Bridging Neurodiversity and Open Scholarship: How Shared Values Can Guide Best Practices for Research Integrity, Social Justice, and Principled Education

All authors are joint-first authors. The authorship order was decided on the scores of the Academic Wheel of Privilege we developed (see Supplementary Figure 2).

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Abstract

Not all people conform to what is socially construed as the norm and divergences should be expected. Neurodiversity is fundamental to the understanding of human behaviour and cognition. However, neurodivergent individuals are often stigmatised, devalued, and objectified. This position statement presents the perspectives of neurodivergent authors, the majority of whom have personal lived experiences of neurodivergence(s), and discusses how research and academia can and should be improved in terms of research integrity, inclusivity and diversity. The authors describe future directions that relate to lived experience and systematic barriers, disclosure, directions on prevalence, stigma, intersection of neurodiversity and open scholarship, and provide recommendations that can lead to personal and systematic changes to improve acceptance of neurodivergent individuals' lived experiences within academia.

Keywords: Academia; Community; Disability Research; Inclusion; Intersectionality; Neurodiversity; Open Scholarship; Open Science; Representation; Social Justice;

Abstract (Portuguese)

Nem todas as pessoas se conformam com o que é socialmente interpretado como a norma, e divergências devem ser esperadas. A neurodiversidade é fundamental para a compreensão do comportamento e cognição humana. Entretanto, os indivíduos neurodivergentes são frequentemente estigmatizados, desvalorizados e objetivados. Esta declaração de posicionamento apresenta as perspectivas de autores neurodivergentes, a maioria dos quais tem experiências pessoais vividas de neurodivergência(s), e discute como a pesquisa e a academia podem (e devem) ser melhoradas em termos de integridade, inclusividade e diversidade da pesquisa. Os autores descrevem direções futuras relacionadas à experiência vivida e barreiras sistemáticas, divulgação, indicações sobre prevalência, estigma, intersecção de neurodiversidade e ciencia aberta, e fornecem recomendações que podem levar a mudanças pessoais e sistemáticas para melhorar a aceitação da experiência vivida de indivíduos neurodivergentes dentro da academia.

Palavras chave: Academia; Comunidade; Pesquisa sobre Deficiências; Inclusão; Interseccionalidade; Neurodiversidade; Ciência Aberta; Representação; Justiça Social;

Abstract (Italian)

Non tutti si conformano a ciò che socialmente è interpretato come la norma e ci si dovrebbero aspettare divergenze. La neurodiversità è fondamentale per la comprensione del comportamento e della cognizione umana. Tuttavia, gli individui neurodiversi sono spesso stigmatizzati, svalutati e oggettivati. Questa dichiarazione di posizione presenta le prospettive degli autori neurodiversi, la maggior parte dei quali ha esperienze vissute personali di neurodivergenza, e discute come la ricerca e il mondo accademico possano e debbano essere migliorati in termini di integrità, inclusività e diversità della ricerca. Gli autori descrivono le direzioni future che riguardano l'esperienza vissuta e le barriere sistematiche, la divulgazione, le indicazioni sulla prevalenza, lo stigma, l'intersezione della neurodiversità e la scienza aperta e forniscono raccomandazioni che possono portare a cambiamenti personali e sistematici per migliorare l'accettazione delle esperienze vissute degli individui neurodiversi all'interno del mondo accademico.

Parole chiave: Accademia; Comunità; Ricerca sulla Disabilità; Inclusione; intersezionalità; Neurodiversità; Scienza Aperta; Rappresentazione; Giustizia sociale

Introduction

Academia still remains an exclusive club in an Ivory Tower. The voices, perspectives, and experiences of minorities have been systematically excluded, while members are overwhelmingly White, male, cisgender-heterosexual (cis-het), and nondisabled. This specific demographic of researchers is more likely to receive institutional support and access to positions, funds and resources, perpetuating and heightening existing inequalities. Academia's few diverse voices often lead to biased and unfair perspectives benefiting the majority at the expense of minorities. A recent study by Cech (2022) with 25,324 participants examined the demographic privileges within the US STEM field observed that White able-bodied heterosexual males were at a significant advantage compared to all other demographics, with LGBTQ Black disabled females the most disadvantaged across several measures, including social inclusion, workplace harassment, lower professional respect, career advancement opportunities, and persistence intentions. Further decomposition analysis focused on explaining the observed differences in five categories including background characteristics, job characteristics, and family responsibilities, but across all measures a significant proportion of the difference remained unaccounted for by these (e.g. persistence intentions only 31.18% of the gap could be explained by the variables), suggesting privilege as the other factor. This privilege towards White able-bodied heterosexual males contributes to a toxic feedback loop such that minoritised voices are not being heard due to a lack of representation, thus disincentivising minorities from participating in academia and the workforce. These power relations and inequalities are also clearly observable across academia, with Anthropology (Tallmana & Bird, 2020), Ecology (Tseng et al., 2020), Engineering (Rampler et al., 2022), Ethology (Cooke, 2022; Howard, 2022), and Psychology (Gruber et al., 2021; Ledgerwood et al., 2022) facing issues of representation of minorities and acknowledging their contribution (Reardon, 2022). Furthermore, the hidden curriculum (Parsons et al., 2022) and current academic infrastructure focused on metrics and closed scientific systems perpetuate global inequalities and stereotypes reinforcing hierarchies that silence marginalised voices and reinforce their subordination. This justification is further perpetuated by science being misused as a weapon to socially oppress minoritised voices by clinging to the assumption that scientific practice is rational, impartial, and objective, when in fact it is not (e.g., Eagly et al., 2012). In turn, these so-called ‘facts’ are used to justify the claim that under-represented minorities are unable to ascend to positions of power, thus limiting their freedom, opportunities to succeed, and opportunities to participate equally in society.

To counter these inequities, local, as well as, international collaborations of early-career researchers have initiated grassroot movements (e.g., ReproducibiliTea; FORRT; Open Scholarship (***OSch***); see review by Whitaker & Guest, 2020) aimed at pushing for a bottom-up change. Operating primarily within higher education institutions (Tennant et al., 2020), OSch discourse requires us to rethink pedagogical and scientific practices in order to make them more equitable, open, diverse, and accessible (Azevedo et al., 2019, 2022; Farran & Scerif, 2021; Fecher & Friesike, 2014). These include limiting questionable research practices (Bouter et al., 2016; John et al., 2012) in the scientific process, restructuring access to scientific knowledge, and improving reproducibility and replicability (Farrar et al., 2020, 2022; Parsons et al., 2022; Pownall et al., 2021a, 2022) and though there are some difficulties with adoption (e.g., see Kalandadze & Hart, 2022 for a discussion on how to adopt OSch in developmental science), change is afoot. However, the interplay between open scholarship and ***social justice*** has not received much focus, despite discussion about how OSch can benefit marginalised voices (e.g., Baum et al., 2022; Roberson, 2020; Pownall et al., 2021b). Therefore, it remains one of the overlooked principles of contemporary scholarship (Azevedo et al., 2019, 2022) even though paired with social justice, it is a means to help dismantle the systematic barriers in academia, such as difficulty in accessing scientific knowledge due to scientific outputs being behind a paywall, unnecessarily complex academic writing, and lack of data sharing, all of which contribute to a further schism within academia between researchers, as well as between academia and the public. This gatekeeping of scientific knowledge leads to fewer policy changes in underprivileged countries, which is associated with shorter life expectancy, and less access to education and health systems (see Roser & Ritchie, 2020, who show COVID vaccines are being globally disseminated unfairly to countries). Therefore, widespread adoption of OSch practices can aid in abolishing barriers to education, facilitating career progression, and providing more opportunities to enter academia for everyone without exceptions. What OSch can provide to students and aspiring scholars are accessible and ethically curated tools, equipping them with the knowledge and skills to advance not only open and reproducible scholarship by progressing the processes of science making, but also to contribute to sustained culture changes by ultimately improving diversity and representation within science. If we break the boundaries posed by the present academic environment, an inclusive space can be constructed for all scholars to thrive, and in particular, ***neurodivergent*** students and scholars, who are underrepresented in academic scholarship and often marginalised in academia.

Aim

While there has been some discussion in academia about how OSch can benefit marginalised voices such as females, transgender individuals, and underrepresented ethnic and racial minorities (e.g., Ledgerwood et al., 2022; Pownall et al., 2020; Robertson, 2020), neurodivergent researchers have not received as much attention as is critically needed. In this manuscript, we aim to discuss ***neurodiversity*** and its relevance to, and relationship with, OSch, then reflect on how these movements may benefit one another. We follow with an in-depth consideration of the interplay between neurodiversity, other protected characteristics (e.g., gender, race, and sexuality), and social justice. Finally, prior to drawing conclusions and identifying some of the current issues and potential avenues for future discussion, we address a concrete action plan of how OSch can be used to mitigate the effect of barriers encountered by neurodivergent researchers and how this is being implemented by Framework of Open Reproducible Research and Training (***FORRT***) (https://forrt.org/).

Our Positionality

We are a group of neurotypical and neurodivergent researchers at different career stages who are a part of the FORRT community, aiming to make academia and the OSch community more open to neurodiversity. Everyone is welcome in this group. This manuscript is written as a collective work of early career researchers that includes incoming graduate student(s), doctoral researchers, postdoctoral associates, and lecturers from different backgrounds and countries. The plurality of these perspectives is especially beneficial to explore OSch from a neurodiversity viewpoint, by bringing a wide variety of perspectives, experiences, capacities, and resources that can be used to best promote scientific practices and improve scientific dissemination and educational practices. The meaning of the term ‘neurodiversity’ and linguistic prescription[1] of neurodivergent condition slightly differs among the authors of this paper, depending on our epistemological, ontological, and methodological perspectives and also, our unique lived experiences (see Dwyer, 2022 regarding different meanings of neurodiversity). The concept of neurodiversity was formed out of a need to combat the ***ableist*** nature that has suppressed the voices of neurodivergent individuals (Singer, 2017), and the recommendation that academia and psychology need to be critically restructured in order to include neurodivergent voices (Muggleton et al., 2022). We aim to discuss how the neurodiversity movement intersects with other minority movements and OSch. We want to emphasise how differences should be highlighted and accepted, shed light on the barriers encountered by neurodivergent individuals, and evaluate the ableist, colonial, heteronormative and patriarchal assumptions about the concept of knowledge, accessibility, and the concept of neurodiversity. We share specific recommendations that further support diversity in research, equity, and social justice while differing in research epistemology, methodology, etc. Our neurodiversity team is a group that currently consists of anxious, autistic[2], depressive, developmental coordination disorder/condition: (***DCD/DCC***), dyslexic, and attention deficit hyperactivity disorder/condition (***ADHD/ADHC***) individuals as well as neurotypical allies who champion neurodiverse voices in academia (see supplementary tables).

To reflect our mission of justice and equity in academia we created the Academic Wheel of Privilege (see Supplementary Figure 2) as a framework for reflecting on our intersecting identities across multiple domains (e.g. race, wealth, health, gender, education, etc). This framework was adapted from Sylvia Duckworth's Wheel of Privilege and acknowledges the intersectionality framework developed by Kimberlee Crenshaw (Crenshaw, 2017). We each examined our degree of privilege/marginalisation experienced in academic and wider societal context through

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[1] In this manuscript we use identity first language (e.g. dyslexic person) which reflects the anecdotal general preference of the neurodivergent community. Research into linguistic prescription remains understudied but see Pearson et al., 2022. We recognise that linguistic preference will vary between neurodivergent people as well as between the same individual over time or between neurodivergent conditions.

[2] We recognise that different people use different terms for Autism, including Autism Spectrum Disorder (ASD), Autism Spectrum Condition (ASC), Autism Spectrum Disability, or Autism Spectrum Development (Dwyer et al., 2022). Within the manuscript we decide to use "Autism" or "Autistic People" as this is the least controversial term and well recognized by the vast majority of people. Please see the glossary for more information.

a scoring system. Authors with fewer “privileges points” were prioritised in the author list.

Part 1: Neurodiversity

Neurodiversity is the non-pathological variation in the human brain regarding movement, sociability, learning, attention, mood, and other mental functions at a group level (Singer, 2017). An individual is neurodivergent if their neurology diverges from that of the neurological majority (***neurotypical***; see examples in neurodiversity sphere in Figure 1 and Supplementary Table 1 for a glossary of terms such as autistic, DCD/DCC, and ADHD/ADHC). Neurodivergent conditions are frequently centred around diagnoses fitting a narrow set of presentations or behaviours, as such a universal agreement on the classification of neurodivergence does not currently exist (Ne’eman & Pellicano, 2022). We take an inclusive approach to neurodivergence and propose that it is not solely dependent on a diagnosis and takes into account the variable nature of human neurobiology.

