ACT's Focus on Research Conference 2023

Sensory Features and Anxiety in Autism: Implications for Families and Practitioners

A two-day in-person and virtual conference hosted by ACT

Thursday, April 27, 2023
Friday, April 28, 2023

Attention and Neurodivergent Sensory Experiences

Presented by **Patrick Dwyer, PhD (c)**

Territorial Acknowledgement

As visitors on this land, ACT - Autism Community Training is grateful for the opportunity to work and learn on the ancestral and unceded territory of the Sḵwx̱wú7mesh (Squamish), xʷməθkʷəy̓əm (Musqueam) and səl̓ilw̓ətaʔɬ (Tsleil-Waututh) people who have lived in this area since before recorded time. These nations are həńq̓əmiṅəṁ and Sḵwx̱wú7mesh speaking peoples. The həńq̓əmiṅəṁ (Halkomelem) and Sḵwx̱wú7mesh (Squamish) languages are part of the Salish Language family, which dates back many millennia. We pay our respects to elders past, and to those present and emerging. As settlers to this land, we are committed to working towards reconciliation.

Simon Fraser University respectfully acknowledges the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh Úxwumixw (Squamish), səl̓ilw̓ətaʔɬ (Tsleil-Waututh), q̓íc̓əy̓ (Katzie), kʷikʷəƛ̓əm (Kwikwetlem), Qayqayt, Kwantlen, Semiahmoo and Tsawwassen peoples on whose unceded traditional territories their three campuses reside.

Event Schedule

All times are Pacific Daylight Time (PDT)

Day 1 – Thursday, April 27, 2023

8:15 am	**–**	**9:00 am**	Registration / Log on with Zoom Link
9:00 am	**–**	**9:15 am**	Introduction by Michelle Schmidt
9:15 am	**–**	**10:15 am**	Keynote Presentation by Connor Kerns, PhD
10:15 am	**–**	**10:45 am**	Break
10:45 am	**–**	**12:00 pm**	Panel: Experiences with Anxiety
12:00 pm	**–**	**1:00 pm**	Lunch
1:00 pm	**–**	**3:10 pm**	Research Presentations

Day 2 – Friday, April 28, 2023

8:15 am	**–**	**9:00 am**	Registration / Log on with Zoom Link
9:00 am	**–**	**10:00 am**	Keynote Presentation: Tiffany Woynarski, PhD
10:00 am	**–**	**10:30 am**	Break
10:30 am	**–**	**11:45 am**	Panel: Early Development & Sensory
11:45 am	**–**	**12:45 pm**	Lunch
12:45 pm	**–**	**1:45 pm**	Future in Research

Accessibility

ACT is committed to preventing, as well as identifying and removing barriers facing people interacting with our organization. Moving forward, ACT will make every effort to provide real time captioning as well as American Sign Language (ASL) interpreters for all our events.

Acknowledgements

We are grateful to Patrick, whose talk will explore sensory processing and attention for neurodivergent people. Patrick will be presenting data on the relationship between hyper-reactivity and hypo-reactivity, and how anxiety and attentional hyper-vigilance are closely intertwined. ACT is delighted to have Patrick present on attention and neurodivergent sensory experiences, including practical suggestions to support neurodiverse individuals.

Over the years, those who have attended ACT events know that as we are a small not-for-profit organization, we depend on community collaboration and support to sustain our work. We deeply appreciate the many autistic individuals, parents, professionals, and organizations across British Columbia who volunteer their time, donate funds, provide sponsorship, and help spread the word – especially during these challenging times.

Thank you also, to Still Interpreting Inc. for providing ASL Interpretation and Accurate Realtime Inc. for providing communication access realtime translation (CART) services.

Support evidence-based resources – Donate to ACT!

Free Resources from ACT

Autism Videos @ ACT (AVA) – Over 80 quality online videos on diverse topics, including Toilet Training, Sleep, Mental Health, IEP's, Research, and much more – all available free, thanks to our sponsors!

