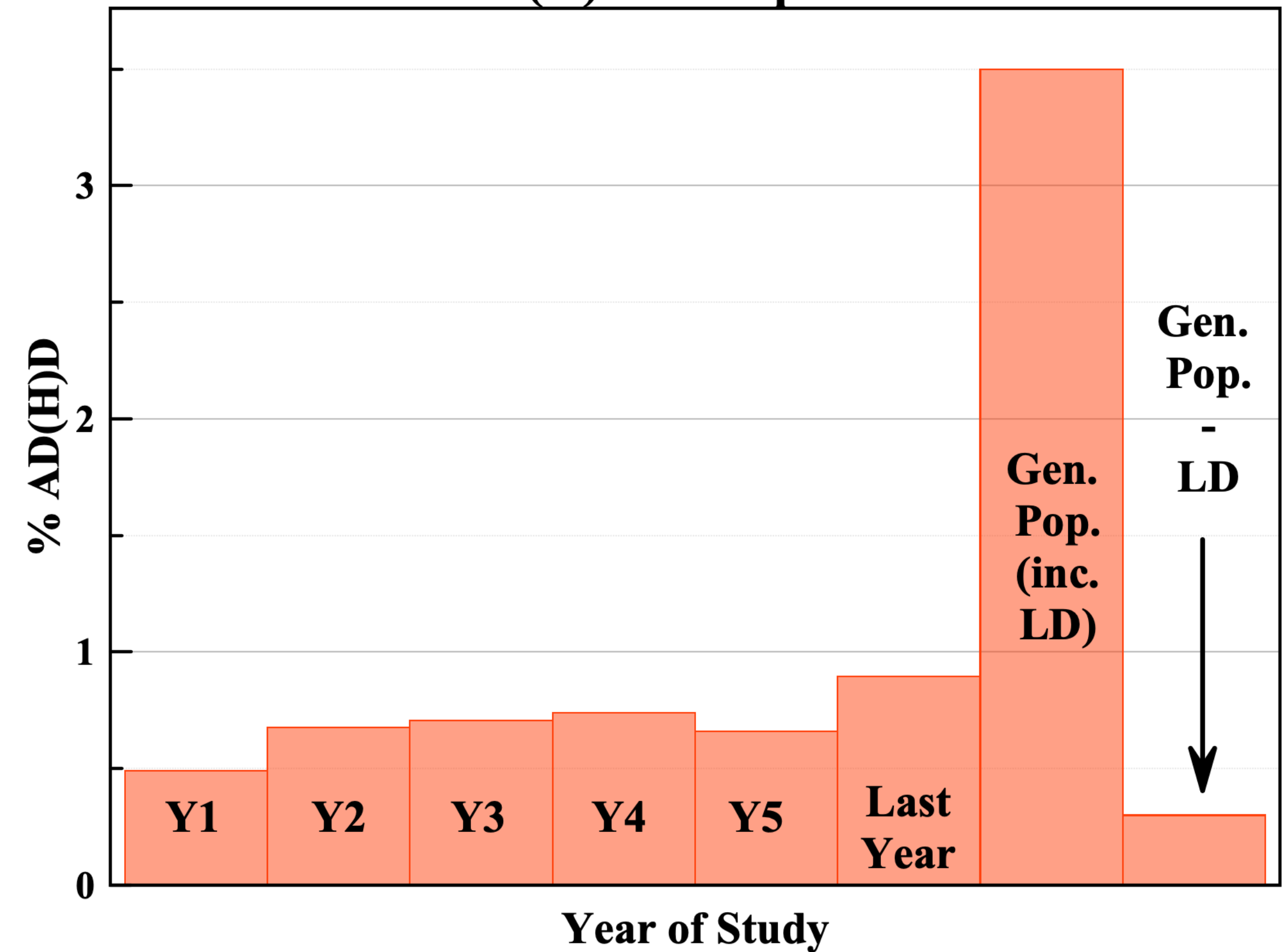
Why would we care ?

ASD: Comparison



Note: 30-40 x Gen. Pop. w/o LD

AD(H)D: Comparison



Note: 1.7-3 x Gen. Pop. w/o LD

Autism Spectrum

What we can do in practice

- **Sensory Environment**

- strong perfumes, random lighting, random noises should be minimised

- **Project Management**

- Difficulties in planning, flexibility, sustained attention or inertia?
- Do they prefer to be immersed in a specific topic or task, or have a selection of different tasks/ intermediate deadlines - and can this preference be built into the project plan?
- **May have to gauge time spent on projects and deliberately stop them from doing more work if satisfactory results were already obtained**

- **Communication Styles**

- Specific, literal language ?
- Written or face-to-face communication ? Might help making them take notes during chats
- Skype easier than direct meeting/ phone call ?
- Explain why you are offering a particular comment or piece of advice, along with offering it.