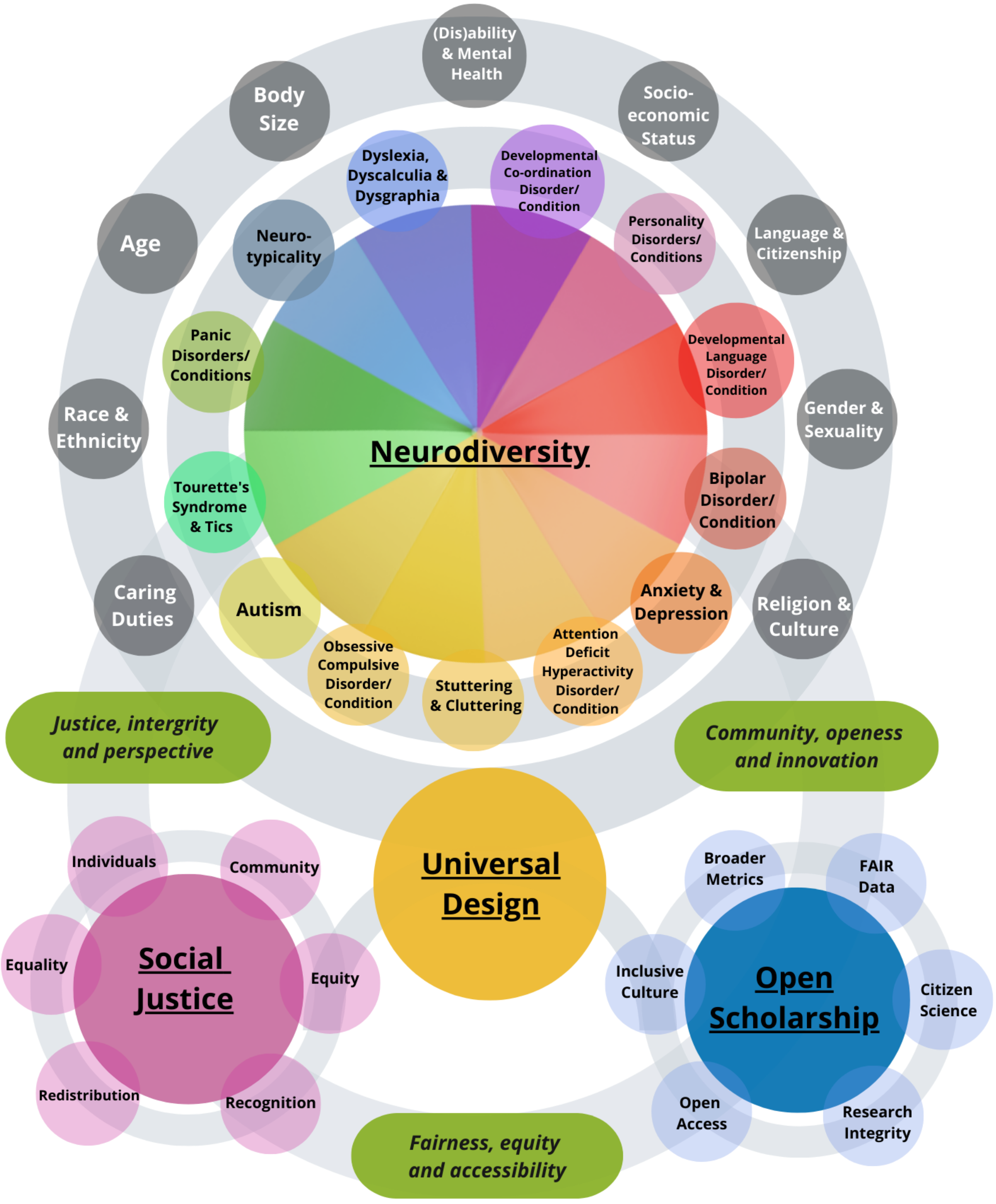
Although one can descriptively argue for *neurodivergence* to include differences such as left-handedness, here we especially refer to neurological ***disabilities*** (and for ***neurodiversity*** to refer to the inclusion of people with and without neurological disabilities: Kapp, 2020). The neurodiversity movement takes place within the disability rights movement, borrowing concepts from other sub-movements like Deaf culture, independent living, and self-advocacy of people with intellectual and developmental disabilities (Ne’eman & Pellicano, 2022). The movement began from autistic rights activists counteracting the elimination narrative that autism could be prevented, normalised, or cured, and instead focussed on the need for accommodation, support, and even amelioration of traits that threaten the quality of life (Kapp et al., 2013). Its grassroots activists advocate for the full autism spectrum (Kapp, 2020; Ne’eman & Pellicano, 2022), and likewise, value the contributions of people with intellectual disabilities to scholarship and society. Supported by the growth of the inclusive post-secondary education movement (Raynor et al., 2016) and ***participatory research*** (e.g., Chapko et al., 2020; Tilley et al., 2021), people with intellectual disabilities increasingly contribute to higher education and participatory research. The issue of the scope or boundaries of neurodivergence is important but relatively unexplored and demands future research on the views of people with neurological conditions (see Dwyer, 2022; Ne’eman & Pellicano 2022 for discussions on ethical considerations).

Neurodiversity is critically relevant to the social sciences as it discusses the diverse cognitions and behaviours forming the foundations of what it means to be unique and human. Importantly, the neurodiversity movement questions the assumption that all humans must conform to the same expectations in order to flourish, but instead assumes that neurodivergent individuals such as autistic, ADHD/ADHC, dyslexic and/or DCD/DCC individuals have valuable human differences in behaviour and brain function and that it is okay to be different. Put simply, ‘Variety’s the very spice of life, That gives it all its flavour’ (Cowper, 1785, lines 606–607).

With this in mind, in a system such as academia that draws upon a hidden curriculum and is focused upon unstandardised metrics, where are the neurodivergent researchers, scholars, and students? We are here but hardly seen or recognised. Within US universities, data from 2015/16 suggest that 19% of undergraduates as well as 12% of postgraduate students reported a disability (NCES, 2017). Similarly, according to the UK Higher Education Statistics Agency (HESA, 2022), in 2020/21 17% of undergraduates reported a disability, dropping to 12% for postgraduates. This decreases even further, as only 5% of staff at UK universities in 2020/2021 disclosed a physical or neurological disability (HESA, 2022). The true figures for staff disability are likely to be higher than reported as concerns regarding negative perceptions of disability disclosure remain, with recent literature highlighting concerns around feelings of being defined by their disability (Brown & Leigh, 2018), or perceptions of not being able to contribute to academia due to their disability being mentioned as reasons not to disclose (Mellifont et al., 2021).

Figure 1.

The nested intersecting spheres of neurodiversity, Open Scholarship (OSch), Social Justice and Universal Design for Learning. The smaller spheres of Open Scholarship and Social Justice show key pillars and their interactions with each other. The six pillars in the social justice sphere are adapted from North (2006). The smaller spheres in the neurodiversity sphere illustrate examples of neurodiversity (e.g., dyslexia, bipolar disorder/condition and neurotypicality). The outermost ring of the neurodiversity sphere indicates other identities (e.g., socio-economic status) that intersect with being neurodivergent/neurotypical and each other. The outer ring connecting neurodiversity, OSch and Social Justice shows the shared values between them with Universal Design being at the intersection of these values. Note our *examples of neurodivergent conditions and intersecting identities are not exhaustive and we present a subset here. See Supplementary Figure 1 for extended figure description.*


(Dis)ability & Mental Health
Body Size
Socio-economic Status
Age
Language & Citizenship
Race & Ethnicity
Gender & Sexuality
Caring Duties
Religion & Culture
Dyslexia, Dyscalculia & Dysgraphia
Developmental Co-ordination Disorder/ Condition
Neuro-typicality
Personality Disorders/ Conditions
Panic Disorders/ Conditions
Developmental Language Disorder/ Condition
Neurodiversity
Tourette's Syndrome & Tics
Bipolar Disorder/ Condition
Autism
Anxiety & Depression
Obsessive Compulsive Disorder/ Condition
Stuttering & Cluttering
Attention Deficit Hyperactivity Disorder/ Condition
Justice, intergrity and perspective
Community, openess and innovation
Universal Design
Individuals
Community
Social Justice
Equality
Equity
Redistribution
Recognition
Broader Metrics
FAIR Data
Inclusive Culture
Open Scholarship
Citizen Science
Open Access
Research Integrity
Fairness, equity and accessibility

Part 2: Synergistic relationship between neurodiversity and Open Scholarship

One key foundation of OSch is accessibility, a key facet that also belongs to the neurodiversity movement (e.g., Brown & Leigh, 2018; Brown et al., 2018). Yet despite this significant overlap between the goals of OSch and Neurodiversity movements (e.g., accessibility, fairness, equity, diversity, and inclusion as core values), current discussions in OSch have given little attention to the neurodiverse experience. It is thus a priority to build a community that discusses how the neurodiversity movement can be included into OSch, as the lived experience of neurodivergent individuals (including encountered barriers) may help to enhance accessibility, allowing OSch to be truly open (Whitaker & Guest, 2020).

There are many potential ways that embracing neurodiversity would benefit the OSch movement. Neurodivergent individuals think about and experience the world differently, thus including neurodivergent researchers in the OSch discourse would only strengthen and diversify it, offering a perspective based on the difficulties that we encounter in accessing traditional science. Although there has been no direct work investigating the influence of neurodiversity on OSch, some links have been made between neurodiversity and scientific or applied science practices more generally. One common problem that autistic scholar Damian Milton (2012) has termed the "***double empathy*** problem" explains communication breakdowns that often occur between autistic and neurotypical individuals caused by both parties' difficulties in understanding one another. Further reflective work by autistic clinical psychologists has suggested that difficulties in understanding (neurotypical) social rules and others' thought processes, which under the medical model would be viewed as a disability, may in fact add value by encouraging observation, evidence gathering, active attempts to understand viewpoints different from one's own, and developing the ability to ask "difficult" questions (Hawker, 2017; Muggleton & Johnston, 2016; Radev, 2020). This process could benefit all through challenging the hidden curriculum and encouraging reflection on what is taught in classrooms in a less explicit way, whilst also potentially benefiting minorities by inviting a critical evaluation of the implicit biases we all hold and may incorporate in classes unintentionally. Furthermore, Radev (2020), an assistant psychologist diagnosed with autism, noted that "being self-aware of my difficulties further encourages me to follow information-gathering procedures and to always be questioning my own conclusions and methods" (p. 50). Although these qualities were discussed in relation to clinical training, they reflect crucial elements of OSch - transparent and critical evaluation of one's own and others' work.

Neurodivergent individuals also differ in their moral judgement, cognitive judgments, and decisions (Dempsey et al., 2020; Rozenkrantz et al., 2021), which may be helpful in the OSch movement and advancement of science. For example, a strong sense of justice is often reported in autistic (e.g., Russell et al., 2019) and ADHD/ADHC (Schäfer & Kraneburg, 2015) individuals, with other ***neurominorities*** (e.g. DCD/DCC; Smith & Kirby, 2021) also anecdotally reporting a similar strong sense of justice. These traits arguably exemplify the integrity and transparency of OSch. Within academia, this strong sense of justice can motivate activism in OSch and other social movements, such as movements for social justice or opposing the climate crisis. In discussing their experiences as autistic researchers, Grant and Kara (2021) identify this as a motive for engaging in emancipatory and participatory health research. Furthermore, differences in moral reasoning may help neurodivergent researchers to identify ethical or epistemological issues which would otherwise remain uncovered.

This difference in moral reasoning reflects a larger heterogeneity of information processing across the neurodiversity spectrum, including differences in creative or divergent thinking (Best et al., 2015; Colautti et al., 2021; Magenes et al., 2021; Majeed et al., 2021; Sedgwick et al., 2019), vocabulary and reading experience (e.g., Elsherif et al., 2021), pattern recognition (Baron-Cohen et al., 2009; Schneps et al., 2011), and the influence of cognitive biases (Rozenkrantz et al., 2021). In particular, cognitive biases such as confirmation bias have been identified as a key issue in the interpretation of scientific results. However, autistic individuals appear to be less prone to these biases and generally make more rational judgements and decisions (Rozenkrantz et al., 2021). Given that OSch aims to identify and mitigate against these biases (Bishop, 2020), autistic researchers could play a key role in assessing existing research systems and processes for potential sources of bias, developing ways to mitigate against such biases, or conducting research including replication studies, meta-analyses and systematic reviews with reduced bias. Cognitive and behavioural differences also influence the process of assessing others' work. For example, autistic researchers have reported strengths in repetitive and detail-oriented tasks, such as data processing (Grant & Kara, 2021; Hawker, 2017). These skills are particularly valuable in peer review of preprints or open code as they enable the identification of errors, one of the major goals of OSch.

Though not always the case, some neurodivergent individuals also experience strong interests (commonly labelled ***“special interests***” in the autistic community, but sometimes labelled as involving “monotropism”; Murray, 2020; Murray et al., 2005), reflecting a preference for a narrower range of topics of interest than average but deeper knowledge about them. Neurodivergent individuals also report experiences of ***hyperfocus***, that is, an intense state of attention upon an intrinsically rewarding task which results in inattention to one’s surroundings (Ashinoff & Abu-Akel, 2021). Hyperfocus is often linked to the pursuit of one’s special interest (Russell et al., 2019), but has also been reported to occur for ADHD/ADHC individuals and neurotypicals (Groen et al., 2020; Hupfeld et al., 2018). Neurodivergent researchers often report having their research area as their special interest (i.e., intense and passionate level of focus on things or events of interest; Martin, 2020). Within the context of academia, OSch may become a special interest of a neurodivergent scholar. This would lead the individual to learn more about the problems identified by the OSch movement and proposed methods to overcome these issues. On the individual level, this may lead to research led by a scholar implementing these solutions and becoming more rigorous. For example, a scholar who develops a special interest in robust statistical inference could be expected to apply this to their own work and share the good practice by making their statistical code openly available. Furthermore, hyperfocus would allow the neurodivergent researcher to immerse themself in their subject of interest and assess aspects of their research. On a broader level, this may drive engagement and innovation in OSch practices, as the individual may encourage colleagues' participation, overcome organisational issues relating to OSch, or aim to address unsolved issues.