ACT's Autism & Intellectual Disability (AID) Search – Keyword search over 2,000 records containing evidence-based, practical information resources in 36 languages sourced internationally, including B.C.-based community resources useful to families and community professionals.

ACT in Chinese and **ACT in Punjabi** – ACT has been able to both create and identify valuable resources for the Chinese-speaking and Punjabi-speaking communities in British Columbia.

ACT's Autism Manual for B.C. – A manual for parents and community professionals with 13 chapters, including New Diagnosis Process, Contracting with Professionals, B.C. Education System, Building a Community Group, and more!

ACT's Event & Training Alerts – Sign-up to keep in touch with our upcoming events and training opportunities.

ACT's Facebook – ACT carefully sources interesting, insightful stories to inform our community of over 9,000 followers.

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Attention and Neurodivergent Sensory Experiences

1

- When I was growing up, I lacked the concepts to fully understand my sensory experiences
- Neurodivergent communities sometimes have to develop their own language, concepts in order to express sensory experiences outside conventional neurotypical understanding (Belek, 2018)
- Without understanding sensory experiences, how can we advocate?

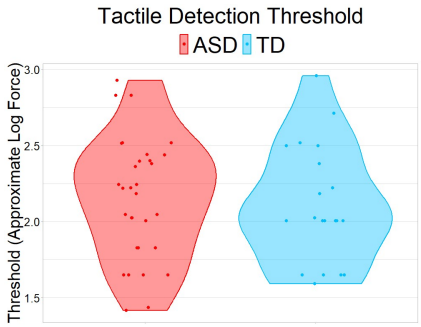
2

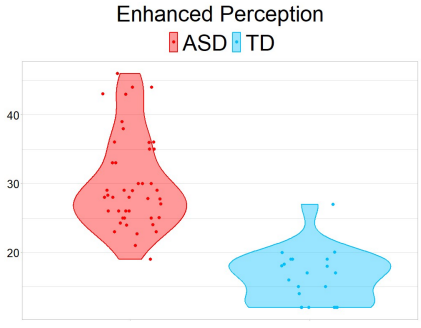
What might underlie neurodivergent sensory differences?

3

What our sensory differences aren't

- When tested in controlled lab conditions, our sensory systems usually **aren't capable of detecting** things others can't perceive
  - (*with a few exceptions, like a subset of autistic people with really good pitch)
- But in day-to-day life, we may **notice** things others miss





Dwyer, P., Takarae, Y., Zadeh, I., Rivera, S. M., & Saron, C. D. (2022b). A Multidimensional Investigation of Sensory Processing in Autism: Parent- and Self-Report Questionnaires, Psychophysical Thresholds, and Event-Related Potentials in the Auditory and Somatosensory Modalities. *Frontiers in Human Neuroscience*, *16*, 811547. https://doi.org/10.3389/fnhum.2022.811547

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Attention in Autism: Hyper-Focus

- **Monotropism** – a theory proposed by autistic people (Murray et al., 2005)
  - Thinks about autistic attention as being driven by internally motivated interests
  - We hyper-focus our attention on these targets
- Could be many manifestations:
  - Intense interests in particular topics
  - Object interests (e.g., sensory exploration, lining up/arranging)
  - "Autistic inertia," slowness to shift or engage

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Attention in Autism: Attention Capture

- Not just focus on intense, internally motivated interests
- Autistic people can also be more prone than neurotypicals to having their attention captured in a stimulus-driven way (e.g., Keehn et al., 2016; Poole et al., 2018; Venker et al., 2021)

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So what?

- Could atypical autistic sensory experiences at least partly reflect susceptibility to stimulus-driven capture of hyper-focused attention?
- If a stimulus is aversive, and autistic people can't shift attention away from it, that could be very unpleasant!

