Northwestern | SEARLE CENTER FOR ADVANCING LEARNING AND TEACHING

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Supporting Neurodivergent Student Success

Brief Description

Nine strengths-based learning and teaching strategies to support neurodivergent student success, increasing retention, well-being, and post-graduation outcomes. These evidence-driven strategies are empirically demonstrated to enhance learning for *all* students.

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NEURODIVERGENT STUDENT VOICES

"I feel like I have to do a lot of self-advocacy and explaining. Having instructors know more about neurodiversity would make the pursuit of learning, just overall, less stressful."

—Noelle Hutchinson

Introduction

Neurodiversity refers to the natural variation in how individuals think, learn, interact, and express themselves. Neuroinclusive learning environments are designed to support the academic success and wellbeing of students across this range of variation, especially *neurodivergent* students—those whose cognitive and behavioral variations have been viewed as different to *neurotypical* variations.

Neurodivergent students are not new to postsecondary education, but advances in diagnosis, increased awareness of neurodiversity, and expanded access to services have resulted in higher numbers of students who identify as neurodivergent. In learning environments that were traditionally created to serve neurotypical students, neurodivergent students continue to face lower retention rates, decreased well-being, and lower post-college rates than their neurotypical peers (Luchs 2021).

Leading-edge scholarship on neurodiversity presents a new paradigm for supporting neurodivergence, reducing the onus on neurodivergent students to take extra steps to achieve the same learning outcomes as neurotypical students by (re)shaping educational contexts to create learning environments in which the widest possible range of learners can thrive (Luchs 2021; Hamilton and Petty 2023). Neurodiversity scholars have pinpointed instructor awareness of neurodivergence as an important factor in addressing different needs and cultivating neuroinclusive learning environments.

This guide presents nine evidence-driven strategies to cultivate neuroinclusive learning environments, breaking down barriers and building in choice to empower students to utilize and develop their own academic strengths.

HIPPA Privacy Rule

The Health Insurance Portability and Accountability Act (HIPPA) Privacy Rule protects individuals' medical records and identifiable health information. Students are under no obligation to disclose their neurodivergence, and they should not feel pressured to do so. Similarly, instructors are under no obligation to disclose their own neurodivergent identities. Disclosure is an individual choice.

Positionality Statement

The practice of sharing one's own positionality vis-à-vis neurodiversity has become commonplace in literature on neurodiversity, influenced by the call many scholars and activists have made to center neurodivergent voices as leaders within the academic field and corresponding social justice movement.

We recognize both the strengths and limitations of this practice. For instance, disclosure can be an act that promotes the social justice maxim "nothing about us without us" and stands as a positive representation of neurodivergent people in academia. At the same time, however, this practice creates social pressure to disclose information that one may not wish to share for a variety of reasons.

We hope the positionality statements that we as the authors have included below demonstrate a range of possibilities for participating in this practice. We believe that such statements are personal decisions that should be respected and not expected.

Ali Levinson: I was formally diagnosed with ADHD in 2023, and navigated undergrad with accommodations for broader mental health concerns. Getting a diagnosis later in life, though unexpected, helped contextualize my life both in and out of academia and greatly improved my quality of life. Before coming to graduate school at Northwestern, I worked in student life at a boarding school for students with learning differences. Many of my contributions to this project have been rooted in my own experiences or those I noticed in the students I support and then underscored with the literature we reference throughout this guide.

Laura Ferdinand: I have close personal relationships with people who identify as neurodivergent, but I will refrain from sharing details to maintain their privacy.

Additionally, this guide was reviewed by subject-matter experts across the neurodiversity spectrum and Northwestern students who self-identify as neurodivergent. Their expertise, voices, and perspectives have deeply enriched this guide. For more on this, refer to our Acknowledgments.

Definitions

Neurodiversity

The term neurodiversity was coined in 1998 by Australian sociologist and autism rights activist Judy Singer. It is an intentional reference to the term biodiversity, which asserts that variation and difference are both natural and beneficial. Originally associated exclusively with autism, the term has expanded to include a host of cognitive and behavioral variations. "Neurodiversity describes the idea that people experience and interact with the world around them in many different ways," writes Harvard neurologist Nicole Baumer; "there is no one 'right' way of thinking, learning and behaving" (2021).

Neurodiversity is a broad term encompassing all cognitive and behavioral variations. Therefore, everyone is part of the broad spectrum of neurodiversity. However, neurodiversity is often used interchangeable with other terms—such as *neurodivergence* and *neuro-non-conforming*—that signal divergence from the neurotypical (i.e., a culturally constructed idea of what constitutes typical cognition).

