

Soundscapes of the Mind: Identifying Sound and Musical Preferences in Children with Autism Spectrum Disorder



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Introduction

- ❖ Autism Spectrum Disorder (ASD): neurodevelopmental disorder, impacts social communication, emotional expression, self-regulation, verbal and motor control.
- ❖ Heightened sensory sensitivities, specifically auditory, which is referred to as hyperacusis. (Ludlow et al., 2014, Kellerman et al., 2005, Nieto Del Rincon, 2008, Samson et al., 2006).
- ❖ Both scholarly literature and personal observations indicate that many individuals with ASD display a strong positive response to music (Molnar-Szakacs & Heaton, 2012).
- ❖ Music can facilitate emotional awareness, emotional regulation (Papoutsi et al., 2018), educational environments (Unwin et al., 2022).
- ❖ Music, specifically modular music, can help children with ASD express their individual preferences and increase engagement (Karwankar et al., 2025)*

Study

- ❖ The primary goal of this study is to **create a more accessible music listening experience for children with autism** by learning about their individual and group specific music listening preferences
- ❖ I look at **preference for envelope** (**Attack, Decay, Sustain, Release** - ADSR) levels, **Pitch Register** (high, medium, low), and **Source Type** (acoustic, synthesized, ambient)
- ❖ Pinpoint specific musical features that may evoke a positive or negative reaction to music or other sound stimuli for individuals with and without ASD.



Hypothesis

Studies on sound preferences for children with ASD suggest the following hypotheses:

- ❖ ASD group would have different preferences than the non-ASD, but there would be more variance within the group of children with ASD
- ❖ ASD group would prefer sounds with a weak attack, long decay, long sustain, and slow release than the other envelope levels. They would also prefer these more than non-ASD group.
- ❖ ASD would prefer lower pitch registers more than others. They would also prefer these more than non-ASD group.
- ❖ Both groups would prefer acoustic sounds to synthesized or ambient sounds

Procedure

- ❖ Recruited **children aged 5-13 with and without ASD** through Facebook, ResearchMatch, LinkedIn, and through partner organizations
- ❖ Clicked through soundbank of **26 sounds ranging in envelope, pitch register, and source**. Then listened to 4 renditions of “Twinkle, Twinkle Little Star” with different combinations of these variables
- ❖ Listened to sounds one at a time, and clicked a **smiley face if they liked it and a frowny face if they did not**

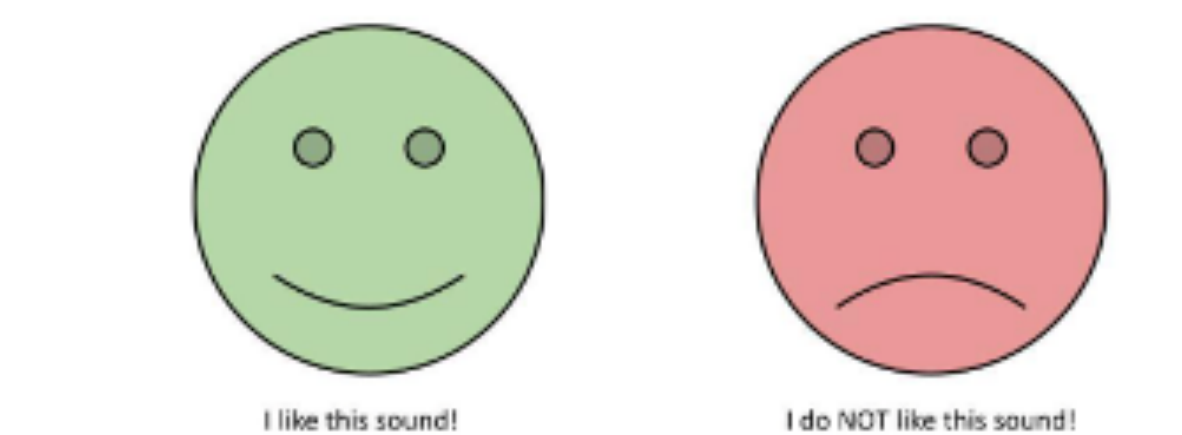


Do you like this sound?