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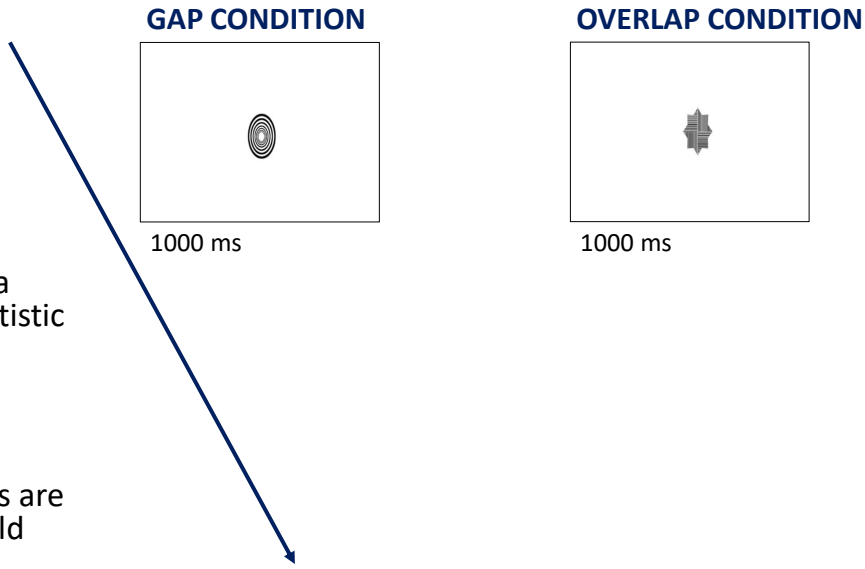
Gap-Overlap: "Attention Disengagement"



- Usable data from 41 autistic and 26 typically-developing children
- Participants are 2-4 years old

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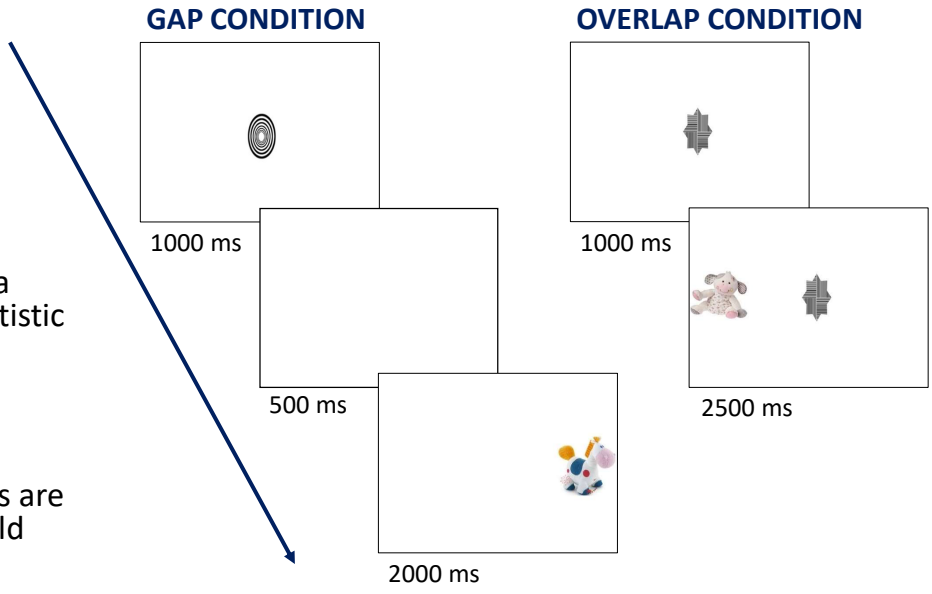