More than a term, neurodiversity is also a body of scholarship and a social justice movement that eschews the assumption that neurodivergence is a deficit.

Neurodivergence

Neurodivergence is an umbrella term that covers an evolving list of conditions, disabilities, and neurological and behavioral traits. Mirfin-Veitch et al., (2020) state that neurodivergence encompasses a "wide range of specific, non-specific, hidden and/or undetermined diagnoses that include, but may not be limited to: Learning (intellectual) and/or Developmental Disability (ID/DD); Communication Disorders (CD), autism or Autism Spectrum Disorder (ASD), Attention Deficit/Hyperactivity Disorder (ADHD); Specific Learning Disorders (SLD); Traumatic Brain Injury (TBI); and Fetal Alcohol Syndrome Disorders (FASD)." Other specific examples of neurodivergence include dyslexia, dyscalculia, epilepsy, and Tourette's syndrome. Conditions such as Post-Traumatic Stress Disorder (PTSD), also affect neurocognitive functioning, but their classification as neurodivergence is not universally agreed upon. Furthermore, different types of neurodivergence can co-occur in individuals.

Terminology Best Practices

Flowers et al. (2021) demonstrate that language preferences are highly individual and therefore suggest that the best practice regarding terminology for neurodivergence and/or disability is to honor individual preferences. Because this guide discusses neurodivergence at large, the authors made ethical decisions about the terminology we use, decisions that we will continue review and update as the neurodiversity movement evolves. We describe our choices in the question section, below.

Why do we use the term neurodivergent?

We have chosen to use neurodivergent to describe those who diverge from the neurotypical, recognizing that the idea of what is "typical" is culturally constructed and subject to change. We uphold that the spectrum of neurodiversity is not a hierarchy and that diverging from the typical is not inherently negative. However, we recognize the structures that create challenges for neurodivergent individuals, including accessibility issues and stigma.

Why not use neurodiverse or neuro-non-conforming?

We have chosen not to use neurodiverse interchangeably with neurodivergent. Because neurodiversity refers to the natural variation in brain function and behavioral traits, everyone is part of the neurodiversity spectrum, and we uphold that it is not only those who diverge from the typical that are diverse, as that belief could suggest that only those who diverge from the typical should be implicated or interested in creating neuroinclusive learning environments.

Neuro-non-conforming suggests that an individual could choose to conform, that neurotypicality is a question of compliance. We assert that neurodivergence is not a choice, and we recognize the negative impact masking—the act of hiding one's neurodivergence to appear neurotypical—has on well-being. Moreover, the goal of the strategies presented in this guide is not to turn neurodivergent students into neurotypical students, but to empower them to use their strengths in their academic journeys.

What are best practices to referring to neurodivergent people and individuals?

On a personal level, it is best practice to honor individual preference (Flowers et al. 2021). If, and only if, a student chooses to disclose to you that they are neurodivergent, you can ask them how they prefer to be identified. For example, "You shared with me that you are on the autism spectrum. What terminology do you prefer to use when discussing that aspect of your identity?" Likewise, if you choose to disclose your own neurodivergence, you may share your own preference.

There are two ways to describe identities: *person-first language*, which identifies a person before their condition or disability (e.g., "a person with dyslexia" rather than "a dyslexic person," and *identity-first language*, which foregrounds the identity (e.g., an autistic person" rather than "a person with autism") (2021).

On a broad level, the recommended best practice is using person-first language: identifying a person before their condition or disability, such as "a person with dyslexia" rather than "a dyslexic person." However, many communities—particularly blind, Deaf, and autistic communities—view their disabilities as fundamental aspects of their identities and prefer identify-first language (e.g., "an autistic person" rather than "a person with autism"). Even within these groups, opinions and preferences vary.

Therefore, when a person's neurodivergent identity is relevant to a course (e.g., referring to a scholar who centers their neurodivergence in their work), it is useful to find out how that person refers to themselves. Personal professional websites and recent interviews are typically good resources.

For more on this topic, see activist Jevon Okundaye's "Ask a Self-Advocate: The Pros and Cons of Person-First and Identity-First Language."

Recommended Strategies Overview

The neurodiversity movement's strengths-based approach to neurodivergence is an important development of the past 30+ years. Still, acknowledges Lawrence Fung, Director of the Stanford Neurodiversity Project, "the characteristics of neurodiverse individuals can be both strengths and challenges at the same time" (Fung et al. 2022). This guide honors the interrelated nature of those strengths and challenges, drawing connections between common assets, challenges, and effective teaching strategies.