Times Played: 0

Total Duration Played: 0 seconds

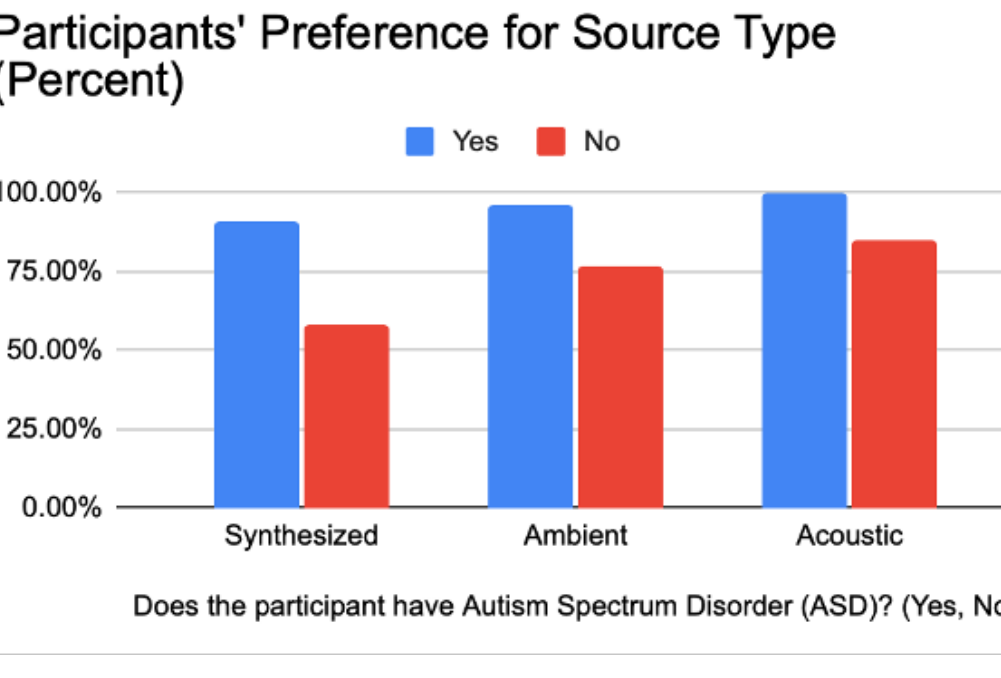