Though the previous paragraphs are primarily focused on autistic academics, this is a reflection on the literature available, with little research currently done on other conditions (Bishop, 2010). Regardless, OSch would clearly benefit from greater inclusion of neurodivergent researchers, and likewise, neurodivergent individuals would also benefit from their inclusion in this movement.[3]

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[3] It is important to note that for every strength neurodivergent traits offer, they also present a challenge that must be considered. For example, strong attention to detail and the ability to hyperfocus are strengths in some contexts but may lead to sensory overload or come at the expense of health and sometimes productivity in others (Russell et al., 2019). Our strengths do not diminish our struggles, nor do our struggles overpower our strengths.

The cultural and institutional reforms advocated for by the OSch movement are of particular benefit to neurodivergent researchers. ***Team Science*** (Kozlowski, 2018; Rolland et al., 2021) and large-scale collaborations allow us to highlight our skills while allowing others to compensate for our struggles. For example, a ADHD/ADHC and/or dyslexic researcher may develop innovative ideas but struggle to implement them; likewise, an autistic researcher may have a preference for systematising others' ideas. Furthermore, the shared workload may lead to reduced pressure on individual disabled researchers. It is important to note that to benefit from these collaborations, they must be accessible to all and account for all communication preferences.

Another reform that would benefit all is "***slow science***". Contrasting from the current system of publish-or-perish culture that actively encourages poor research practice in order to get more publications (see the glossary for ***p-hacking, salami slicing***), slow science emphasises a move towards fewer publications but with a greater focus on higher quality research practice, teamwork, and transparency of the process (Frith, 2020; Parsons et al., 2022). Though slow science would benefit everyone involved in the research process, for neurodiverse individuals the reduction of publication pressure and the implementation of a teamwork-focused research culture would allow the opportunity to maximise the strengths listed above. The adoption of these two methods wouldn't just benefit neurodiverse researchers, but science as a whole.

Beyond research, it has been noted that changes to systems that benefit neurodivergent academics often also benefit neurotypical academics (Martin, 2020). For example, before the COVID-19 global pandemic, technologies such as Microsoft Teams, Panapto, and Zoom enabled remote learning to occur but were not always deemed to be a popular choice (e.g. Geange et al., 2020; Zhao et al., 2020) and thus rarely used. However, due to the COVID-19 pandemic, there was a sudden need to rely on remote teaching, and these technologies were seen as successful tools and lauded by neurotypical individuals as methods to improve accessibility (e.g. Crawford et al., 2020; Zhao et al., 2020). This highlights how remote learning improves accessibility for both neurodivergent and neurotypical individuals, with tools to include closed captions in online meetings/learning improving accessibility further. In turn, reducing the highly pressured workload faced by academics generally would improve working conditions for all but with a particularly noticeable impact on neurodivergent individuals.

However, OSch can also benefit the neurodiversity movement beyond academia. By reducing barriers to accessing and engaging in science, it improves the extent to which neurodivergent members of the public can inform research. For example, the traditional model of having two or three reviewers from within the field and often suggested by the author(s) limits the perspectives and constructive critiques which influence published research. Early access to preprints allows for more perspectives to be taken into account, including those of academic and non-academic neurodivergent individuals. As a step further, editorial boards can recruit reviewers from neurodivergent communities who may have experiences and strengths that can aid in improving the clarity of the manuscript, making the sharing of data and stimuli more open and accessible, while allowing for the layperson to have access to a deeper understanding of their own condition, with some journals already adopting this practice (e.g. non-academic autistic reviewers among at least one autistic reviewer per paper policy of the *Autism in Adulthood* journal). This allows neurodiverse perspectives to influence research which affects them, the findings of which in turn can inform their self-advocacy and may feed into wider social or organisational policies. Similar to the imperative to pay community partners fairly in participatory research (Nicolaidis et al., 2019), community reviewers also should be compensated (see Aczel et al., 2021).

Neurodiverse perspectives can be more explicitly included in research and policy-making decisions that affect them using emancipatory and/or participatory approaches, such as participatory action research[4] (e.g., Bertilsdotter-Rosqvist et al., 2019; Fletcher-Watson et al., 2018; Grant & Kara, 2021; Leadbitter et al., 2021; Nicolaidis et al., 2019; Strang et al., 2019; Strang et al., 2020). These have considerable potential for facilitating collective knowledge creation, which simultaneously drives social change that benefits neurodivergent people, as it enables co-creation of projects that consider a diverse range of perspectives. Participatory approaches are rarely considered in quantitative research (Gearing, 2004), although there is some discussion within qualitative research,(see Bennett, 2021 and Tamminen et al., 2021 for recommendations). However, these approaches can work

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[4] However, participatory research is not the only approach to be used for neurodivergent researchers to take a leadership role. Neurodivergent individuals are capable of initiating, leading and conducting research without collaborating with neurotypical researchers. As a result, these neurodivergent-only decision making spaces may inspire innovation (Fletcher-Watson et al., Pellicano et al., 2014a).

hand-in-hand simultaneously to generate transparent and rigorous research, while addressing current OSch principles and practices which serve to reinforce inequalities.

To summarise, making research more accessible is essential for unlocking barriers to participating in research, allowing science to truly progress. However, until we acknowledge that accessibility means accessible for everyone, OSch cannot truly be ‘open’.

Part 3: Intersectionality, interplay of neurodiversity, social justice and Open Scholarship and universal design

Interplay of Social Justice and Open Scholarship

Many OSch policies and practices (e.g., FAIR principles, open code, data, education, materials, etc.) are rooted in ethical and utilitarian interests (McKiernan et al., 2016; Willinsky, 2006) such as that of accessibility, inclusivity, equity, and integrity in the creation, comprehension, dissemination and evaluation of research (Azevedo et al., 2022; Fecher & Friesike, 2014). However, OSch is largely embedded within academia, which in turn can be viewed as a microcosm of wider society. Just as society’s institutions and systems of power and privilege serve a narrow demographic, so does academia, which reinforces the dominant values of the academic archetype (Shin, 2008). Alone, OSch practices are unlikely to be able to promote social justice and may propagate injustices, as academic power and privilege remains in the hands of the few (e.g., ***Bropen Science***, Whitaker & Guest, 2020). Policies such as open source, where data systems curated mostly by the academic archetype, can introduce and propagate unconscious biases along the data pipeline, as perspectives from marginalised groups are excluded (Johnson, 2014). Solving the myriad of ways that inequalities are reinforced in societal and academic spheres requires an understanding of the interplay of these power-privilege systems from the individual to the societal level.

Despite these issues, OSch shares key goals with contemporary social justice: creating equitable and inclusive spaces for the benefit of the whole community, not only a few selected members of it. Multiple models of social justice exist (see North, 2006), but a central tenet of social justice in most of those models is fairness by means of solving inequalities as a collective (Barry, 2005). In striving to solve inequalities, there is a recognition of the multidirectional tensions between social organisational scales (e.g., from individuals to communities and institutions, see social justice sphere in Figure 1; North, 2006). OSch and social justice must be paired to create an inclusive learning/research environment for all to thrive. One way in which this can happen is through ***citizen science***, a branch of OSch. Citizen science bridges the academic and society spheres by recognising the importance of a transdisciplinary approach to knowledge creation and dissemination (Cohn, 2008). This democratisation of research can be facilitated by harnessing technological advances (e.g., artificial intelligence and smartphone applications; Robinson et al., 2018; Scheibein et al., 2022). Citizen science, in addition to participatory research, provides another opportunity for neurodivergent individuals who might have faced barriers to entering or staying in academia and contributing to scholarship.

Intersectionality and Neurodivergence

Individuals exist in society within multiple overlapping socio-political identity spheres. ***Intersectionality*** acknowledges the complexity of this multifaceted and dynamic nature of people's identity and provides a perspective on how multiple forms of inequality operate together to exacerbate each other (Crenshaw, 1989). One implication of the intersectionality framework is that identity cannot be examined on a single axis at a time in isolation (e.g., only race, gender, sexuality, (dis)ability, socio-economic status, religion, see outer ring in Figure 1 for more examples) but instead requires simultaneous consideration of overlapping forms of identity. These different concurrent forms of identity can have multiplicative effects that are not the sum of the component elements. Those effects are experienced along a privilege-discrimination spectrum. The contemporary use of intersectionality by Crenshaw (1989) was borne out of the need to address the compounded socio-economic discrimination experienced by African American women during the Civil Rights era. It is noteworthy that uses of intersectionality have been adopted by various temporal and cultural contexts, including those outside the Global North, and are not restricted to the axes of race and gender (Collins & Bilge, 2020). In the neurodiversity context, Singer consciously meant for the term *neurodiversity* to form a new axis within the intersectionality framework, as a means to interrogate discrimination based on neurology (Botha & Gillespie-Lynch, 2022; Singer, 2017). Further, the neurodivergent sphere is diverse with people with other axes of identity mentioned above, presenting unique sets of challenges and/or privileges in navigating society in general and specifically academia. Adopting the intersectionality lens in academia is necessary to challenge the dominant academic narrative, which currently excludes under-represented voices (Collins & Bilge, 2020; Khelifa & Mahdjoub, 2022). Intersectionality in OSch also allows us to examine inclusion practices to identify and reduce toxic behaviour, whilst uplifting traditionally marginalised voices. Doing so will allow us to make an environment more accessible, equitable and inclusive to all.

Individuals with intersecting identities can experience the resulting benefits and/or challenges. The perspective of an all-or-nothing between benefits and challenges (i.e., intersecting identities and scholarship) ignores the nuance of intersectionality and importantly, the intrinsic and extrinsic experiences surrounding an individual’s identities and social structures. Individuals with intersectional identities are often faced with situations and environments to survive rather than thrive. They may grapple with balancing the benefits of self-disclosure of their multiple identities (e.g. accommodations, cultural awareness) with potential challenges (e.g. loss of opportunities, being perceived as a nuisance). Resorting to survival mechanisms, such as masking or camouflaging, a neurodivergent individual with intersecting identities finds ways to “blend in” among neurotypical peers (Sedgewick et al., 2021). The trade-off of chronic masking is its impact on an individual’s psychological wear-and-tear and sense of identity at the cost of blending in with social standards.

In an environment where diversity, equity, and inclusion (DEI) are promoted, gaps between teaching and practice lead to a mis-messaging of DEI awareness and acceptance (Cage & Howes, 2020). This leads to confusion for all on whether it is truly safe for an individual to disclose their intersectional identities and ask for accommodations, even through appropriate administrative mechanisms. Being turned down for an accommodation request – even if that request is reasonable by general standards – can leave an individual unsure whether the denial could relate to their disability status, socio-political identity (e.g., race, ethnicity, gender, sexual orientation), both, or neither. This ambiguity adds to the daily microaggressions experienced by individuals who are marginalised by social standards favoured by neurotypical, non-disabled, and cis-het societies. ***Multiple minoritised neurodivergent*** people can experience poorer psychological and physical wellbeing through this ‘minority stress’ from the compounded stress of masking, discrimination, or stigmatisation, in addition to everyday stresses experienced by everybody (Meyer, 2003). This increased burden of stress on neurodivergent students results in poorer academic attainment and in extreme cases, may mean their only option is to drop out of their program of study (Cage & Howes, 2020; Botha & Gillespie-Lynch, 2022).

Intersection of Neurodivergence, Race and Ethnicity

The complex socio-historical legacy of neurodiversity research as only a "white boys" phenomenon is still evident today in many racialised people of colour (POC) communities (Botha & Gillespie-Lynch, 2022). The research of neurodivergent conditions, remains practised by and studied on a slender demographic (Jones & Mandell, 2020; but see Lopez & Strang, 2021). The narrow blueprint for what constitutes "acceptable" neurodivergent presentations or characteristics has meant that many neurodivergent POC, women and trans and/or non-binary people are chronically under-/misdiagnosed, and under-represented in research, both as researchers and as study subjects (Botha & Gillespie-Lynch, 2022; Morgan et al., 2022).

Racialised Black neurodivergent people in North America and Europe encounter multi-layered challenges with accessing a formal diagnosis, social integration, and wellbeing (Botha & Gillespie-Lynch, 2022; Jones & Mandell, 2020; Robinson, 2013). In the US, even accounting for socio-economic factors, Black Americans experience more healthcare inequalities compared to White people (Jones & Mandell, 2020). Racial inequalities, coupled with the Black American community's distrust of medical research from historic violations (e.g., Tuskegee syphilis study and Henrietta Lacks' immortal cells), has led to their low engagement in neurodiversity research (Jones & Mandell, 2020; Nature, 2020).