It is important to note that each student's educational journey is unique and shaped by their intersectional identities and life experiences. What works for one student may not work for another. Some students will know exactly what works for them while others may still be experimenting and figuring it out. As an educator, it may feel overwhelming to think of supporting individual learning styles, especially in large-enrollment classes that may have over 1,000 students.

This guide takes a two-pronged approach to cultivating neuroinclusive learning environments in ways that are affirming to students and manageable for instructors. First, we utilize the principles of Universal Design for Learning which allow instructors to bake neuroinclusivity into their course designs by breaking down barriers and building in scaffolding and choice to empower students to utilize and develop their own academic strengths.

Second, we provide strategies for maintaining open channels of communication. Instructors cannot anticipate every need. Therefore, it is useful to be transparent about your commitment to cultivating neuroinclusive learning environments, what strategies you have implemented, and your openness to working with students on an individual basis to support their success.

All of the strategies presented in this guide work in tandem with academic accommodations coordinated through disability services offices, such as Northwestern's AccessibleNU.

Common Assets and Strategies to Harness Them

Asset: Transformative Thinking

Director of the Stanford Neurodiversity Project, Lawrence Fung, asserts that neurodivergent individuals "can bring new perspectives to the world, some of which could be groundbreaking" (Fung et al. 2022). This view has recently permeated many industries—particularly tech, information technology, and financial services—which have been actively recruiting neurodivergent individuals. For example, Microsoft launched its Autism Hiring Program in 2015, reshaping traditional hiring processes to allow candidates to better demonstrate their strengths (Bleasdale 2021). Other companies, such as PGIM Inc., have created similar programs to attract candidates who have "specific skills and ways of working to foster innovation and creativity that will lead to better outcomes…" (Degen & Baker 2023, 16).

Indeed, research indicates that neurodivergent individuals are likely to demonstrate strengths in particular skills when compared to control groups. For instance, people diagnosed with autism spectrum disorder (ASD) tend to have strengths working with systems and machines and excel at identifying details in complex patterns (Armstrong 2015). People with dyslexia tend to have strong visual-spatial and three-dimensional thinking abilities as well as the ability to process low-definition, peripheral, or diffused visual information more efficiently than those without dyslexia (2015). Those diagnosed with ADHD and bipolar disorder display increased levels of "novelty-seeking and creativity" (2015). These are just a few examples of the assets that researchers have observed in studies of neurodivergence.

It is important, however, not to sensationalize individuals based on the strengths associated with their neurocognitive variations. Rather, familiarity with such strengths can inform the strategies instructors use to cultivate neuroinclusive classrooms, including the design of courses, syllabi, and assessments of student learning.

>> Strategy: Utilize Universal Design for Learning (UDL)

UDL is the current gold standard for cultivating neuroinclusive learning environments. Based on the concept of universal design coined by architect Ron Mace, UDL extends the inclusive design approach to educational contexts to accommodate individual needs, preferences, and abilities while minimizing the need for specialized accommodations. Essentially, this is accomplished by building in multiple, accessible ways for students to engage with course materials, participate in class, and demonstrate their learning.

For example, consider offering students a choice of assignments to demonstrate their learning that highlight different strengths, such as a written response, an infographic, or a short podcast. Written responses highlight writing strengths, infographics highlight visual-spatial organization and relationships, and podcasts highlight verbal reasoning and creativity to demonstrate mastery of content and learning outcomes.

The UDL framework offers many practical, implementable strategies for increasing student engagement, meta-cognitive learning, and neuroinclusivity. The Searle Center has partnered with units across Northwestern to convert the popular Universal Design for Learning Practicum into a free Open Educational Resource (OER). The resource, which introduces key UDL concepts and includes practical applications, tools, and discussion/reflection prompts for instructors of all levels, can be completed as a whole or can be used ad hoc to address educational pinch points as they arise.

>> Strategy: Implement Equity-Centered Assessment

Equity-centered assessment is a continuous improvement process that prioritizes learning growth and achievement for *all* students. Rooted in the principle of meeting students where they are, it actively aims at incorporating their perspectives at every stage of the assessment process. This approach seeks to identify and address barriers to learning while celebrating and amplifying effective strategies that drive progress. By shifting the focus from solely evaluating the achievement of learning outcomes to understanding what and how students are learning, equity-centered assessment promotes inclusive, transparent, and impactful assessment practices.

Explore assessment techniques with our Open Educational Resource on Reimagining Assessment.

Asset: Increased Awareness of Neurodiversity

Since the neurodiversity social movement began to take off in the 1990s, there have been significant shifts in how neurodivergence is researched, understood, and supported. Access to information and lived experiences facilitated by the internet and social media have increased awareness of and helped to destigmatize neurodivergence and mental health, even as those technologies pose challenges of misinformation.