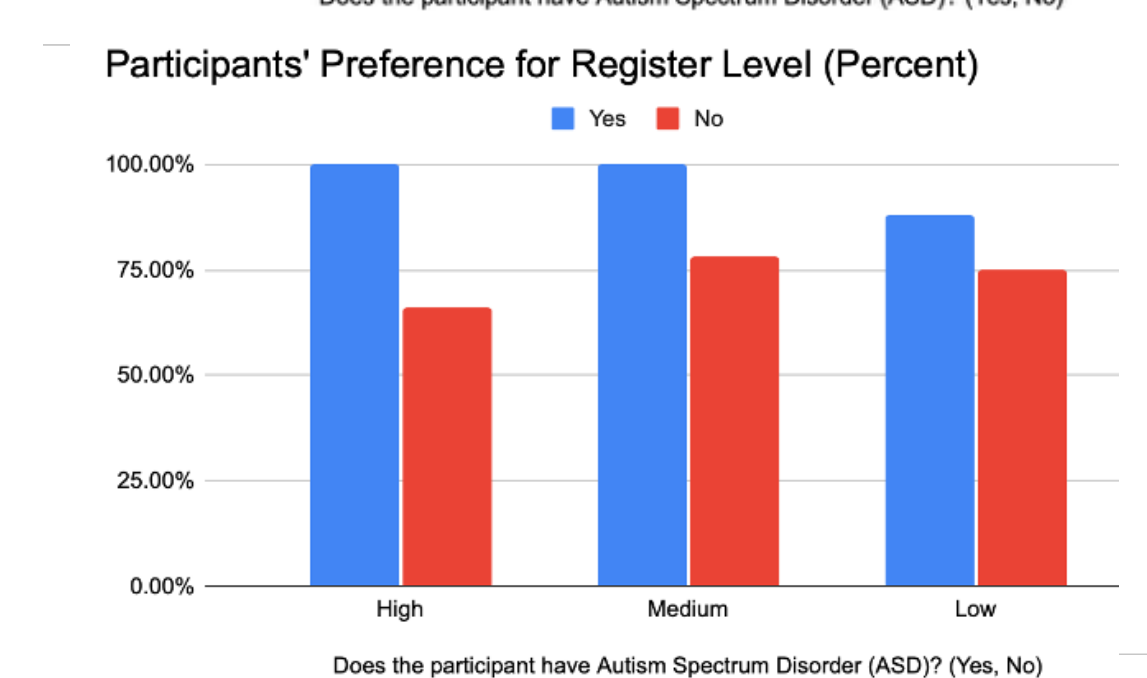
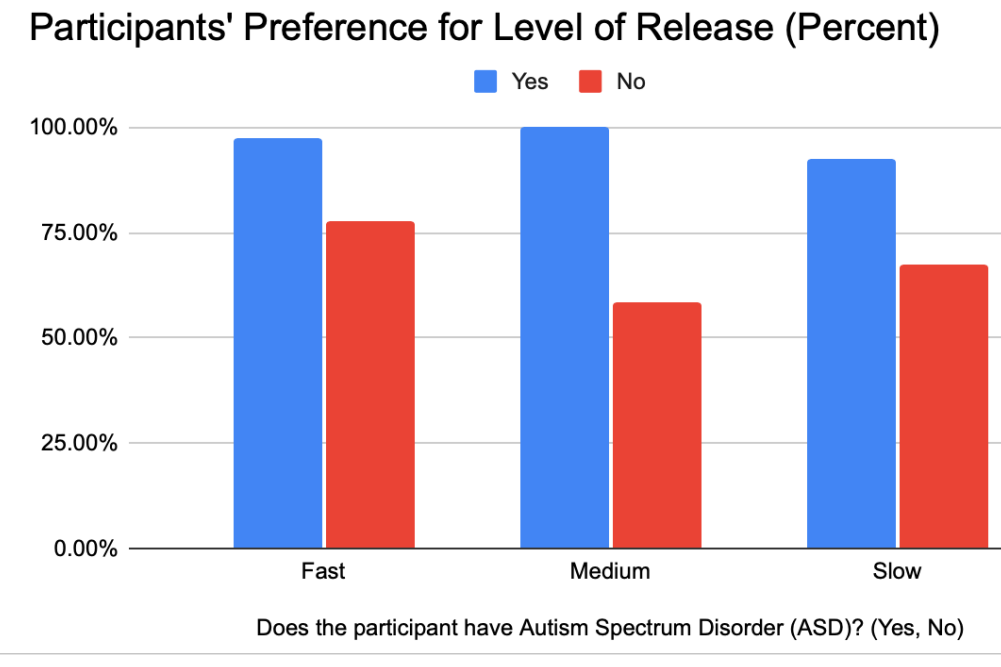
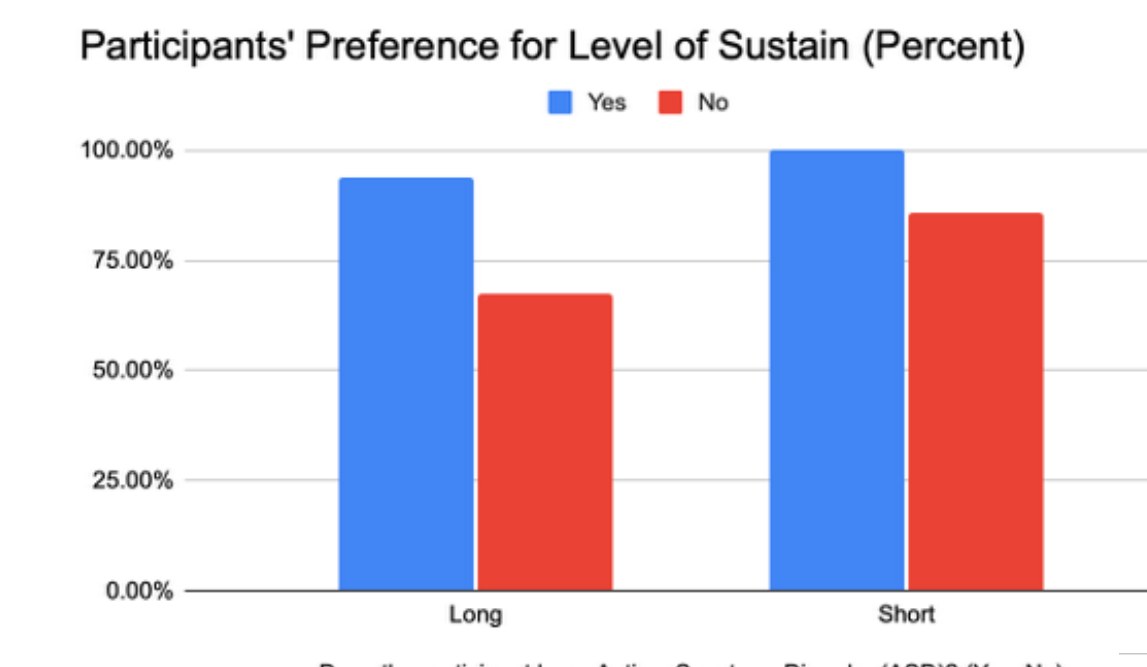