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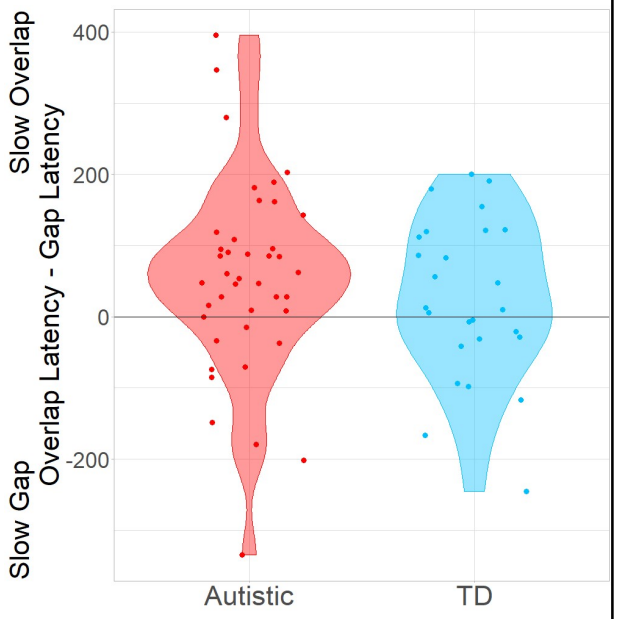
Sticky Attention

In our study, no significant difference in "sticky attention" between young autistic and typically-developing children



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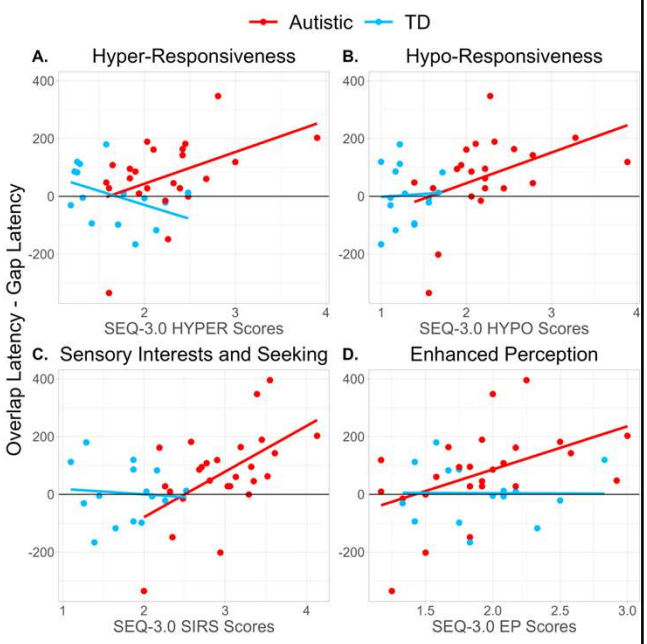
Sticky Attention & Sensory Responses

In autistic participants, more sticky attention related to more:

- Hyper-responsiveness
- Hypo-responsiveness
- Sensory interests
- Enhanced perception

In other words, all the sensory patterns we looked at…



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Questionnaires and Surveys in Adults

- Data from 492 adults:
  - 122 ADHD-only
  - 141 autistic+ADHD
  - 130 autistic-only
  - 99 controls
- Measured constructs like:
  - Hyper-focus (e.g., "…when I am very focused on something or I am doing something that I find especially rewarding, I do not notice the world around me, and I won't realize if someone calls my name or if my phone buzzes")
  - Inattention (e.g., "…How often do you have difficulty keeping your attention when you are doing boring or repetitive work?)
  - Hyper-vigilance (e.g., "…when I am in public or new places, I need to scan the crowd or surroundings")
  - Anxiety
  - Different forms of hyper-responsiveness/reactivity to sounds