Research has expanded, publications such as the peer-reviewed journal *Neurodiversity* have been created, and university centers for neurodiversity, such as the Stanford Neurodiversity Project, have been established. There are more quality resources to support neurodivergent students than ever, including the students themselves.

>> Strategy: Get Feedback from Students

Ask students for feedback. While direct methods of assessing student learning, such as exams, essays, and performances, provide concrete evidence of student achievement, indirect methods, such as student surveys, offer valuable insight into students' perceptions of their learning experiences.

Building in feedback mechanisms throughout the course can provide information about how students are experiencing the class, informing instructors about what is working well and what could be revised. Common feedback methods include informal surveys, exit tickets, discussions with students during office hours, and mid-course feedback.

An anonymous pre-course survey could be beneficial for designing a neuroinclusive course, assignment, or class activity. The following is an example survey with introduction.

> I am committed to cultivating a learning environment in which *all* students can thrive, and I will be using evidence-driven teaching and learning strategies toward this goal throughout the course.
>
> This anonymous survey is intended to inform decisions about course assignments and class activities. While I may not be able to incorporate all suggestions, I will do my best to address your needs.

Additionally, you may request formal academic accommodations from AccessibleNU and/or speak with me about your learning experience.

This survey is anonymous, optional, and not graded.

I provide several choices of assignments to assess learning, including written responses, video recordings, and concept maps. These choices allow students to demonstrate their learning through formats that highlight their strengths. Are there any other formats that you have used to express learning that you know work for you or are interested in trying? If so, please explain.

I typically plan in-class activities where students work in small groups. What might help you to work most productively in a small group? Examples could include things like being allowed to work in the hall or another room to reduce background noise, building in time for introductions, and/or having clearly defined roles, among other things.

Is there anything else that you would like me to know that could help me support your learning and success in this course?

Explore our 10 Tips for Designing Effective Surveys or request one of our mid-course formative feedback services.

Asset: Increased Well-Being Through Community/Disability Identity

Increasing trends of self-advocacy among neurodivergent populations alongside the development and awareness of strengths-based perspectives have strengthened the perception of neurodivergence as a social identity over the past ten years (K. Cooper et al. 2023). Still, not all neurodivergent students will have a positive relationship with their neurodivergent identity. Some students may view their neurodivergent identity as a central part of their selves while others may distance themselves from that identity (K. Cooper et al. 2023; R. Cooper et al. 2021).

Negative feelings towards one's neurodivergent identity may influence students' decisions to utilize services or seek academic accommodations, leading to masking or burnout. Conversely, developing a positive self-identity of neurodivergence has been linked with positive correlates (Bogart 2015; Nario-Redmond et al. 2013), and a sense of collective self-esteem as a member of a neurodivergent community has been linked with increased personal self-esteem (R. Cooper et al. 2021). Therefore, Shmulsky et al., (2021) draw upon this research to suggest that "services combined with identity-supportive activity may yield the best outcomes."

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"Meeting in communities that I get to learn from and about has been such a fundamental aspect of my success and survival."

—Valentina Parra

>>Strategy: Facilitate Connections and Strengthen Community

Faculty can encourage positive self- and collective identity by facilitating a climate of acceptance and sharing community resources. Examples of practices that can increase acceptance include educating faculty, staff, and students about strengths and characteristics of neurodivergence, inviting neurodiversity advocates to speak on campus, and encouraging disclosure among faculty and staff who self-identify as neurodivergent (Shmulsky et al. 2021).

The field of disability studies, which overlaps with neurodiversity studies, has asserted the importance of finding a community with shared identities (Forber-Pratt & Zape 2017). Instructors and staff can facilitate connection and community by organizing voluntary neurodiversity student groups, hosting neurodiversity events, providing information about advocacy organizations, and supporting student attendance at neurodiversity-themed local conferences and events" (2021).

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"It takes a lot of work to find people and start study groups, especially as a first year. That's something an instructor could facilitate by saying, "If anyone's interested in working side by side with another, y'all can sign up to share your information."

—Zai Dawodu

Common Challenges and Strategies to Overcome Them

Challenge: Shift from K-12 to Postsecondary Education

College can be a significant period of adjustment for students, particularly for neurodivergent students who may face unique challenges due to shifts in support services and expectations. Studies such as Shattuck et al. (2012) demonstrate that the shift in support from K-12 to college is a contributor to poorer post-secondary outcomes, especially among adults with autism.