Many neurodivergent POC face a suite of delays and misdiagnoses, often leading to receiving their correct diagnosis later in life, if at all (Jones et al., 2020). People of Colour who are diagnosed in childhood have to combat challenges as outlined in Mandell et al.'s (2006) study. Ethnic disparities in autism diagnosis within the US are a common problem with significant diagnosis delays in Asian (Fong et al., 2021) and Arab American children (Habayeb et al., 2020), as well as misdiagnoses in Black children (Dababnah et al., 2018). For example, Black children in the US were about 2.5 times less likely than White children to receive an autism diagnosis during their first specialist appointment. Black children were more likely to be misdiagnosed with conduct disorder or adjustment disorder than ADHD/ADHC at approximately 5 and 2.5 times the rate of White children, respectively (Mandell et al., 2006). Similar experiences of misdiagnoses and/or misattributions of neurodivergent behaviours are seen in Black dyslexic students in educational settings in the US (Robinson, 2013). Asian children are less likely to receive outpatient services and lower case management services compared to other racial groups (Bilaver et al., 2021; Shorey et al., 2020). These racial/ethnic disparities are likely attributed to a combination of differences in awareness of the diverse presentations of neurodivergence among caregivers, and difficulties communicating and interpreting these differences among educators and clinicians (Liang, 2022; Mandell et al., 2006).

The intersection of race and ethnicity in the social integration, identity development and wellbeing of POC is scarcely considered in academic research and societal provisions (Botha & Gillespie-Lynch, 2022). Many POC in White-majority countries are burdened with the stress of triple masking: masking or code-switching in White spaces to assimilate to Eurocentric professional standards (e.g., moderating use of African American Vernacular English (AAVE)), masking in neurodivergent (White) spaces (e.g., not discussing cultural special interests), and masking neurodivergent traits (e.g., supressing self-stimulatory behaviours) in POC community spaces to avoid lateral discrimination/ostracisation (Botha & Gillespie-Lynch, 2022; Liang, 2022). Many neurodivergent POC make numerous daily micro-decisions between their comfort and wellbeing on the one hand and personal safety on the other. Examples include not wearing headphones needed to prevent auditory sensory overload in public, in order to be aware of potential danger; wearing restrictive “smart” office attire to educational or financial institutions to be seen as competent and/or not suspicious, at the expense of sensory comfort; forcing eye contact; and suppressing self-stimulatory behaviour or potential shutdowns/meltdowns/situational mutism in public, to minimise chances of being seen as a threat. In the U.S., POC, particularly Black and Latine autistic people have disproportionally more negative and fatal encounters with law enforcement like arrest, brutality, and murder by police officers than White or Asian Americans (Liang, 2022; Menifield et al 2018). It is thought up to 50% of people killed by U.S. police officers are disabled, but disaggregated data of law enforcement engagement in both racialised minorities and disabled communities is unknown (Liang, 2022). Even if these negative encounters with police occur outside the campus gates, the psychological stress bleeds into study/work life affecting wellbeing, sense of belonging and productivity. In academic settings, the disproportionate weight of first impressions, known as the primacy effect (Forgas, 2011), means many neurodivergent POC do not have the privilege of unmasking (Giwa Onaiwu, 2020). The intersection of neurodivergence with race/ethnicity adds to the burden of already trying to counteract racial/ethnic stereotypes in White-majority spaces (e.g., Black women as angry or hypersexualised, Black men as lazy, Arab men as terrorists, Asians as inferior, Asian women as submissive and demure). This adds to the weight of initial impressions at first committee/supervisor meetings, or conference networking events as these interactions can determine access to future job and funding opportunities.

These enduring stressors can lead to an eroded sense of self with negative consequences for wellbeing. However, Botha and Gillespie-Lynch (2022) noted that neurodivergent POC youth within POC family/community networks with strong cultural and value systems were buffered from some of these effects of navigating oppressive spaces and had a well-developed racial/ethnic identity.

Intersection of Neurodivergence and LGBTQIA+

The heterogeneity of neurodiversity is matched by equal diversity in gender, sexuality, and sexual orientation (Sala et al., 2020). Individuals whose neurodivergent identity intersects with one belonging to the lesbian, gay, bisexual, transgender, queer, intersex and asexual/aromantic (LGBTQIA+) spectrum may grapple with double disclosure as a double minority. Disclosure of one, the other, or both may depend on the context and environment. Open disclosure of both identities can have a positive effect on awareness and acceptance as an advocate of others and on individual empowerment as a self-advocate, which can come with a cost. Individuals who identify as one or more of the LGBTQIA+ identities may have similar disparity experiences and realise that there could also be differences in their disclosure experiences. Focusing differences that can occur during disclosure, a neurodivergent individual who is also transgender may find that they are often overexplaining their intersectionality to educate others, something that other neurodivergent individuals on the LGBTQIA+ spectrum may not experience to an extent (Strang et al., 2018).

Specific to transgender individuals, approximately 6–26% meet diagnostic criteria for autism (see a systematic review by Thrower et al., 2019). Autistic individuals and gender-diverse individuals, respectively, often report feeling isolated, and at the intersectionality of both, the impact of social isolation is even stronger (Strang et al., 2018). Emerging research is finding higher rates of non-heterosexuality in autistic adolescents and young adults than their non-autistic peers (Weir et al., 2021). In this research literature, much of the focus is on mental health problems that are experienced by autistic LGBTQIA+ individuals (Davis et al., 2022), and less attention has been given to resilience traits and identity development, as well as advocacy empowerment. The intersectionality between neurodivergence and gender, sexuality, and sexual orientation is unfortunately an understudied topic; therefore, those who identify with this intersectionality are not represented in scientific work limiting evidence-based approaches that can improve this population's quality of life.

There is emerging scholarship at the intersection of neurodivergence and LGBTQIA+ with the use of the term ***neuroqueer*** in academic and social justice circles (Oswald et al., 2021). Neuroqueer, first coined by the scholars Yergeau, Michaels-Dillon and Walker, aims to extend the neurodiversity paradigm using an intersectional lens with queer theory (Walker & Raymaker, 2021). Neuroqueerness actively challenges the dominant societal expectations of cis-heteronormativity and neuronormality by resisting compliance, conformity and narratives of cures (e.g., Applied Behavioural Analysis and conversion therapy; Oswald et al., 2021). It values neurodiversity and queerness as non-pathological variations in people, allowing individuals to fluidly reclaim space to fully be and express oneself (Walker & Raymaker, 2021; Oswald et al., 2021).

Intersection of Neurodivergence and Co-occurring Disabilities

Many neurodivergent individuals also have diagnoses of other disabilities and have to grapple with additional accessibility challenges and ableism (Mannion & Leader, 2013, Tye et al., 2019). Research suggests that a small number of physical-related health conditions are prevalent in neurodivergent conditions, including asthma, daytime urinary incontinence, epilepsy, faecal incontinence, gastrointestinal issues, allergies and sleep disorders (e.g., Ajdacic-Gross et al., 2020; Cashin et al., 2018; von Gontard et al., 2021). To date, research regarding co-occurrence and neurodivergent individuals has focused on describing the overlap of a specific neurodivergent condition with other medical conditions, with findings suggesting that on average, neurodivergent individuals have other conditions that are ignored or rarely acknowledged (Bishop-Fitzpatrick & Rubenstein, 2019; Elsherif et al., 2021), leading to less discussion of how best to provide reasonable adjustments that can support the individual and make them feel included and belonged in a specific environment. In turn, this makes it more challenging for students to continue their education. We need to develop a deeper understanding of the mechanisms of these co-occurrences at the patient, provider, systems, and population level and how they affect the quality of life for these specific individuals in order to make the environment they live in less discriminatory, embarrassing, and more inclusive.

In addition, there is still an assumption that there is one form of ‘the human mind’ and accordingly, many systems (education, employment, health, and social services, social relationships) have been built up premised on being neurotypical and able-bodied. Building a society that is accessible for neurodivergent people is not only beneficial for everyone, but fair. However, professionals lack basic knowledge for neurodivergent individuals that they can provide a constructive dialogue in order to deliver effective treatment to aid neurodivergent individuals with physical-related illnesses such as incontinence. As a result of this double empathy problem (see Supplemental Table 1), it can lead to additional illnesses to be ignored or excluded, thus neurodivergent individuals with these physical-related illnesses will be more likely to have poorer mental health and be unable to alleviate the burden they may encounter. In light of this increased potential for poor long-term outcomes, it is critical that those who provide education and health services to possess a fundamental knowledge of these conditions to support neurodivergent individuals; to rely on not a single professional but an interdisciplinary and holistic approach, to provide optimal care in order to provide the best quality of life for neurodivergent individuals (e.g., see *Ready to Act* model; Scottish Government, 2016); and finally to be cognisant of the intersectionality between neurodivergent and other physical-related health communities.

However, as a result of poor awareness, it is also common for neurodevelopmental conditions to be misdiagnosed as mental illness, alternative neurodivergent conditions and physical-related conditions, leading to the individual feeling like the problem and believing they will place additional burdens on other adults. Any effort to support neurodivergent children with several co-occurring conditions should be provided in a culturally safe and responsive manner. Professionals should develop their knowledge on neurodiversity by working to build understanding of the barriers these neurodivergent subgroups may encounter, examine their own privilege and biases, and integrate these insights to inform the care that can best provide a more holistic picture of the neurodivergent individual.

Individuals whose identity intersects with neurodiversity and other co-occurring disabilities may deal with additional experiences that may not be understood by individuals who are only neurodivergent. Accessing and communicating support needs can be challenging when symptoms overlap between neurodivergent conditions and physical disabilities. For example, it can be difficult to disentangle the cause and therefore access to appropriate diagnoses/support for issues like poor working memory ("brain fog"), which is common with ADHD/ADHC, as it is for chronic inflammatory conditions like arthritis or lupus (Mackay, 2015). For ADHD/ADHC individuals with heart conditions, it can be harder to manage their ADHD/ADHC where often the first line of treatment is stimulant medication, due to increased risk of heart problems (Sinha et al., 2016). For neurodivergent individuals experiencing a flare up in their chronic illness (e.g., increased pain and/or fatigue and brain fog), it can further exacerbate executive functioning issues already present with their neurodivergent condition. Flare ups can be stress-induced (Jedel et al., 2014), which can be caused by being in high-pressure academic settings, leading to lower quality of life and work performance. DuPaul et al (2020) noted that ADHD/ADHC students in the U.S. were more susceptible to effects of stress especially with co-occurring psychiatric conditions like depression resulting in lower grade point averages (GPA) and likelihood of course completion compared to their peers without depression and/or anxiety.

The dynamic nature of physical disabilities adds additional challenges to neurodivergent staff and students in academia, as performance metrics are set at a neurotypical and able-bodied standard. Individuals will often need to take time off to manage their chronic illness (e.g., rest days, hospital check-ups, physical therapy), which can put pressure on ongoing commitments such as teaching, research, or assignments. These work absences mean individuals are unable to consistently fulfil their academic duties, which can lead to ableist remarks of being "lazy" or "unmotivated" from their peers. Further, a lack of awareness of disabilities in academic spaces means individuals expend a lot of time and energy advocating for accommodations, which are not always granted. Pre-pandemic, flexible or remote working was a frequently denied accommodation for chronically ill/neurodivergent people, as in-person attendance was seen as "essential" (Bosua & Gloet, 2021; Schur et al., 2020). However, the pandemic forced us all to re-examine our relationship to work. It has shown us that effective remote working is possible, albeit with some challenges, for various academic activities like online meetings, conferences, networking and teaching (Chacón-Labella et al., 2021; Pionke, 2022). Emerging evidence is showing that flexible working has been beneficial for people's wellbeing and productivity: autistic people (Lawrence, 2021), cancer survivors (Kruse et al., 2022), Postural Tachycardia Syndrome (Knoop & Dunwoody, 2022), arthritic individuals, people with cardiovascular diseases, and sleep disorders (Vanajan et al., 2020). It is important to acknowledge and address the barriers of flexible/remote working such as access to digital infrastructure, lack of flexibility, disability cultural awareness and training of managers, being overlooked for opportunities only available in-person (Bosua & Gloet, 2021; Schur et al., 2020) to create academic spaces that foster a sense of belonging and are fully accessible for disabled people.

Intersection of Neurodivergence and Socioeconomic Status

Micro- and macro-systematic barriers, such as health service disparity and access to education, disproportionately impact neurodivergent individuals from low-to-middle income countries (LMIC). OSch is necessary for connecting these individuals with professionals, researchers, educators and policy experts. Accessibility needs to include open access of knowledge and education to populations that are most impacted by systemic inequities (e.g., intersectionality of neurodivergence and LMIC). When scholarship is inaccessible (e.g., publication fees, journal subscription), the inequity gap widens; for instance, authors from LMIC rarely are lead authors (Ross-Hellauer, 2022; Kwon, 2022), while the number of neurodivergent lead authors is unknown, as is the intersection of neurodivergence and LMIC authors. Scientific work on marginalised and minoritised communities needs to be accessible to individuals who come from these backgrounds. Thus, self-advocacy is strengthened by use of empirical science and theoretical frameworks guiding information through advocacy for policy change.