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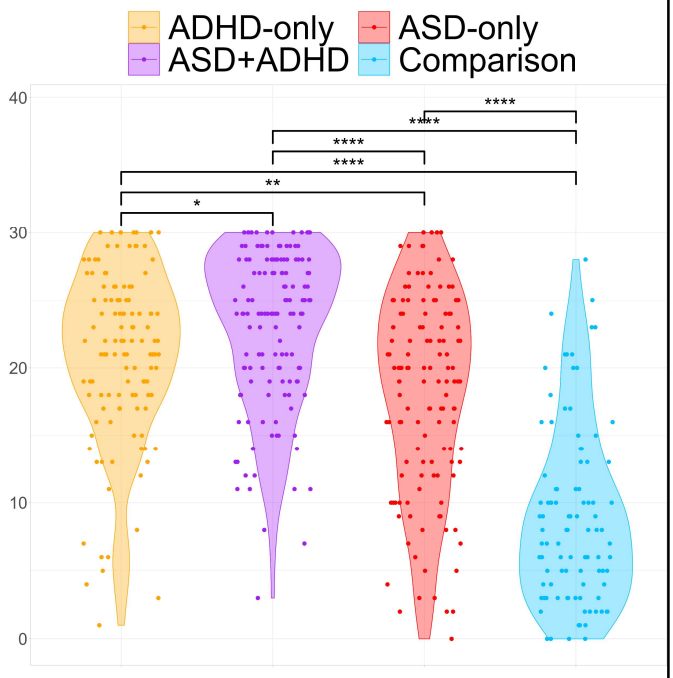
Hyper-Focus

- High in all neurodivergent groups, including ADHD!



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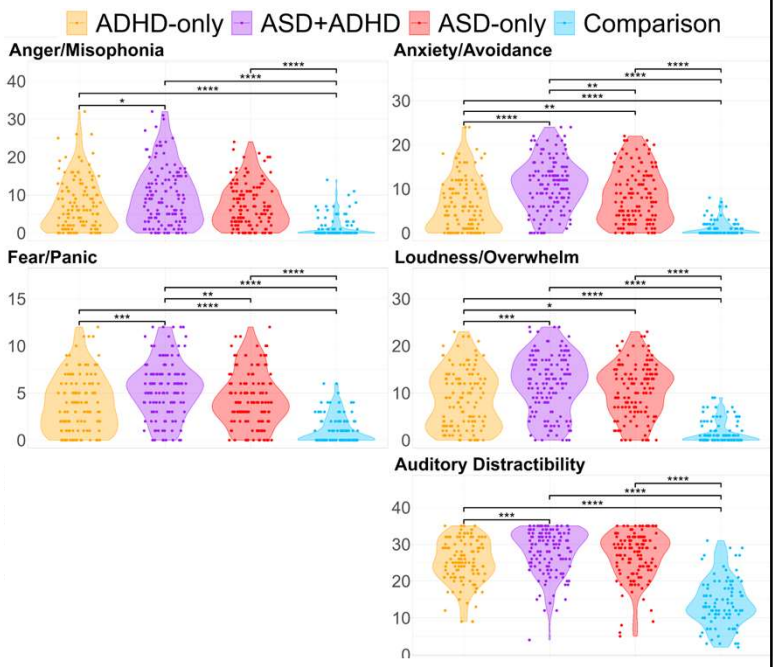
Auditory Hyper-Responsitivity

- Neurodivergent participants report considerably more of all kinds of auditory sensory issues than comparison participants



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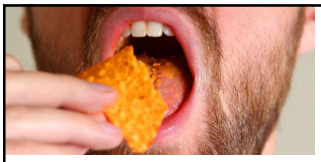
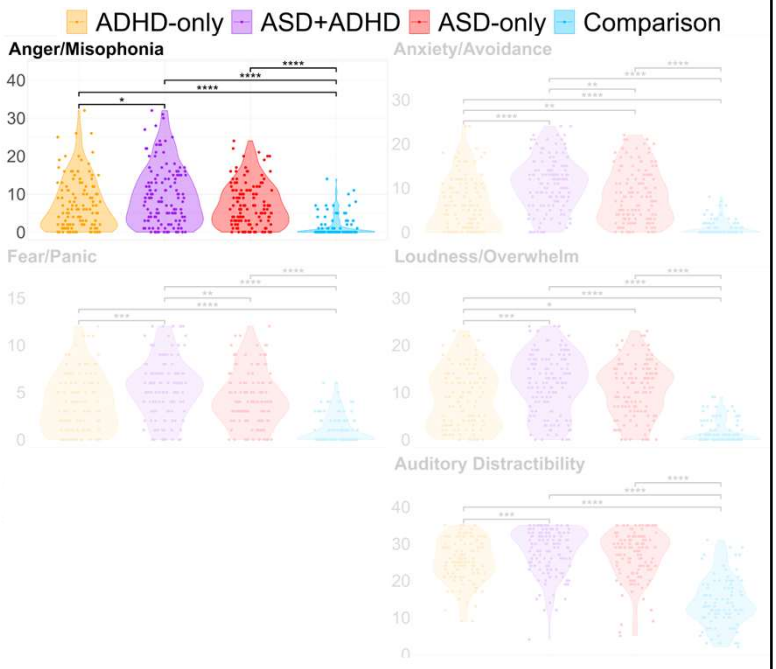