Under the Individuals with Disabilities Education Act (IDEA), US public K-12 schools are required to evaluate students for and provide special education and related services. School staff initiate the process, identifying and evaluating students and creating and implementing an Individualized Education Plan/Program (IEP) in conversation with parents and/or legal guardians. The school then provides the necessary services, measures progress, and conducts regular reviews and reevaluations (U.S. Department of Education).

In post-secondary education, students are required to disclose and provide documentation to disability services offices in order to receive formal academic accommodations, and many students are surprised by the need for self-advocacy to receive accommodations after experiencing school staff and/or parents taking the lead in K-12.

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"I thought I knew how to advocate for myself, *that I already had*."

—Valentina Parra

Some students will enter college with an understanding of the academic accommodations they have received, access to documentation, confidence in being able to advocate for themselves, and a clear sense of how to request accommodations. Others will face common obstacles to receiving appropriate academic accommodations in higher education such as inadequate educational support in K-12, lack of access to medical care and/or records, late diagnosis, misdiagnosis, and a lack of research on how neurodivergence presents across genders and races. This is further compounded for international students who are familiar with laws, processes, and classification of neurocognitive difference that may vary greatly from the US (Clouder et al. 2020, 759).

Even if a student is able to navigate such obstacles, they may choose not to for a variety of reasons including fear of disclosing personal information, shame, a desire for privacy, feeling intimidated or confused by the accommodation process, or concerns that accommodations might lessen the rigor of their education. Negative past experiences with education may also lead some students to avoid interacting with campus offices (Hamilton and Petty 2023).

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"I know the process of getting accommodations can be kind of difficult. There is a lot of trial and error involved, and it's not always super accessible, especially as someone who was diagnosed late and is still going through the diagnosis process."

—Noelle Hutchinson

>>Strategy: Recognition, Respect, and Transparency

There are many obstacles to receiving academic accommodations, which disability services offices like AccessibleNU work to minimize and overcome. Still, students may be unable to receive formal academic accommodations or choose not to disclose their medical information. It is affirming to recognize these obstacles and respect students' choices.

The following is an example of the type of statement instructors could deliver in class and/or include in their syllabi to signal their commitment to cultivating neuroinclusive classrooms. You are welcome to use or modify this language.

> Cultivating a neuroinclusive learning environment is important to me, and I am implementing several evidence-driven strategies to support the widest possible range of learners. Some of the strategies include providing multiple ways to engage with course materials, such as readings, videos, and audio recordings. I also offer a choice of assignments to demonstrate your learning in ways that utilize your strengths.
>
> Please know that I am a resource to discuss ways for you to succeed in this course and that you are under no obligation to disclose private medical information. Additionally, you may choose to request formal academic accommodations from AccessibleNU.
>
> I appreciate your feedback and will do my best to incorporate strategies to improve the learning outcomes for everyone in this course.

You can also share links and descriptions of campus resources and services that support neurodivergent student success, such as the list found at the end of this guide.

Challenge: Stigma, Discrimination, and Shame

Neurodivergent college students commonly experience shame and self-blame when seeking help, often perceiving themselves as burdens to professors and peers (Stamp et al. 2014).

Shame is characterized as a painful emotion accompanied by a feeling of worthlessness and powerlessness, and the person experiencing shame feels exposed to others (Tangney 1999). These feelings can intensify the desire to hide the extent of their struggles (Hull et al. 2017; Stamp et al. 2014).

Additionally, the fear of stigmatization and misconceptions about neurodivergence contribute to students' reluctance to disclose their condition in academic settings (Stamp et al. 2014). Neurodivergent college students report experiencing stigmatization and discrimination through social rejection from peers and faculty (Kim et al. 2023). Social rejection leads to higher rates of mental health challenges in neurodivergent students (Anderson et al. 2019; Kim et al. 2023).

Neurodivergent students commonly struggle with anxiety due to experiences including marginalization and stigma (Hamilton and Petty 2023). Anxiety in higher education may be triggered by a host of conditions and experiences including unclear expectations and uncertainty, perfectionism, fear of failure, time management challenges, sensory stress, and interactions with instructors, staff, and peers in and outside of the classroom (Clouder et al. 2020). Additionally, students may also experience Post-Traumatic Stress Disorder as a result of negative previous educational experiences including being removed from the classroom, bullying, and stigmatization from teachers and/or peers.

>>Strategy: Foster an Inclusive Learning Environment through Self-Reflection and Transparency

Instructor support is associated with fewer discrimination and harassment experiences for students (Kim et al. 2023). Learning about the experiences of neurodivergent students and critically reflecting on how neuro-normative assumptions may be shaping one's teaching practice can positively inform how instructors shape their courses and class activities to be more neuroinclusive.