Socioeconomic inequity impacts access to formal diagnosis, especially for individuals in low-to-middle income socio-economic status (SES). While early diagnosis has been a consistent aim among stakeholders (Freeman et al., 2019; Gu, 2019; Harris et al., 2019; Song et al., 2022), a significant proportion of the low-to-middle income SES population continues to be unscreened for developmental and mental health disabilities as well as co-occurring medical conditions, particularly POC (Keynejad et al., 2018; Niessen et al., 2018). Burgeoning late diagnosis of a developmental disability (Green et al., 2019; Leedham et al., 2020) indicates six of several underlying problems: 1) lack of access to early screening (Choo et al., 2019); 2) low awareness of developmental disabilities (Whittle et al., 2018); 3) distrust of healthcare professionals (Zeleke et al., 2019); 4) fear of not being believed (Lewis, 2017); 5) misgendering or sex bias in characterizing disability conditions (Bargiela et al., 2016; Santos et al., 2022); and 6) low cultural competency in patient-provider interactions (Aylward et al., 2021; Eken et al., 2021). Some still cannot access a formal diagnosis when missed as a child due to living in a LMIC or region, immigration status, lack of healthcare coverage, language/communication barrier, or lack of access to a professional licensed to conduct diagnostic evaluations. For these individuals, ***self-diagnosis*** through increased awareness and openly accessible screenings may be the only option. Until the six underlying problems above are addressed, self-diagnosis will continue to be some individuals' only option for self-advocacy.

Taken together, classist, sexist, paternalistic and racist systems of oppression and domination coordinate to deliver the figure of a neurodivergent individual as cisgender, White, middle class and male. This neurominority is taken to reflect the average neurodivergent individual, despite being a product of the systems of oppression which cooperatively function to pathologise neurominorities, misdiagnose under-represented minorities to exclude them from participating in the social phenomenon of neurodiversity, provide few (if any) reasonable adjustments, and perceive neurominorities as a commodities/objects to be studied, rather than world-makers/subjects in society. People with intersecting oppressed identities experience not only the same oppression as people in any of these groups, but also unique lived experiences of prejudice and disadvantage that apply to a combination of identities. This highlights that intersectionality is required to combat the institutional prejudice and disadvantages that pervade society. Only when institutions take responsibility for making adjustments to support and accommodate under-represented individuals, rather than placing the onus upon these individuals, can an equitable society be realised.

Universal Design for Learning and Neurodiversity

There has been a recent shift towards the use of ***Universal Design for Learning (UDL)***. Defined as educational institutions proactively making adjustments to their approach to learning (e.g., providing editable documents or assignment options) rather than relying on students actively requesting accommodations. When properly implemented, UDL leads to an inclusive environment for learning and scholarship including people of all backgrounds within higher education (Burgstahler & Cory, 2010; CAST, 2022). UDL shares a commonality with the neurodiversity movement: that all of us have a brain that is unique (Waisman et al 2022; Singer, 2021; Blume, 1998). UDL can offer a more flexible and inclusive practice, there is no need to disclose one's disability, irrespective of student status (Clouder et al., 2020). University staff should recognise the different manners in which students may communicate and contribute, whilst being open to collaborating with students to find suitable approaches. In addition, UDL allows students to engage in the material that best suits their learning. Traditionally, university students are assessed through essays/dissertations, group/individual presentations or examinations, but neurodivergent students may find these types of assignments more challenging despite having the knowledge to succeed. UDL encourages educators to examine the students' strengths, as opposed to weaknesses and allows students to have more choice. Learners could do a recorded presentation, as opposed to presenting in a group or present the skills they have acquired on the course in a different form that may suit them better. This would benefit the students in terms of better preparation for employment, by focusing on the student's ability and professional values, as opposed to the challenges. Put simply, it can be described as neurodiversity involvement for pedagogy[5].

Universities are already making some progress incorporating elements of universal design. This is being accomplished with social and technological changes shaping the educational landscape (e.g., closed captions). Before the COVID-19 pandemic, the use of closed captions in the university context was beginning to be adopted for neurodivergent and neurotypical students to aid learning (Dello Stritto & Linder, 2017) but the rapid transition to remote contexts saw an increased use of closed captions that was seen as beneficial by many students (Chen et al., 2022). More recently, Nightingale et al., (in prep) evaluated the extent undergraduate students used captions in video recorded learning materials (e.g., pre-recorded

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[5] UDL also fully aligns with the UK Professional Standards Framework in Higher Education (UKPSF, 2011) as it facilitates educators' continuous development (A5), focuses on respecting individual learners and diverse learning communities (V1), promotes participation in higher education and equality of opportunity for learners (V2) and acknowledges the wider context in which higher education operates recognising the implications for recognising the implications for professional practice (V4).

lectures and/or supplementary lecture recordings). They included closed captions (e.g., rolling ‘subtitles’) or a transcript function in Panopto recordings. Each approach to text-based support depends on automated speech recognition on Panopto but has differing levels of accuracy. The authors found that 60% of students use either closed captions or the transcript function in Panopto video recordings. There were higher levels of use among those that disclosed specific learning difficulties (e.g., ADHD/ADHC, dyslexia) and English language learners. In one-to-one interviews, the authors also noted that students use captioning to support note-taking, their understanding and increase their engagement with recorded materials when viewing recordings and/or revisions. Closed captions were used to compensate for the lecturer’s speaking style (e.g., speaking too quickly to take notes), nature of the material (e.g., unfamiliar scientific terminology) or technical issues (poor audio quality). The use of closed captions offers new endeavours to transform the design of educational experience for students and educators and how current, outdated and existing views of pedagogy fail to recognise new approaches as knowledge contributors in terms of teaching students by making education an inclusive experience.

A further UDL incorporation, which can similarly improve the experience of neurodivergent and neurotypical people alike, is the embedding of plain language in teaching and communicating with students. The plain language campaign is currently led by the US government (Blasie, 2021) and wider adoption and effectiveness studies are needed. Plain language is one of the recommendations for accommodation for people with intellectual disabilities (Raymaker et al., 2019) and Developmental Language Disorder/Condition (DLD/DLC[6]) individuals because some of them can experience difficulties processing oral and written sentences (Jones & Westermann, 2021). However, the evidence base for support and accommodations in DLD/DLC is

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[6] The term Developmental Language Disorder/Condition (DLD/DLC) is used as opposed to modifying it to Developmental Language Condition (DLC), which would have been consistent with the other terminology used throughout the paper. The term DLD is very recent and the existing advocacy efforts to raise awareness about this misunderstood and largely hidden condition (e.g., The DLD Project https://thedldproject.com/, and RADLD https://radld.org/). We are placing priority on raising awareness through preserving the keyword “DLD”, as inconsistent terminology has caused issues for advocacy and finding reliable information for those who need it (Georgan & Hogan, 2019). It is also acknowledged that DLD/DLC individuals were not included in the decision process for choosing the name (Bishop et al., 2017). There is currently no information available on the naming preferences from DLD/DLC individuals, although research is underway (Pearson et al., 2022). Anecdotally, “DLD individual” and “DLDer '' are terms preferred by some DLD/DLC individuals (personal communication).

still underdeveloped (Royal College of Speech and Language Therapists, 2020). DLD/DLC is highly prevalent in the population (7.6% prevalence rate, Norbury et al., 2016) and a small proportion of DLD/DLC individuals attend university despite facing barriers (Dubois et al., 2020). Due to the recency of adoption of the term DLD/DLC and it being an invisible disability, it is likely that large portions of the population, student bodies, and academic staff at universities are underserved. Hence, it is essential for universities to consider this type of UD adjustment, especially with the aim of widening access for DLD/DLC individuals and intellectually disabled people. As with other aspects of UD it may be anticipated that plain language will benefit other neurodiverse groups as well (Shailes, 2017).

An important core property of UDL is to provide choice to allow students to develop agency in their own learning. Lecturers may feel that academic standards will not be maintained or students will not achieve the learning outcomes. However, student choice and agency aims to remove structural barriers, such as making a specific activity unnecessarily difficult. The aim is not to reduce the academic level. In fact, its aim is to create an environment that benefits all and is crucial to some. For instance, lecture capture allows the student to learn in an environment that suits them and to learn at their own pace. Over decades, lecturers have questioned the effectiveness of lecture capture (Nordmann et al., 2021), but students, for example dyslexics, who otherwise would struggle, may engage with learning and develop at their own speed (Nightingale et al., 2019). Rather than creating concerns on whether students will continue to engage, UDL offers learners an opportunity to develop agency in the process , a goal that lecturers should encourage. Applied more broadly to the academic employees' relationships, UDL can also improve the academic culture, providing academic workers with opportunities to engage in their trade in a way that fits their neurocognitive style and thus provide a new perspective. Last but not least, UDL promotes and facilitates social justice and equality. For UDL and inclusion for neurodiverse individuals to be truly universal, they need to be embraced both bottom-up and top-down. This would look like individual instructors opting for accessible teaching strategies and universities making a formal commitment to implement recommendations for inclusivity (e.g., Lynch, 2020, Spaeth & Pearson, 2021).

Whilst the framework of UDL is widely considered to be beneficial for neurodivergent/disabled learners (Spaeth & Pearson, 2021), there remains challenges to its practical implementation, critique of efficacy for all learners (Boysen, 2021) and accessibility conflicts. Educators in higher education institutions are often not adequately trained or given sufficient resources to implement UDL (e.g. multi modal lecture delivery). Well intentioned educators may continue to use familiar pedagogy because of the perceived (or actual) high workload needed to embed UDL, adding to their already pressured roles. The responsibility of implementing UDL should not solely rest with educators, but requires a partnership between educators, students, and administrators. Resources should be allocated to train educators and administrators in how best to support neurodivergent/disabled learners. It is important to note that UDL does not erase all barriers to learning as some accessibility conflicts will remain (e.g. a neurodiverse class may have an autistic individual who needs low sensory input to learn, whilst another ADHD/ADHC student needs high sensory input), but offers a solution to widespread issues within the current system.

Finally, we want academia to approach neurodiversity in the same way that true cosmopolitans approach cultural diversity. We want academics to reject the idea that the lived experiences of neurominorities such as dyslexia, autism, intellectual disability, ADHD/ADHC, which differ from the neuromajority, should be pathologised. Rather, these experiences should be accepted as fundamental to the human experience, to allow us to have different perspectives to understand what it means to be human. As a result, by considering this perspective, ‘‘our strengths and deficits will shape, not deny, our humanity” (Grinker, 2010, p.173). For example, striving for lay and/or plain language, such as including a lay abstract or community brief (now standard in journals like *Autism* and *Autism in Adulthood*) makes scholarship more cognitively accessible by explaining complex concepts simply. Through their experience, we can expect neurodivergent academics to be more likely to adopt and promote UDL principles for teaching and learning. The inclusion of neurodivergent people in academia, and particularly in OSch, is therefore likely to support the adoption of those principles which facilitate social justice. Not only that, but as neurodivergent academics, we want to promote UDL principles not only in teaching and learning, but throughout the organisational cultures we navigate daily: UDL applied beyond the classroom to the academic environment, from research seminars to departmental meetings to organisational development, would ensure to promote social justice and equality in our teaching, and in academic career development.

Future Directions and Our Action Plan

Neurodiversity-informed scholarship

We are currently crowdsourcing a database of papers by neurodivergent researchers to: recognize their scientific contributions; reduce bias in science by supporting the inclusion of perspectives by both neurotypical researchers and neurodivergent researchers in research articles; and diversify course syllabi by supporting the inclusion of work and perspectives by neurodivergent researchers in lecture notes and readings. In the past two decades, there have been more and more neurodivergent researchers in the fields of education, psychology, and neuroscience. Lived experiences of neurodivergent researchers offer diverse perspectives to advance science, notably but not limited to science of neurodiversity (e.g., Chown et al., 2017; Gillespie-Lynch et al., 2017; Grant & Kara, 2021; Kapp, 2020). For example, Michelle Dawson is commendable for her work in “enhanced perceptual functioning” in Autism (Mottron et al., 2006), and Damien Milton is a pioneer in the “Double Empathy Problem” theory (Milton, 2012). We also hope that this database improves learning engagements and satisfaction of neurodivergent students by diversifying course syllabi, so that they feel included, welcome, and respected by instructors and peers, and that they can have strengths that are essential for research and knowledge development (Grant & Kara, 2021).

Furthermore, we believe and hope that the OSch movement can continue to support and benefit the neurodiversity movement. We are part of the FORRT community, which consists of a very inclusive neurodiversity team with both neurodivergent and neurotypical researchers. For example, in our first meetings, we discussed everyone’s access needs and we recognised the dynamic nature of accommodations. In our Code of Conduct (https://forrt.org/coc/), we emphasised that “We pledge to make participation in our community a harassment-free experience for everyone, regardless of age, body size, *visible or invisible disability*, ethnicity, sex characteristics, gender identity and expression, level of experience, education, social and economic status, nationality, personal appearance, race, religion, *neurodiversity*, or sexual identity and orientation”, and we “Welcome neurodivergent people to make themselves comfortable – feel invited to tic, self-stimulate/stim, fidget, move around etc.”. We hope other education and research communities will incorporate similar important statements in their Code of Conduct and ensure inclusivity of their environments.