Attention Deficit (Hyperactivity)

What can we do in practice

- **Be Simple, Clear, and Direct**
 - give instructions in simple terms. Offer them repeatedly!
- **Break Things Up**
 - divide large projects into smaller chunks
 - use workbooks/labbooks and make students keep track of progress
- **Task (not Time) Management (especially for SH/MSc projects)**
 - focus on short-term steps, not long-term plans
 - try to make goals explicit, rather than implicit
 - concrete starting point, use clear mini-milestones

Mental health

* Most neurodiverse traits have very strong co-morbidities with a wide range of mental health conditions (mainly depression and anxiety-related)

- *I know the university's PT system is changing to address such things slightly better, however, practically, academics within the department will still be the people students have most frequent, day-to-day contact with, so are actually the only people who may be able to see early signs and direct the students to find proper help and care*
- *<https://www.ed.ac.uk/student-disability-service/students/support-we-provide>*
- *<https://www.ed.ac.uk/student-counselling/what-is-silvercloud> *** VERY USEFUL, FREE TOOL for students and members of staff at UoE*
- *<https://www.ed.ac.uk/student-disability-service/staff/supporting-students/support-for-disabled-students/mental-health/online-training-supporting-students-mental-health>*

Included link to e-learning resources: <http://learning.cwmt.org.uk/>

Personal Anecdote

DO NOT
READ THIS

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I happen to rank very high on the Autism Spectrum (within the High functioning part of it), and also have the pleasure of one of its most common co-morbidities, that is manic-depression. I have never hidden this information when I felt it was relevant, but I also have a tendency not to disclose it unless needed.

Practically, when I used to be a PhD student, the most helpful thing was that I told my first supervisor (John Loveday) about these when I was going through an actual episode and deemed it necessary so he is not scared/frustrated by my behaviour. When he prompted me I told him about pitfalls and what I thought sensible adjustments for my own situation would look like. He was very accommodating of these, and far as I can tell me being so hasn't actually impacted my academic path and career so far too much (maybe even impacted a bit positively). This was rather different from some of my colleagues with the same 'issues' where the supervisors were unaware of them and clearly had no intuitive feel for how/what to do, and just ended in pretty dysfunctional relations (this is worse in cases where supervisors are themselves neurodiverse).

The most awkward situation also happened during my PhD, when John felt the need post-factum to go and chat with the other person involved to clear the air. Practically, due to autism having a very strong tendency to reduce processing of information to a single mode and boost the speed at which it is done (in my case, numbers and maths), I literally did not see what I was supposed to do in a certain situation (generate a plot), as to me all the versions of it looked the same (whether normal, or log-log makes no difference, I still 'see' that in my mind by whatever convenient mathematical function looks like going through the data). Needless to say, I didn't like the fact (and felt very uncomfortable for a long time afterwards) that I possibly missed/damaged irreparably a professional relationship I was looking forward to with the other person involved (still not sure if that is fixed at the moment to be fair).

Moving forward to better support each other

- Find a standard training module for staff educating on neurodiversity (focus on awareness and simple adjustments to create a better environment)
- Bring professionals (UoE has a dedicated unit doing research and guiding practice in this specific area) to explain things we may overlook i.e. through lectures/workshops
- Gather more data on both students and staff (we have no staff data at the time)
- Form a support group (???)
- Provide information leaflets for all students and staff with resources to help for individual conditions (i.e. Silvercloud [UoE has subscription for all members], EverNote, Notion [both note-taking aids], Student Disability Service*, **)

* Careful not to victimise unnecessarily, not all NDs are/consider themselves disabled in any sense

** There is currently a 2-year waiting time for assessment for AD(H)D

Questions ?



- Can also contact me privately at: cip.pruteanu@ed.ac.uk or MS Teams

Autism Spectrum

Links

- <https://www.ed.ac.uk/student-disability-service/staff/supporting-students/guidance-supporting-students-specific-conditions/autistic-spectrum>
- <https://www.teaching-matters-blog.ed.ac.uk/mini-series-how-do-we-ensure-wellbeing-for-autistic-students-at-the-university-of-edinburgh/>
- <http://dart.ed.ac.uk/supporting-autistic-people-in-he/>
- Thinking styles in autism:
<https://www.templegrandin.com/article.html>
- <https://theplaceforchildrenwithautism.com/autism-blog/thinking-and-the-autism-spectrum>

Attention Deficit

Links

- <https://www.cdc.gov/ncbddd/adhd/school-success.html>
- <https://www.highspeedtraining.co.uk/hub/managing-adhd-in-the-classroom/>
- <https://www.ldonline.org/ld-topics/teaching-instruction/strategies-teaching-youth-add-and-adhd>
- <https://www.disability.illinois.edu/strategiestechniques-adhd>
- <https://www.bath.ac.uk/guides/add-and-adhd-implications-for-study/> ***MOST RELEVANT***
- <https://www.ed.ac.uk/clinical-brain-sciences/research/epic-edinburgh-psychoeducation-intervention/epic-resources-download>
- https://www.ed.ac.uk/sites/default/files/atoms/files/epic_strategy_teachers.pdf
- <http://www.drps.ed.ac.uk/17-18/dpt/cxedu11395.htm> ***does anything similar still exist, and can a bootstrapped version of this become a training module (like Unconscious Bias) ? The school of education has to have some ideas and know answers to these.***
- ***Bonus*** : This is focused on mathematics (so closer to physics), but is primarily-intended for other disorders than those most generally present in our students. May have useful things (need to read through, don't know enough about that condition).
<https://www.nottingham.ac.uk/helm/dev/prism/index.html>