Clinicians who work with neurodivergent clients recommend explaining 360º expectations: what students can expect and what is expected of them (Maddox et al. 2020). Such clarity and transparency have been empirically demonstrated to benefit all students. Our In Brief: Transparent Communication of Course Expectations for Student Success guides instructors through a reflection process to better communicate expectations to students, prompting instructors to ensure that implied expectations are clearly articulated and aligned with learning outcomes.

Challenge: Masking/Camouflaging

Camouflaging, also known as masking, is a phenomenon in which individuals conceal their disability to blend in as someone without a disability (Hull et al. 2017). Early research studying camouflaging has illuminated the toll this performance takes on individuals' mental health (Hull et al. 2017; Shmulsky et al. 2021). Among neurodivergent individuals, camouflaging strategies encompass various methods, such as concealing behaviors associated with neurodivergence, employing explicit techniques to simulate social competence, and actively preventing others from witnessing their social difficulties (Hull et al. 2017).

In efforts to diminish the visibility of their condition, neurodivergent individuals often describe efforts to suppress self-soothing behaviors, known as "stimming," and to mitigate responses to overstimulation (2017). Notably, camouflaging has been suggested as a factor contributing to delayed diagnoses in women, reflecting the way that societal gender expectations negatively and unevenly affect neurodivergent students (2017).

In certain contexts, successful camouflaging may create external perceptions of competence and a lack of neurodivergent-related difficulties; however, when camouflaging efforts fail or become strenuous, they can engender heightened stress levels, diminished mood, and reduced self-esteem (2017). The most consistently reported consequence of camouflaging is exhaustion, characterized by mental, physical, and emotional drain, requiring intensive concentration, selfregulation, and management of discomfort (2017).

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"It would be useful to see examples of Northwestern students who've been successful with healthy boundaries, with failure, with bumps in the road."

—Zai Dawodu

>>Strategy: Reimagine the Model Student

Take a moment to imagine a "model student." Perhaps the imagined student is sitting up straight, making eye contact with the teacher, and generally quiet unless directed to speak. Perhaps they refrain from fidgeting or seldom excuse themselves from the room. This traditional concept of the model student fails to capture the full range of techniques students may use to focus, engage with course material, and do their best learning.

Many students may use tactile strategies to enhance focus and self-regulation, including doodling, crocheting, or using fidget toys (Kapp et al. 2019). Some may close their eyes in order to focus on listening, while others step outside to refocus before returning to the activity. Taking a moment to recognize and welcome strategies students use to focus and engage can help create a learning environment in which students feel less pressure to mask or camouflage.

It is also appropriate to set boundaries and expectations for the class. For instance, an instructor may say, "I recognize that students may use different techniques for staying engaged during class, such as using fidget toys or stepping out of the room from time to time. I welcome this. Since we are all learning in this space together, let's negotiate classroom expectations that work well for everyone."

Challenge: Group Work

Neurodivergent students have reported challenges with verbal and non-verbal communication, social interactions, and cognitive styles. When asked to complete group work, students on the autism spectrum have reported struggling to socially engage with the group as well as navigating the distribution of assignments (Cullen 2015). This is influenced by unspoken expectations and requirements for group work, such as how to break up the workload (Scott 2019).

Traditionally, challenges in interpersonal dynamics have been addressed by providing neurodivergent people with training in social mores, requiring neurodivergent people to make an extra effort to fit into a world that privileges neurotypical behavior. Little attention is paid, however, to training neurotypical individuals to be more neuroinclusive. Studies demonstrate that neurotypical students may reason that it is legitimate to exclude neurodivergent students from classroom activities *when those activities will be graded* (Bottema-Beutel et al. 2018). This is a form of social rejection that can increase feelings of shame and not belonging.

>>Strategy: Scaffold Group Work

Learners across the neurodiverse spectrum benefit from learning groups with clear goals, roles, responsibilities, and opportunities for peer interactions and support (*UDL: Foster Collaboration and Community*). Guidelines and rubrics are useful for clearly communicating goals and expectations. It is also useful to structure time for students to share their strengths, divide labor, and clearly assign roles among group members, discussing internal deadlines and expectations. All students also benefit from support in knowing how to approach a professor with their concerns (Barnhill 2016).

Additionally, as research demonstrates that neurotypical students are more likely to exclude neurodivergent students *when they are being graded*, it is useful to familiarize students with group work through ungraded activities and projects, allowing students to develop their skills as a group and troubleshoot issues before undertaking a graded assignment.