In addition, we hope our initiative will inspire more many-lab/collaborator projects in neurodiversity or development of neurodiversity teams within Big Team Science groups, notably in developmental psychology (Mascolo & Bidell, 2020), educational psychology (Annan et al., 2008), neuroscience (Gau et al., 2021; Yen et al., 2017), and clinical psychology (Hall et al., 2019) fields following the examples already set (FORRT: Azevedo et al., 2019, 2022; Parsons et al., 2022; Many Babies: Frank et al., 2017; ManyBirds: Lambert et al., 2022; ManyDogs: Espinosa et al., 2022; ManyPrimates: Many Primates et al., 2019; Psychological Science Accelerator: Moshontz et al., 2018). As mentioned above, Big Team Science offers excellent opportunities for neurodivergent individuals, with unique strengths and challenges, supporting each other through an inclusive environment. Moreover, we hope that future conferences in OSch can consider the needs and challenges of neurodivergent individuals (Levitis et al., 2021; Nuwer, 2020). One possible solution is to provide the option of participating in a conference virtually (or in real life if they prefer and can). Another solution, taking inspiration from the International Society for Autism Research annual meeting who, among others, offers quiet rooms where participants with sensory challenges can have breaks (Nuwer, 2020). This can be incorporated in future OSch conferences. Finally, future conferences can actively seek feedback and suggestions from neurodivergent individuals and implement such suggestions if feasible (Levitis et al., 2021).

Neurodiversity in Higher Education and Academia Surveys

There have been surveys on frequency rates of neurodivergent conditions (e.g., HESA, 2022; NCES, 2017), but we are not aware of any non-US/UK or cross-cultural study; studies on experiences of people with neurodivergent conditions in higher education and academia are very limited. To address these gaps and move forward, we plan to conduct quantitative surveys and/or qualitative research to: 1) investigate the frequency of neurodivergent conditions and co-occurring mental health conditions in academia and higher education; 2) understand experiences (e.g., accommodations, relationships with colleagues and supervisors, satisfaction, different types of stigma, disclosure experiences) by neurodivergent individuals in academia and higher education; 3) understand attitudes towards OSch and neurodiversity of both neurotypical and neurodivergent individuals. Victor et al., (2022) investigated the frequency of mental health conditions and experiences of disclosure and stigma among applied psychology graduate students and faculty members in the universities in the United States, finding prevalence rates of ADHD/C, Autism, and Specific Learning Disability are 8.9%, 0.3%, and 3.0% respectively. We hope to adapt (focusing on neurodivergent conditions) and extend their pioneering work by including participants from different disciplines (not limited to psychology), different educational and career stages (i.e., from undergraduate students to tenured professors), and different regions (not limited to United States or United Kingdom samples).

Given the aforementioned differences in recorded frequency rates between different education stages (NCES, 2017), we expect that there would also be differences in experiences by neurodivergent individuals and attitudes towards Neurodiversity and Open Scholarship at different career stages (e.g., postgraduate students versus faculty members, see Victor et al., 2021), between disciplines (e.g., Psychology versus other fields), and across cultures (e.g., Western samples versus Asian samples). Investigating such possible differences and moderators in frequency rates, experiences, and attitudes may be important for developing more contextually and culturally-tailored solutions. We believe this would be implementable, given the inclusive, collaborative and multi-cultural nature and rapid growth of "Big Team Science" projects in the Open Scholarship community (Azevedo et al., 2019, 2022; Forscher et al., 2020; Moshontz et al., 2018; Tierney et al., 2020, 2021). We will present and discuss this plan at the The Society for the Improvement of Psychological Science (SIPS) 2022 Conference, through a hackathon. We hope that we will gain additional insights from the Open Scholarship community for conducting such important research. This would be an important step of understanding and improving conditions and experiences of neurodivergent students and researchers, thus advancing social justice, making Open Scholarship more diverse and representative of the many needs of academics.

Further recommendations

In addition to our own action plan, we want to recommend a number of initiatives and future directions to our readers. We suggest by no means that all these recommendations should be adopted at once: in the spirit of OSch, we want to encourage readers to approach these suggestions as a buffet, changing practices where they can and at a rhythm that they can sustain (Bergmann, 2019, as cited by Whitaker & Guest, 2020).

The movement from Diversity, Equity and Inclusion (DEI) to Diversity, Equity, Inclusion and Accessibility (DEIA), the promotion and use of Universal Design for Learning (UDL), and the Plain English campaign are existing initiatives that we have mentioned above and which can be adopted to make OSch more open, thanks to enhanced inclusion. Additionally, we want to highlight to readers the proposal to shift to inclusive metrics to measure impact (e.g., mentoring; Davies et al., 2021), and the use of inclusive recruitment practices in recruitment (e.g. cluster hiring; Sgoutas-Emch et al., 2016), not only in departments, but also in editorial teams; both these actions would ensure that more diverse voices are heard in the production of science, thereby advancing social justice. At the recruitment level, decision-makers should ensure that assessment methods do not discriminate against neurodivergent applicants, for example by expecting eye contact or body language as usually produced by neurotypical people; providing interview questions in advance; and, learning from UDL, giving job applicants the opportunity to present in flexible formats. Managers in academia should also consider how the workplace environment they provide could be less stimulating at the sensory level, or at least how each staff member can be in control of the amount of sensory stimulation they receive. Management should also consider shifting to hybrid working, enabling remote working when tasks do not require it, rather than prioritise a return to campus. Finally, the use of self-certified sick days would also allow neurodivergent academics to autonomously manage their conditions along their work-life balance. UDL principles can furthermore be brought into academic publishing in order to open scholarship to all groups: this can include, but is not limited to, the use of alternative communication in conferences (e.g., sign language, built-in text-to-speech), and alternative texts walking readers through models, figures and tables in publications (see Anstett et al., 2021 for an example). This would not only make scientific outputs more open to neurodivergent scholars, but simply to the broader neurodivergent community, who may wish to learn more about their condition(s), perhaps even to self-advocate.

Finally, to further include the broader neurodivergent community, we also recommend seeking community-based partners to develop participatory research projects, and to compensate these partners for their consultation (i.e., to write their participation into grants/budgets). Including neurodivergent communities at all stages of research would not only promote their voices further, but would ensure that research questions are addressed with their perspectives in mind. A first effect of this, we argue, would be to reduce the use of ableist language in publications: while we encourage non-neurodivergent authors to make efforts on their own to use non-ableist language (see examples in Bottema-Beutel et al., 2021 - specific to autism research but generalizable to all neurominorities), the inclusion of neurodivergent communities in research projects would support this further, allowing not only draft manuscripts but also, for example, press releases and other similar communications, to be reviewed for sensitivity. At the other end of the research cycle, another way to support the reduction of ableist language in publications is for editorial boards to recruit and compensate reviewers from neurodivergent communities, in the same way that the *British Medical Journal* now seeks pre-publication reviews not only from academics and medical practitioners, but also from the wider community; this should be particularly true of journals focusing on neurodivergence (e.g., we note that such a mechanism does not seem to exist at the *Journal of Attention Disorders, Journal of Fluency Disorder*). Finally, the requirement to have a community involvement statement (such as seen in, e.g. *Autism*) in every paper is a good research practice to include in academic journals about neurodivergence.

Conclusion

To conclude, science is in service to the people, however not all people are treated equally. The lived experience of neurodiversity is rarely discussed but is still stigmatised and discriminated against within the current structure of academia. As a result, not all neurodivergent individuals encounter the same opportunities as the authors of this manuscript, but instead experience frustrations that result in burnout, impacts on their mental health, and often leads to exclusion from academia. Neurodivergent individuals have been marginalised in so many ways that opportunities to ensure their lives improve have been missed. While we cannot change what has happened in the past, this position statement aims to be the first step to ameliorate the toxic, exclusionary Ivory Tower known as academia. Readers, especially those in power (e.g., White, male, cisgender, affluent, able-bodied, neurotypical), can identify and implement concrete steps to offer a constructive dialogue within their research group, discipline, department and program and ensure their neurodivergent colleagues can thrive, not just survive. In psychological science and OSch, there is a broad discussion regarding social justice, equity, diversity and inclusion, however a position statement will not suffice to adequately resolve these matters. This conversation requires dedicated and self-reflective individuals, who want to produce ongoing actions to enable sustained and meaningful changes that will impact culture, and hopefully, wider society. These provisions need to continue post-pandemic because we cannot return back to normalcy, as the conversation about disability, race, language, gender and sexuality has truly started (see Figure 1). Ghai (2021) noted that "[W]e have a huge opportunity to not only advance our science but also to equitably serve all of humanity" (p. 2), and to further this point, we hope, and truly believe, that science and OSch are capable to complete this task, ensuring that the name of OSch is truly *open*.

Disclosure

Parts of the manuscript are based on an Educators' Corner on navigating Open Scholarship for neurodivergent researchers published at FORRT's blog (Elsherif et al., 2022; https://forrt.org/educators-corner/010-neurodiversity). We wrote this Position Statement with reference to that piece but expanded on several topics and made substantial changes and additions.

Statement of Authorship

We represent a diverse range of abilities, class, cultures, ethnicities, genders, races, and sexualities, but we also recognise that our experiences do not encompass all lived experiences within the fields of sciences.

Acknowledgments

We are a group of neurodivergent and neurotypical academics at diverse career stages, which also means that some of us are in more privileged positions and can publicly self-identify as neurodivergent, along with their other identities. Therefore in this section, some of us will publicly present how they each identify, but we want to remind our readers that no assumption should be drawn about other authors who chose not to self-identify below.

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Amélie Gourdon-Kanhukamwe: I am a white French non-binary AFAB (pronouns: she/they), who was diagnosed as ADHD/ADHC-Combined (both Hyperactive and Inattentive) as an adult, after completing all my studies. The period, country and working class origins I grew up in had little, if any, discussion of ADHD/ADHC, and even when I started studying psychology in France in the 2000s, the condition was still stereotypically presented as a male one, mainly expressed through physical hyperactivity. Even after my daughter was diagnosed with ADHD/ADHC, I kept attributing my difficulties to my presumed own flawed traits for a while. Only letting go of that stereotype, thanks to conversation with, and reading about, women and AFAB with ADHD/ADHC, was I able to learn about myself and receive diagnosis. Also a first-generation higher education graduate with a non-traditional path post-high school, I was still able to benefit from buffers to the effects of my ADHD/ADHC, through white privilege and growing up in a country with great social security.

Jenny Mai Phan *(she/her/hers)*: Jenny is Asian American with Vietnamese ancestry, bilingual, a child of immigrant parents, and a first generation college graduate. Jenny openly identifies as autistic and neurodivergent and was diagnosed as an adult after recognizing autistic traits within herself from her children receiving a diagnosis of Autism. She attributes her late diagnosis to lack of access to a licensed psychologist who can diagnose adults with developmental conditions and to her family's lack of awareness about developmental conditions and female presentation of autism, low SES background, minimal English communication, and pressure to assimilate in a new country. After her diagnosis, she is learning to be a better self-advocate and expanding her comfort zone with disclosure of her neurodivergence.

Flavio Azevedo (he/him/his) is a Brazilian immigrant ensuing from a low-SES background and experienced extreme poverty. He is also a first generation university graduate. He was able to start his Bachelor in Psychology, at the age of 26, via a special program aiming to make higher-education accessible to older, uneducated, and economically disadvantaged populations. Flavio was informally referred to as a child/teen with learning disabilities in schools by educators but only well into his adulthood he was formally diagnosed as ADHD/ADHC and Dyslexia during his masters for constantly needing more time to finish his exams. Flavio now identifies as a neurodivergent early-career scholar.

Mahmoud Elsherif *(we/they)*: We are an Arab non-binary AMAB who uses *we/they* pronouns. They are an Arabic Egyptian Muslim, multilingual, child of immigrant parents, and a first generation university graduate. Mahmoud openly identifies as DCD/DCC. Their diagnosis was around adolescence and is privileged that this occurred during this time, as otherwise it would have been a late diagnosis. My family lacked awareness about neurodevelopmental conditions, had a strongly negative view about disability within Middle Eastern, North African and Turkish (MENAT) countries, low SES background, minimal English communication, and pressure to be culturally aware of the English culture.

John J Shaw *(He/Him/His)* is a white first-generation academic from a working-class background in the north of England. John was diagnosed with ADHD/ADHC-c and DCD/DCC at the end of the PhD aged 24 after a chance meeting with an ADHD/ADHC-c researcher at a conference who upon seeing him struggle encouraged him to contact different GP and see about a diagnosis. Although always struggling to some level academically and labelled an underachiever, when the topic of potential ADHD/ADHC-c came up this was never taken seriously under the premise that he was doing “fine” for someone from his background.

Declarations of Conflicting Interests

We have no competing interests to declare.

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Supplementary Material

Supplementary Figure 1 (extended description).

Figure 1 shows the nested intersecting spheres of neurodiversity, Open Scholarship (OSch), Social Justice and Universal Design for Learning shown as four large circles with their examples as smaller circles all linked by interlocking grey rings labelled with shared values. The top circle is the largest and is labelled neurodiversity and has 12 equal sectors covering the rainbow colours. Examples of neurodiversity are displayed as 13 smaller circles overlapping the neurodiversity circle. The neurodiversity examples listed are Developmental Co-ordination Disorder/Condition, Personality Disorders/Conditions, Developmental Language Disorder/Condition, Bipolar Disorder/Condition, Anxiety and Depression, Attention Deficit Hyperactivity Disorder/Condition, Obsessive Compulsive Disorder/Condition, Autism, Stuttering and Cluttering, Tourette’s syndrome and Tics, Panic Disorders/Conditions, Neurotypicality, Dyslexia, Dysgraphia and Dyscalculia. The outermost ring of the neurodiversity circle has 9 circles providing examples of identities which can intersect. They read: (dis)ability and mental health, socio-economic status, language and citizenship, gender and sexuality, religion and culture, caring duties, race and ethnicity, age, and body size. The neurodiversity circle is linked by a ring to 2 other circles, social justice, and open scholarship. The social justice circle is pink and has 6 central tenets shown as smaller circles labelled as individuals, community, equity, equality, recognition, and redistribution. The shared values of social Justice and neurodiversity are labelled as justice, integrity, and perspective. The open scholarship circle is blue and has 6 examples shown as broader perspectives, FAIR data, citizen science, research integrity, open access and inclusive culture. The shared values of open scholarship with neurodiversity are community, openness, and innovation. The shared values of social justice and open scholarship are fairness, equity and accessibility, Universal design is shown as a yellow circle linked to social justice and open scholarship and overlapping with the outer identity ring.