Misophonia: emotional reactions to specific stimuli

- often repetitive/obnoxious
- not necessarily loud…



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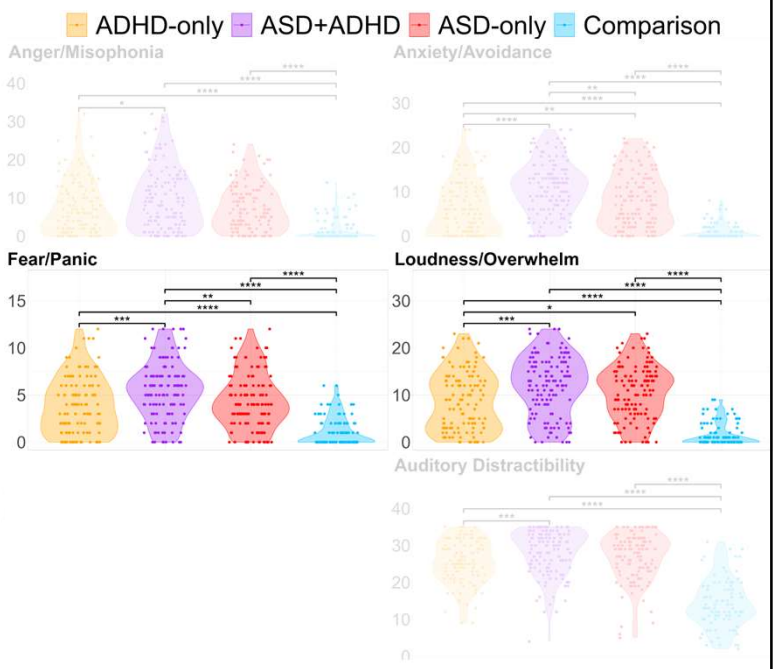
Misophonia: emotional reactions to specific stimuli, not necessarily loud…

Loudness intolerance, sensory overload: being overwhelmed by too many stimuli, intense stimuli…

(Image: Interacting with Autism project)



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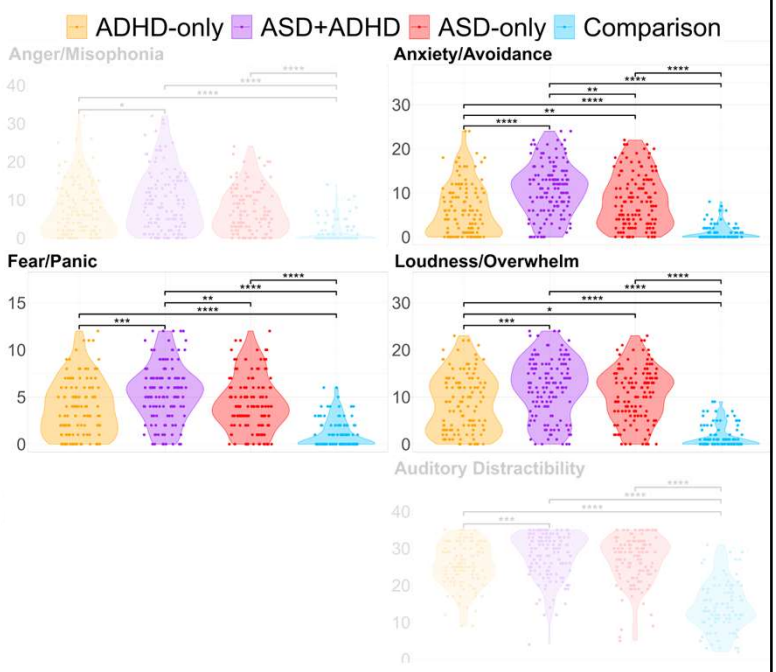