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"Being partnered with groups early and doing team bonding has really helped to make us feel more comfortable working with each other later on. When a class is designed like that, it makes it easier to work with people because you already know them."

—Zai Dawodu

Challenge: Overstimulation and Dysregulation

Sensory processing encompasses the perception, registration, and interpretation of sensory stimuli (Dunn 1997, 2007; Mallory & Keehn 2021). Learning environments with an abundance of visual, auditory, and tactile stimuli may pose challenges for neurodivergent students who may struggle to filter irrelevant input in unpredictable, multi-sensory settings (Mallory & Keehn 2021).

Dunn's Model of Sensory Processing (depicted below) elucidates the different thresholds for tolerating sensory input and the different ways of self-regulating. When an individual surpasses their threshold for sensory input, they may experience sensory overload or dysregulation. It is recommended to accommodate the sensory needs of neurodivergent students in the classroom, as sensory overload can compromise the efficacy of other accommodations (Clouder et al. 2020).

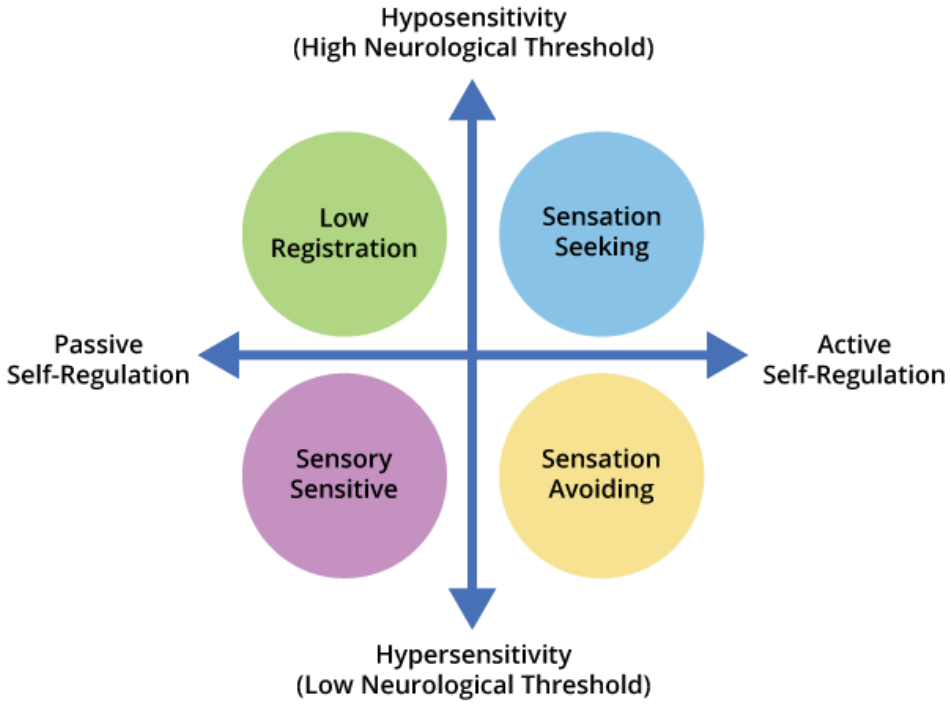

Figure 1. Dunn, Winnie (2007), Dunn's Four Quadrant Model of Sensory Processing.

People who experience hypersensitivity may have trouble focusing when there is competing background noise whereas people who experience hyposensitivity may filter out sensory input causing them to, for example, not hear their own name when called. Examples of selfregulatory techniques for hypersensitivity include the use of noise-cancelling headphones in loud spaces and wide-brimmed hats in sunny areas. Examples of self-regulatory techniques for hyposensitivity include physical activity, such as bouncing one's leg or scheduling regular runs to balance activities with relatively low stimulation.

These thresholds are not fixed but can change based on concurrent factors. For instance, noticing that you may have a lower tolerance for sensory input when you are particularly busy and stressed is a common occurrence that may resonate with your own experiences.

>>Strategy: Be Cognizant of Physical Environments

Instructors often have little control over the physical spaces in which they teach; however, understanding the different ways students may process and respond to sensory stimuli can inform instructors' decisions regarding what is in their control (Dunn 1997, 2007). Be

considerate of simultaneous sensory inputs. When creating slide decks for class presentations, keep slides simple, minimizing excess visual information such as too many bullet points per slide, non-essential pictures, or busy backgrounds (Mallory & Keehn 2021). If playing music in class, recognize that some students may find it difficult to read or listen while music is playing (Hamilton & Petty 2023).