Supplementary Table 1.

Glossary of key terms and concepts related to Open Scholarship, Neurodiversity, Social Justice and Universal Design.

Term (Abbreviation)	Definition with synonyms and/or related terms	Key Reference
Ableism	The discrimination against people with disabilities, including visible and invisible disability such as neurodivergent individuals. People with disabilities are defined by their disabilities and perceived as being inferior to non-disabled people.	Bottema-Beutel et al. (2021)
Ableist language	Any language that is derogatory towards people with disabilities, perpetuating the inequality that anyone with a disability is less than that of anyone without a disability (e.g., *high-functioning* vs. *low-functioning*).	Bottema-Beutel et al. (2021)
Accommodations	Changes that organisations and people providing services or public functions have to make to reduce the structural barriers that individuals encounter. These reduce disadvantages, leading to a more inclusive and equitable society. *Synonym:* Reasonable adjustments	Lord and Brown (2010)
Anti-elimination	The pro-acceptance agenda of the neurodiversity movement as concerns autism and arguably other neurodivergences or neurological disabilities (see Ne'eman & Pellicano, 2022), specifically opposition to the medical model's goals of prevention, recovery or cure, and normalisation (that seeks indistinguishability from *neurotypical*	Kapp et al. (2013); Ne'eman and Pellicano (2022)

	peers, which critics decry as "passing").	
Attention Deficit Hyperactivity Disorder/Condition (ADHD/ADHC)	ADHD/ADHC manifests as difficulties in regulating attention, impulsive behaviour, hyperactivity, restlessness and executive functioning. Under the medical model, ADHD/ADHC is seen as a disorder, while ADHDers often see it as a complex difference with strengths such as dynamic cognition and energy among the core traits. Synonyms: Attention Impairment Hyperactivity Condition (AIHC). Related term: Specific learning difficulty (SpLD)	Sedgwick et al. (2019)
Autism	Autism is medicalized as a spectrum disorder but the autistic community prefers to refer to it simply as "autism" (Bottema-Beutel et al., 2021). While the diagnosis emphasis deficits in social communication in addition to restrictive and repetitive behaviors, autistic people and allies often instead seek acceptance and stress differences in "Organizing and regulating sensory information and movement…including speech, thought and emotion" (Donnellan et al., 2013) alongside strengths such as attention to detail and hyperfocus (Russell et al., 2013). Neurodiversity advocates argue for the mutuality of shared social difficulties between autistic and non-autistic people (Davis & Crompton, 2021; Milton, 2012; see Double Empathy Problem). Synonyms: Autism Spectrum Disorder (ASD), Autism Spectrum Condition (ASC), Autism Spectrum	Donnellan et al. (2013) Dwyer et al. (2022)

	Disability, Autism Spectrum Development (Dwyer et al., 2022).	
Citizen Science	A project that involves the general public to complete a scientific project in order to democratise science.	Cohn (2008)
Developmental Coordination Disorder/Condition (DCD/DCC)	An impairment in acquiring and learning gross and fine motor skills and coordination. Although categorised as a learning condition, this is not on the basis of impaired general learning but can impact learning. *Synonyms:* developmental dyspraxia, developmental motor coordination disorder/developmental motor coordination condition	Kirby and Sugden (2007)
Developmental Language Disorder/Developmental Language Condition (DLD/DLC)	An impairment to understand and/or use spoken and written language in all languages that the individual uses. *Synonyms:* Specific Language Impairment; Verbal Dyspraxia	Bishop et al. (2017)
Disability	Disability can be impairments, activity limitations and participation restrictions resulting from problems with body function and structure (impairment), limitations to execute tasks/actions (activity restriction), and individual involvement in life situations (participation restriction) (World Health Organization, 2011). These can be temporary, total or partial, lifelong, acquired, visible or invisible.	Bosua and Gloet (2021)
Double Empathy Problem	Autistic people experience difficulties in terms of fitting into society not only because they misunderstand others but also are	Davis and Crompton (2021); Milton (2012)

	misunderstood by others (especially non-autistic people). Considering how autistic and neurotypical individuals perceive and understand each other, there could be a failure of empathy on both sides, as supported by growing empirical evidence. In contrast, generally, Autistic people communicate and empathise well with Autistic people (see recent review by Davis & Crompton, 2021). This may be applicable to other neurominorities but more research with other neurominorities is needed.	
Dyslexia	An impairment to identify speech sounds and learning how they relate to letters and words, leading to challenges in reading. *Related term:* Specific learning difficulty (SpLD)	Snowling (2019)
Framework of Open Reproducible Research and Training (FORRT)	An organisation that provides a pedagogical infrastructure to support the teaching and mentoring of open and reproducible research in line with prototypical subject matters in higher education. It is a grassroot initiative to raise awareness of pedagogical implications of open and reproducible science and its associated challenges (i.e., epistemological uncertainty). One of the primary aims of FORRT is to facilitate access, discovery and learning to those who are educationally disadvantaged.	Azevedo et al. (2019, 2022)
Hyperfocus	An intense state of attention upon an intrinsically rewarding task which results in inattention to one's surroundings.	Ashinoff and Abu-Akel (2021)

	Synonym: Flow	
Identity first	This puts the condition before the person, describing a part of their identity, as opposed to what the person has, e.g., autistic person vs. person with autism.	Botha et al. (2021)
Intersectionality	A term which derives from Black feminist thought and broadly describes how social identities exist within ‘interlocking systems of oppression’ and structures of (in)equalities . Intersectionality offers a perspective on the way multiple forms of inequality operate together to compound or exacerbate each other. Multiple concurrent forms of identity can have a multiplicative effect and are not merely the sum of the component elements. One implication is that identity cannot be adequately understood through examining a single axis (e.g., race, gender, sexual orientation, class) at a time in isolation, but requires simultaneous consideration of overlapping forms of identity. (Crenshaw, 1989)	Crenshaw (1989); Parsons et al. (2022)
Medical model of disability	Disability is viewed as a defect of the individual, which is compared to neurotypical traits and characteristics. This defect must be remediated, cured, fixed or eliminated in order to have a high quality of life.	Kapp (2013); Pellicano and den Houting (2022)
Multiple neurodivergent	Describe someone who has more than one neurodivergent condition (e.g. ADHD/ADHC and dyslexia)	Walker and Raymaker (2021)

	through a self and/or formal diagnoses.	
Neurodiversity	Neurodiversity has been understood as a biological fact, a sociopolitical movement (and/or a framework supporting the movement), or a combination thereof, referring to variations in the brain. As a descriptive term it can include everyone, but as an ideological term (that we adopt) it advocates for people with neurological disabilities.	Ne’eman and Pellicano (2022)
Neurodivergent (ND)	People whose brains function differently in one or more areas of cognition (e.g., motor, social, attention) than typical; people with neurological disabilities. *Synonyms:* Neurodivergence, neurodistinct	Asasumas (n.d.)
Neurominorities	Any group, such as dyslexic people, that differs from the majority of a population in terms of behavioural traits and brain function. See: neurodivergent, neurodiversity.	Walker and Raymaker (2021)
Neurotypical (NT)	The brain functions, behaviours and processing that is perceived as the typical brain. *Synonyms:* Neuro-majority	Dekker (1999)
Neuroqueer	Neuroqueer is an extension of the neurodiversity paradigm used to actively challenge the dominant societal expectations of cis-heteronormativity and neuronormality by resisting compliance, conformity and narratives of cures. *Related terms:* Neuroqueerness, neuroqueering, neurocosmopolitan	Walker and Raymaker (2021)

Open Scholarship (OSch)	Knowledge of all kinds should be openly shared, transparent, rigorous, reproducible, replicable, accumulative, and inclusive (allowing for all knowledge systems). *Synonyms*: Open Science	Parsons et al. (2022)
P-Hacking	A consequence of the focus in journals on novel or confirmatory results. Collected data is manipulated or changed until nonsignificant results become significant.	Head et al. (2015)
Participatory research	Neurodivergent individuals should be incorporated in the entire research process to achieve the shared goal between researchers and the communities to reduce the power imbalance between the researcher and those researched through a systematic co-creation of new knowledge. *Synonyms:* Co-production	Fletcher-Watson et al. (2019); Nicolaidis et al. (2019); Parsons et al. (2022)
Person first	A linguistic prescription that puts the person before a diagnosis, describing what the person has as opposed to forming part of the identity of that person, e.g., person with autism vs. autistic person.	Botha et al. (2021)
Salami Slicing	Post-hoc research practice designed to increase the number of publications from a dataset by splitting it further. Problematic as it is not always clear that the findings were found from a single dataset	Fanelli (2018)
Self diagnosis	The process to diagnose medical conditions in oneself.	Sarrett and Kapp (2018)
Social Justice	The distribution of opportunities, privileges and wealth within a society.	North (2016)

	Synonyms: Justice, equity, diversity and inclusion (JEDI), equality, diversity and inclusion (EDI), diversity, equity and inclusion (DEI) or diversity, Equity, Inclusion and Accessibility (DEIA)	
Social model of disability	Disability is viewed as being unable to fully participate in home and community life. As a result of these functional limitations and barriers to full participation, disabling environments are created. The social model distinguishes between disabilities and impairments. The former are imposed by society, while the latter is the effect of any condition. The solution lies in fixing society's attitudes towards the condition, as opposed to the person themselves. Like the medical model, it is reductive and normative. It fails to include the material and embodied realities that are divergent and contradictory experiences of impairments and existence of multiple, intersecting oppressions. See Dwyer (2022) regarding differences between medical model, social model, and neurodiversity approaches (which are considered by some as the "middle ground").	Singer (2017)
Special Interest	An interest that involves collecting items such as books, listening to music in a repetitive way or focusing intensely on a narrow topic such as climate change.	Patten Koenig and Hough Williams (2017)
Team Science	A collaboration between a group of scientists to address a particular scientific challenge.	Hall et al. (2018)

Universal design/Universal design for learning (UD/UDL)	A teaching approach for academics/teachers/tutors/universities to proactively, not reactively, accommodate the needs and abilities of all learners without having them disclosing their disability, thus eliminating many barriers to teaching, learning and education.	Steinfeld and Maisel (2012)

Note. The synonyms are a combination of our personal experiences and the literature.

Supplementary Table 2.

Authors' Examples of Negative Disclosure and/or Sharing Experiences regarding Personal Identity and/or Experiences of Neurodiversity (adapted with reference to Victor et al., 2022 supplementary section).

Trigger Warning: The following vignettes contain materials that may be harmful or traumatising to some audiences. Please have a look at the keywords first before reading each vignette.

Keywords	**Examples**
Lack of will, denting self confidence, too smart to be neurodivergent, doubt, excluded, different	Navigating academia (and society) as a neurodivergent person with other marginalised identities is challenging. Disclosing my neurodivergent conditions as an ECR to my PI has been detrimental and I am still experiencing the fallout from this decision, causing me to question my place in academia. Several requests for accommodations like extended deadlines for assignments or alternative ways of engaging in group activities/meetings have been slow to be implemented or straight up denied. I was forced to leave a lab group because the PI was perpetually ableist, after I repeatedly tried to explain how I work best and provide resources to improve the work environment. One time I was labelled as a "troublemaker" for querying research integrity violations in a direct and evidenced-based way.

Denting self confidence, doubt, excluded, different, imposter syndrome	During undergraduate, being an Arab, LGBTQIA+, disabled, neurodivergent, from low socio-economic status and Muslim, we disclosed our disability to our department to ensure that accommodations could be provided. We were shouted at by our lecturer in front of the whole class stating that he will not provide the slides to us because it is unfair on everyone and said that we shall wait like everyone else. This same person tried to fail us on a number of courses until our personal mentor noticed that my scores were the only ones that were close to failure, despite our marks not being in line with our other marks. We later found out that it was because of our identities that they were going to fail us. Despite achieving a first class, we have never felt so despised. This is made worse because the professor was verbally warned. He was close to ruining our education, career and a chance to better ourselves. What makes it worse is that how many before us have failed? This was echoed during our Masters and my PhD, wherein we were told that being neurodivergent means being unable and unlikely to complete our PhD due to lack of intelligence. As a result, we started making lies about our identity.
Self-confidence, doubt, guilt, anxiety, panic, downplaying issues, imposter syndrome	I once confided in a supervisor and mentor that I was having trouble with task load and completion of a specific task given to me by them. I told them I was anxious and not feeling well whenever thinking about that task, that I woke up every morning with that dreadful task in mind and panicked about not being able to finish it. I told them that I couldn't do it and needed help. My active and apparent ask for help was countered by telling me they did not believe that I could have such a problem and were sure I would be able to handle it, if I just tried. This just contributed to my anxiety even more and fuelled my imposter syndrome. If other people thought I should be able to do this, why wasn't I able enough?