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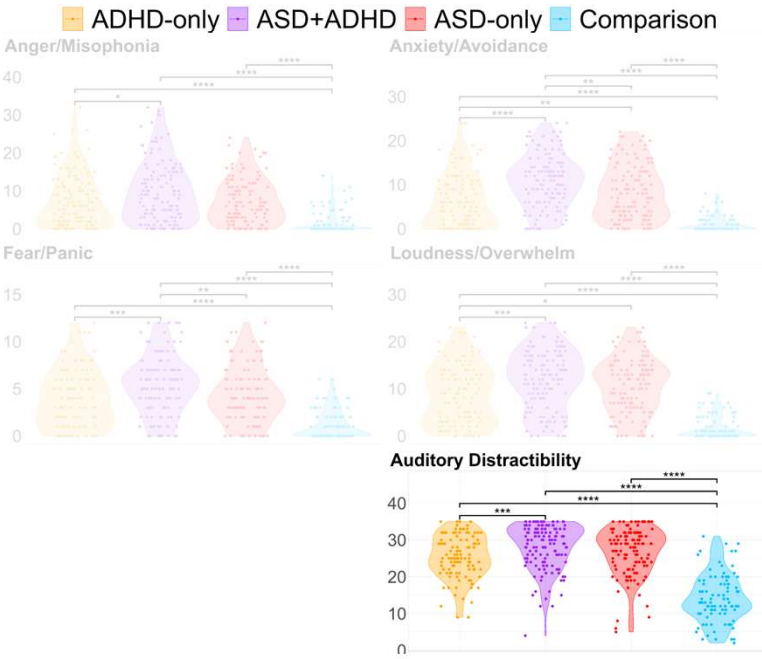
Misophonia: emotional reactions to specific stimuli, not necessarily loud…

Loudness intolerance, sensory overload: being overwhelmed by too many stimuli, intense stimuli…

(Image: Interacting with Autism project)

Auditory distractibility: trouble focusing due to difficulty filtering background noise



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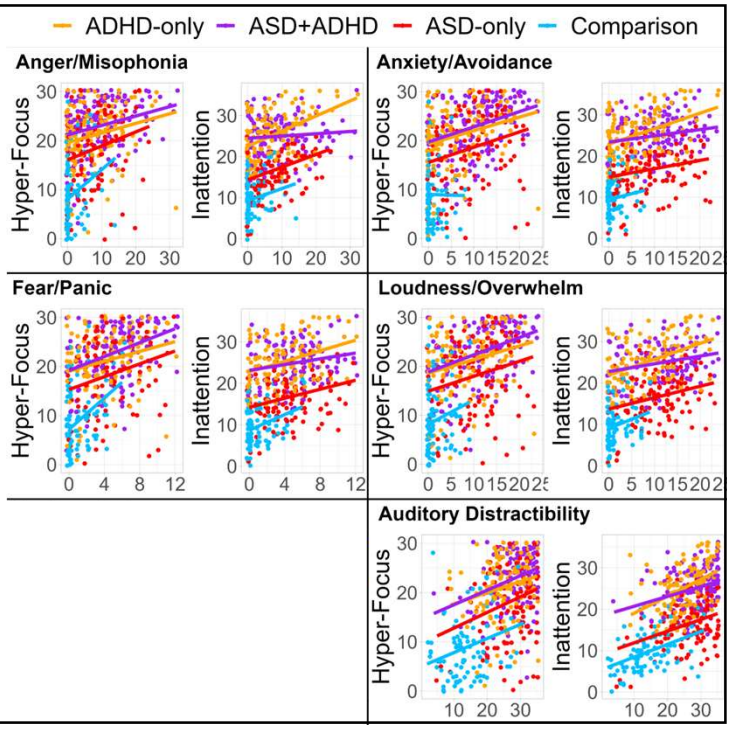
Auditory Hyper-Responsitivity & Attention