Where instructors have more control over the physical space, such as in their own offices, they can consider bringing in lamps to provide an alternative to overhead lighting or simply asking at the start of a meeting with a student, "is the light in here okay?" (Maddox et al. 2020).

Challenge: Digital Accessibility

Jim Stachowiak, the Accessible Technology Strategy and Operations Lead for AccessibleNU and NUIT, reminds us that most digital materials and platforms have some accessibility issues, making it difficult for students to engage with them and reap their full benefits. Examples of a lack of digital accessibility include audio-visual without subtitles or transcriptions, low-contrast or low-resolution reading materials such as scanned copies, and images without alt text.

>>Strategy: Utilize Campus Resources

Northwestern offers robust support for digital accessibility and to enhance digital usability for all students. Upholding the University's Digital Accessibility Policy , several units provide expertise in creating accessible digital materials. NUIT's Teaching and Learning Technologies, AccessibleNU, and the Office of Civil Rights and Title IX Compliance have partnered to lead the Canvas Accessibility Project, hosting Mission: Accessible Challenge, a guided program to help instructors create or update Canvas sites and content accessible to all students.

AccessibleNU offers resources on Digital Accessibility and hosts training opportunities, and the School of Professional Studies Office of Distance Learning contributes to digital learning initiatives across the University. Searle Center programming, such as the Course Design Institute, is designed to uphold these accessibility principles.

Conclusion

There is no singular approach to supporting the academic success and wellbeing of neurodivergent students. By building in choice, opening welcoming channels of communication, and continuing to learn about evidence-driven pedagogical strategies, instructors can create more neuroinclusive learning environments in which students can identify, deepen, and harness their unique strengths.

Campus Resources

In the spirit of cultivating a relationship rich environment, we have identified campus resources relevant to neurodivergent students. Consider including these resources in your syllabus and/or on your Canvas course.

For Instructors

Mission: Accessible Challenge

- A guided program offered by a collaboration of Northwestern offices to help instructors make Canvas course content accessible for all students. Instructors work through seven key accessibility areas, implementing strategies into their own Canvas courses in this practical, valuable program.

Reimagining Assessment Practicum Open Educational Resource

- This open resource was designed to guide instructors of all levels, backgrounds, and teaching contexts to learn more about and reflect on their assessment and grading practices, with an emphasis on equitable approaches and alternative methods. This resource includes some of the presentations and resources shared within the live practicum and is intended for educators across disciplines and institutions to use, share, and learn from.

Teaching and Learning Technologies (TLT)

- The TLT team promotes digital accessibility initiatives and inclusive teaching across campus. They support instructors in their use of Canvas through individual consultations and workshops. They also host the annual TEACHx conference to showcase academic excellence and experiments in teaching and technology.

Universal Design for Learning Practicum Open Educational Resource

- This open was designed to guide instructors of all levels, backgrounds, and teaching contexts to reflect on the evolving needs of students and to implement UDL principles to create more supportive, inclusive, and accessible learning environments. Through readings, videos, and recorded sessions, this resource introduces key UDL concepts and provides practical applications, tools, and discussion prompts.

For Students

Academic Support and Learning Advancement (ASLA)

- Northwestern's student learning support center. ASLA offers a suite of programs for undergraduate students designed to help them succeed in STEM and social science courses and to refine their study strategies and approaches. Offerings include drop-in peer tutoring, peer-guided study groups, and academic coaching and mentoring. ASLA answers common questions and identifies key campus resources on their Resources for Neurodivergent Students and Students with Disabilities webpage.

AccessibleNU (ANU)

- This unit is responsible for the academic accommodation determination and coordination process for students with disabilities, including neurodivergent students. They provide, coordinate, and facilitate reasonable accommodations to provide equal access. They are also campus leaders in the promotion and implementation of Universal Design for Learning.

Counseling and Psychological Services (CAPS)

- CAPS serves as the primary mental health service for students at Northwestern University. CAPS offers individual therapy, group therapy, workshops, and resources at no charge for students as well as connection and referrals to on-campus programs/services and specialized community providers/care.

Northwestern Career Advancement (NCA)

- This unit offers robust programming, resources, and individual consultations for Northwestern undergraduates, grad students, and Northwestern alumni for six months after their graduation. NCA staff can assist students in exploring majors and career paths, jobs and internships, and graduate school and law programs. Programs such as the Northwestern Externship Program, which offers Northwestern students the opportunity to shadow alumni on the job, can be particularly useful for neurodivergent students as they gain insight into the practical aspects of potential careers.

Recommended Resources

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Stanford Neurodiversity Project and annual Stanford Neurodiversity Summit

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