Quick judgement, stereotypes, weaponisation	With my ADHC/ADHD, I can find it difficult to express disagreement in a way that others may not receive as aggressive or at least over the top, especially when my emotions are heightened (hello, under-discussed symptom of emotional lability). Because I over-explain things but also prefer written communications, I can end sending long, developed, emails pointing to issues. This is likely compounded by a non-native status that means I do not naturally follow UK pragmatic conversation rules. In the past, this led me to quickly gain a reputation of being difficult, a complainer, but my managers would still let me proceed with this communication style - and to an extent enable it, since it allowed pushing positions that had some validity. It also always felt that this reputation would not have developed as much, had I been a man: who was I to raise critical points and daring to do so without using any cautious (i.e., hedging) language? Yet, at the same time, I would be regularly praised, in private, for the exact critical thinking I would express in these communications. It was as if my ADHC/ADHD traits were weaponised by my management (since I was seen as the hot head who would first go up close against the opposition, then think about the implications of this), without anyone ever stopping to wonder if maybe there was an underlying reason to this, and if taking advantage of these traits costed me anything.

Misunderstanding in written communication, difficulty with reading between the lines, clear and direct communication, lack of understanding hidden social cues	Emails that involve a social component to communication are difficult for me to write and can be construed as too direct, too detailed (information dumping), or missing information. The several experiences with 'not reading between the lines' communicating via email with my university department chair, colleagues, and collaborators have left me anxious about sending emails. Due to my autism, I struggle with social cues and interactions (hidden social rules) with others in-person and via written communication. I would have my mentor and office mate read my emails before sending and emails sent to me to check for missing social cues. This is not an ideal recurring 'ask' of my mentor and friend, respectively. I wish academics/scholars are clear and direct in spoken and written communication. If there are 'read between the lines' contexts, then the 'spaces between those lines' need to be read out loud or written. When I cannot identify 'hidden' social cues, the consequences fall on me, and I usually do not know the causes of them to either improve or self-advocate.
Excluded, lack of identity,doubt, denting self confidence, an object, lack of intelligence, imposter syndrome, ablesplained, object, monster	During my undergraduate, a research supervisor in response to seeing us struggle to use a ruler, scissors and utility knife a few times and days in a row, said "You clown! Are you a s******, how can you not have mastered these tools, children can use them", implying that we were not capable of using items and that we were not capable of completing a Bachelors in Science. He marked us down because we had struggled in making an arena for locusts and crickets, despite the fact that he said he will not mark me down. We complained about this behaviour and were laughed at, whilst stating that our disability does not exist, this encouraged us not to pursue Neuroethology and to disclose my disability to anyone in my department. This was later reinforced where I participated in a dyspraxia experiment and I was told that my identity is a person with dyspraxia because I am an object to be assessed, not the subject of my own condition, implying that I am not a human being and that my disability is not a part of my identity and that my disability needs to be cured.…

Labels , lazy, too smart to be neurodivergent, smart but lazy, denting confidence, guilt, diagnosis	Throughout childhood at the various parents evening meetings at schools the common theme was I was smart, but I am underachieving/not really concentrating. When the topic of potentially having ADHD came up it was dismissed outright; I'm doing well so I must not have ADHD! After barely getting through Undergraduate during my masters I took the initiative and contacted my GP to ask about seeing if it was possible to explore a diagnosis of ADHD. The GP told me 'If you are doing a Masters, clearly attention isn't that much of a problem', and that was it, I didn't have ADHD. The idea that if you are able to do certain things you definitely can't be neurodiverse stuck with me. I wasn't struggling because of undiagnosed ADHD, I was just lazy.
Quick judgement, stereotypes, exclusion, social justice	I was at a supermarket the other day, standing by the check-out. The person in front of me was taking a longer time than expected to pay, after which they started putting their groceries in their bags. I realised that that person probably needed a bit more time to complete this task and might feel stressed about the line behind them, so I actively looked at my phone to show that I was not bothered by the wait. The people behind me and the cashier, however, were getting restless and started looking at each other. When the person in front of me was finished and left, they openly started talking about that other person, calling them "special" and a "paradise bird" [i.e., a person not like others]. I felt really bad for the person in front of me and wished I would have had the strength to say something.
Internalised ableism, vulnerability, self-doubt	As a PhD student my advisors recommended me against serving as an 'interventionist' with autistic people to help with their peer relationships at school or to interview people became I am autistic and they questioned my interpersonal skills. My qualitative skills are far superior to my quantitative skills and that experience would have been valuable for my career. It has exacerbated internalised ableism that weigh down my psychological vulnerabilities and self-doubts.

Note. Examples have been de-identified, pseudo-randomised, and lightly edited for clarity.

Supplementary Table 3.

Authors' Examples of Positive Disclosure, Sharing Experiences and/or examples of neuro-inclusive practices/accommodations regarding Personal Identity and/or Experiences of Neurodiversity (adapted with reference to Victor et al., 2022 supplementary section).

Keywords	**Examples**
Reasonable adjustments, inclusivity, empowerment, collaboration, self-worth	In the first (virtual) meeting with a new team, after introductions and covering agenda items, we spent a considerable time discussing everyone's access needs (e.g., timing and frequency of future meetings, closed captions on Zoom, document layouts, fonts and colours). During the meeting, there was no pressure to have cameras on and we could use the chat function. At the end, we were each given the space to share our thoughts with options to continue conversation in Slack Channel. This meeting made me cry happy tears, as it was the first time accessibility was explicitly talked about and I felt included in the team right from the start.
Reasonable adjustments, inclusivity, empowerment, collaboration, self-worth	In our new position as a research assistant, our line manager discussed our needs (e.g., closed captions, extra time, summary of what everyone is going to do). We were worried she would be just paying lip service. However, she provided the reasonable adjustments, we were preoccupied that her time was wasted. Her response was it is not a waste of time, I want my future collaborators to succeed and feel comfortable under my supervision. In addition, she said this helped her as well and perhaps, neurodivergent collaborators can help make our environment kind, supportive, as opposed to unkind and competitive. She felt she was in power, thus she had the opportunity to make people's lives better, as opposed to making them worse. This meeting made us feel empowered, happy and accepted. Similar to the individual above, we cried happy tears, feeling that our needs were met, discussed and accepted. We were not an individual but an important member of a team.

Anxiety, panic attacks, understanding, accomodation	When I feel anxious or panic coming up, I usually cancel meetings and other obligations, sometimes very last-minute. My friends and colleagues (no matter whether they know or don’t know about my disabilities) are always very understanding and keen to help in any way they can (listen, shift the meeting, wait for my next move). This avoids me feeling bad about constantly disappointing others and gives me confidence that taking time for myself sometimes is the right thing to do.
Open disclosure, universal accommodation model, inclusivity in the lab, text communication in virtual meetings	Open disclosure in my lab has been beneficial because some days I deal with severe burnout and sensory overload and cannot speak during meetings. My lab has been exemplary in utilising the chat feature in virtual meetings, and I communicate more efficiently through texts. With others in the lab knowing my neurotype, they emphasise allowing lab members, who communicate via text, time to write out their thoughts. It does not single me out and instead reinforces a universal accommodation model in lab meetings.

Note. Examples have been de-identified, pseudo-randomised, and lightly edited for clarity.

Supplementary Figure 2 with extended figure description

The Academic Wheel of Privilege is based on twenty identity types spanning seven categories: living and culture, caregiving, education and career, gender and sexuality, race, health and wellbeing and childhood and development. These identity types are shown as circles connected to three concentric rings (outer, middle and inner) of "identity" circles with increasing privilege as you go towards the centre. The effect of the concentric rings makes it appear like a funnel – the closer you get to the centre the more you're likely to spiral into more privilege. For further explanation of categories and identities see Supplementary Table 4. We used the academic wheel of privilege to determine authorship order in this manuscript based on points with each identity weighted equally. The maximum "points" is 60, representing the most privilege/least marginalisation. Those with a lower privilege score were prioritised in the authorship order. Identities in the outer ring of circles equal 1 point, middle ring of circles equals 2 points and inner ring of circles represent 3 points. The identities circles read from least to most privileged are: skin colour: dark, various shades, White. Neurodiversity: multiply neurodivergent some neurodivergence, neurotypical. Mental health: vulnerable, mostly stable, robust. Disability: multiply disabled, some disability, able bodied. Body size: large, average, slim. Caregiver educational level: primary coma secondary, tertiary. Childhood household wealth: poor, middle class, rich. Childhood household stability: unstable, mostly stable, stable. religion and culture: not widely accepted, usually accepted, widely accepted. Citizenship: undocumented, documented, citizen. language: non-English monolingual, learned English, English. Current wealth: poor, middle class, rich. Housing: homeless, renting, owns property. caring duties: sole care, shared care, no care. Funding/resources: none/ very low, medium, high. career stage: early career, mid-career, late career. institution: teaching intensive, equal teaching and research, research intensive. Formal education: none, limited, degree(s). gender: (trans, non-binary, intersex), cis woman, cis man. Sexuality: (lesbian, bi, pan, asexual), gay man, heterosexual. The centre of the wheel of privilege shows a large circle with the text academic wheel of privilege. The identities listed here are a subset and are by no means exhaustive. Adapted from Sylvia Duckworth.

Supplementary Table 4.

Definitions of categories and identities in the Academic Wheel of Privilege.

Category	*Identity*	*Definition (with examples)*	*Reference*
Living and culture	Religion and culture	Degree of privilege/marginalisation based on religion or culture will vary by country or region that people reside in. Generally in the Global North (e.g. North America and Europe) those who are Musilim face increased Islamophobia and are therefore likely to be more marginalised.	---
	Citizenship	Holding the citizenship of the current country you reside in confers privileges not experienced by those who are undocumented, refugees, or require extensive visa applications.	---
	Language	English is the dominant written and spoken language in academia. The most privilege is typically experienced by people whose first language is English. Another dimension of language not included here is accent, both foriegn and regional accents can add another axis of privilege/marginalisation.	---
	Current wealth	A person’s level of wealth (e.g. amount of income and assets) influences access to academic and societal opportunities.	---
	Housing	A person's current housing situation influences access to shelter, warmth, banking opportunities and academic and societal opportunities. Income is more likely to be used when renting, thus there would be less income for opportunities to improve oneself and being homeless is less likely to provide stability or access to a bank and a job.	---
Caring duties	Caring duties	Level of unpaid caring	---

		responsibilities for supporting people who require care (e.g. children, elderly, disabled person).	
Education and career	Funding and resources	Funding refers to funding to carry out research e.g. funded PhD scholarship or a research grant given to a principal investigator. Adequate funding and resources enables academics to purchase research materials and/or hire technicians, attend conferences	---
	Career stage	The phase in which a person is in along the academic ladder. Early career typically includes undergraduate and postgraduate students and post-doctoral researchers within 5 to 10 years of PhD completion.	---
	Institution	Type of institute currently employed at. Research intensive institutes are typically recognised as more prestigious, thus are awarded more grants, awards and further support, enabling them to move further in their career.	Pinheiro et al. (2017)
	Formal education	The level that someone is educated to. Education to degree level gives exposure to the typical experience of academia.	---
Gender and sexuality	Gender	A person’s gender influences their access to opportunities within academia, with cis-men the most likely to have access to opportunities, followed by cis-women. People who do not conform to cis-status are least likely to have these opportunities.	---
	Sexuality	Individual’s sexuality influences their access to opportunities within academia. Heterosexual individuals are most likely to have access to opportunities. However, individuals who identify as lesbian, gay,	American Psychological Association (2010)

		bisexual, transgender, Queer and/or Questioning, Intersex, Asexual, Two-Spirit (LGBTQIA2S+) are especially susceptible to educational, occupational, socioeconomic disadvantages and are more likely to be harmed.	
Race	Skin colour	Individual's skin colour influences their access to opportunities within academia. White individuals are more likely to have access to the most opportunities. However, evidence has demonstrated that people of various skin colours will receive the least opportunities.	American Psychological Association (2017)
Health and wellbeing	Neurodiversity	Neurodiverse individuals (diagnosed or undiagnosed) a person may have. Those with more complex interactions of neurodivergence are less privileged.	---
	Mental health	Someone whose cognitive, behavioural, and emotional well-being is not typical, but somehow different that leads to long-term impact on daily activities.	Galderisi et al. (2015)
	(dis)ability	Someone whose physical, neuronal, or cognitive abilities is not typical, but somehow different that leads to long-term impact on daily activities. This can be from birth or as a result of an event (e.g. stroke leading to aphasia)	Brown and Leigh (2018)
	Body size	Body size can contribute to privilege as slimness is linked to good health and choices, while a large body size is often linked to poor personal choices due to moralisation of choices.	Lavelle (2020); Senyonga (2017)
Childhood and development	Care-giver educational level	The education level of a care-giver. Educational attainment of caregivers influences a child's access to opportunities	---

	Childhood household wealth	Level of wealth of the household a child grew up in.	---
	Childhood household stability	An indicator of the level of adversity experienced during a child's development. Factors such as death of a care-giver, domestic violence, abuse and neglect from a care-giver can impact the development of a child and their future health and wellbeing and education attainment.	---

Note. The definitions are a combination of our personal perspectives and the literature.