- Reasonably clear associations
- In neurodivergent participants, different kinds of auditory sensory issues are usually significantly related to hyper-focus, inattention, or both



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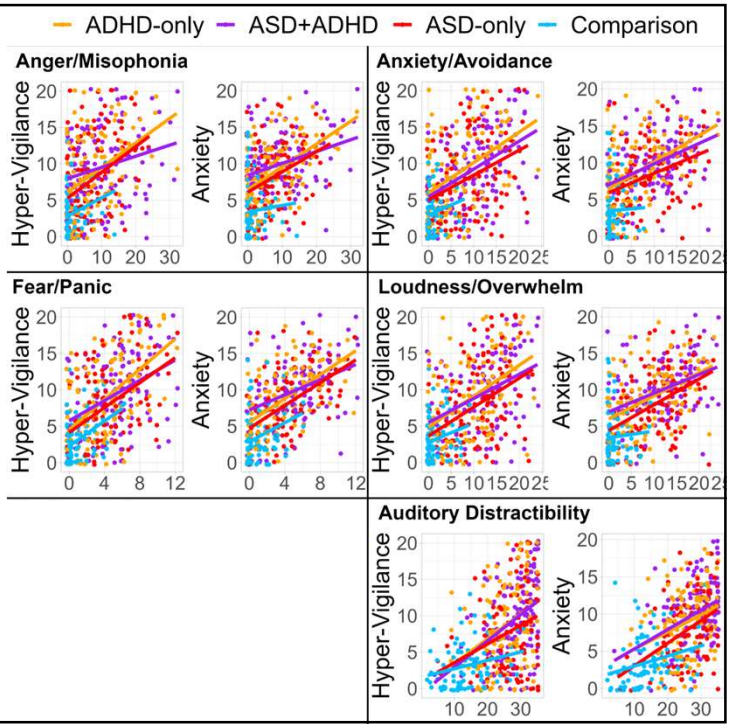
Auditory Hyper-Responsitivity & Anxiety

- Clear, consistent associations in all of the neurodivergent groups
- People with more sensory issues tend to also experience anxiety, hyper-vigilance
- So, which drives which?



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Final thoughts…

NOT clinical advice (I am not a clinician)

Just my personal opinions/suggestions

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Final thoughts – it might be related to attention, but that doesn't mean it's not real

- Can you use your willpower to **NOT** think about a pink elephant?
- Sensory distress is not voluntary! Believe me, if we didn't have to deal with it, we'd be ecstatic…

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Final thoughts – is it always attention?

- Not necessarily! Some neurodivergent people report sensory experiences that can't be easily explained in terms of attention…
- For example:
  - Pain hyperacusis – physical pain caused by sounds that aren't loud enough to cause pain
  - Tinnitus – perceiving sensations that aren't there

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Final thoughts – but could deliberately re-orienting attention help?

- Maybe sometimes… There's a study saying it can be helpful for misophonia (Jager et al., 2022)
- I can sometimes distract myself from overwhelming environments by focusing on something highly engaging, ***but*** then I'm not paying attention to other things…
- In the long run, I hope understanding our sensory experiences may help give us a sense of control & help us communicate with others…

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Final thoughts – and what do to now?

- **Be flexible**!
- Allow escape
- Think about technology (e.g., earplugs, noise-cancelling headphones)
- Be careful about exposing people to sounds to "build up a tolerance"

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