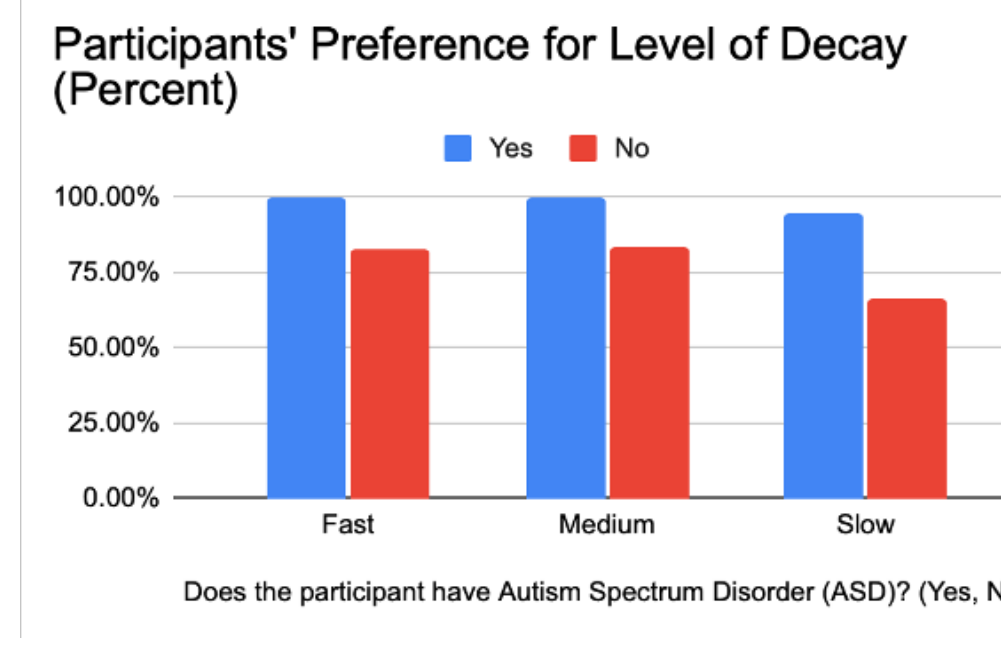
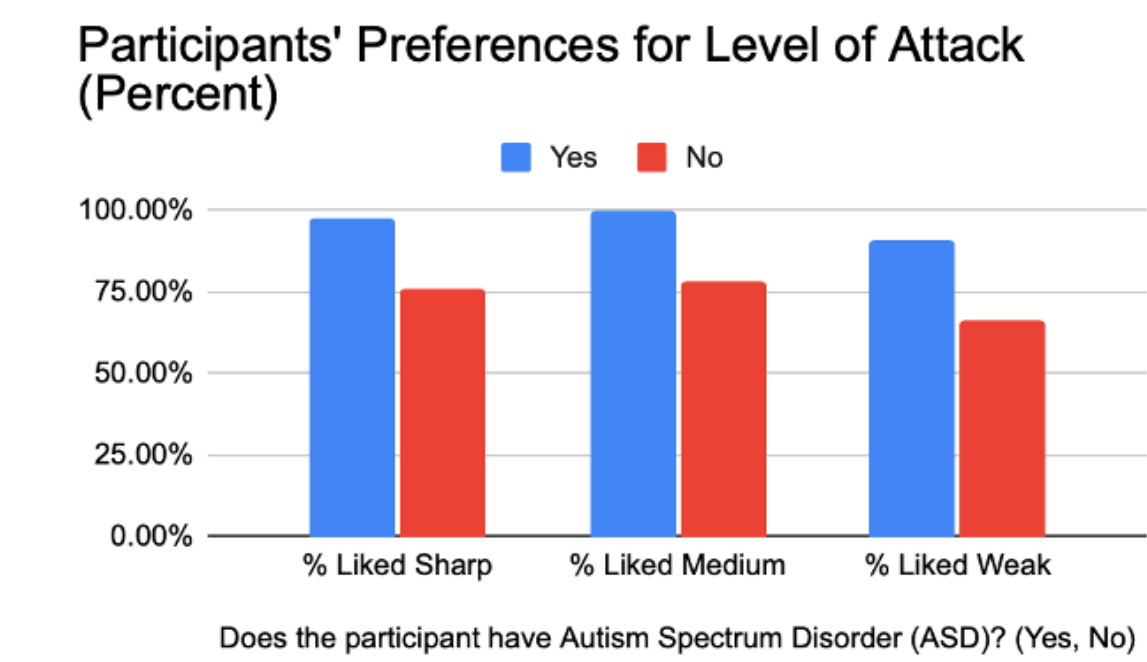


Variable Classification:

- ❖ **Attack:** Sharp (0-300ms), Medium (300ms-600ms), Weak (600+ms)
- ❖ **Decay:** Fast (0-300ms), Medium (300ms-600ms), Slow (600+ms)
- ❖ **Sustain:** Fast (0-30 decibels), Slow (60+ decibels)
- ❖ **Release:** Fast (0-300ms), Medium (300ms-600ms), Slow (600+ms)
- ❖ **Pitch:** High (Around C6), Medium (Around C4), Pitch (Around C2)
- ❖ **Source:** Synthesized (Waveform Synth), Ambient (Epidemic Soundbank), Acoustic (Noiiz Samples)

Results

11 participants: 3 ASD, 8 non-ASD



Discussion & Conclusion

- ❖ **Preferences for children with and without ASD were similar.** There was **more variance in children with ASD's data**.
- ❖ **Both groups preferred acoustic sounds.**
- ❖ Children with **ASD's preferences decreased as the pitch got lower** and children **without ASD's preferences increased as pitch got lower**. This does not align with previous research.
- ❖ The preferences of children with **ASD generally align, showing higher preference for slow decays, long sustains, and slow releases** than those without ASD
- ❖ These preferences may reflect a **desire for increased time to process sounds**, given that some children with ASD exhibit **audio processing delays** (Boets et al., 2014, Jorgensen et al., 2021)
- ❖ **Limitations:** small, unbalanced sample size; volume not controlled for, acoustic instruments generated through electronic sampling



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References



Paper

*Karwankar et al. 2025

