

# Effects of Music on Driving Performance of Experienced Drivers With and Without Autism Spectrum Disorder

Sydney Romer, MSOT, OTR/L<sup>1</sup>, Anne E. Dickerson, PhD, OTR/L, FAOTA, SCDM, GSA<sup>1</sup>

<sup>1</sup>East Carolina University, Greenville, North Carolina, United States

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Primary Author and Speaker: Sydney Romer, seromer.ga@gmail.com

**BACKGROUND:** Achieving a driver's license is essential for teens in order to achieve independence and expand their social participation. Individuals with Autism Spectrum Disorder (ASD) often have difficulty achieving licensure due to difficulties with anxiety, sensory processing issues, and impairment in executive functioning (American Psychiatric Association, 2013). Research demonstrates that individuals with ASD have more driving performance errors compared to their neurotypical (NT) peers (Classen, Monahan, & Hernandez, 2013). While music is a factor that can negatively affect driving performance, music may mediate some of the psychological challenges those with ASD face, specifically with novice drivers with ASD (Hillier, Greher, Poto, & Dougherty, 2012).

**PURPOSE:** Based on a previous study demonstrating that self-selected music enhanced novice drivers' driving performance (Goehmann, 2018), this study investigated the effects that self-selected background music had on the driving performance of experienced drivers with ASD compared to experienced neurotypical drivers.

**DESIGN:** A 2 (autism/neurotypical) x 2 (music/no music) x 2 (hazards/wayfinding) factorial design was used.

**METHOD:** Participants included 34 NT adults (Age Md = 21.6) and 5 adults with ASD (Age Md = 23.9) who were all experienced drivers (3-14 yrs). All participants completed four different driving scenarios (two hazard, two wayfinding) on an interactive driving simulator (STISIM-DRIVE©). During two of the drives (one hazard, one wayfinding) the participant listened to self-selected music with the order of the drives and music counterbalanced to prevent learning effects. The dependent variable of driving performance was measured by the Performance Analysis of Driving Ability (P-Drive) using the total and four subcategories scores.

**RESULTS:** Repeated measures ANOVA showed no significant difference in driving performance on the total scores between music/no music condition ( $F = .095, p = 0.76$ ). There was a significant difference between the drives ( $F = 26.8, p = 0.001$ ). There was also a group ( $F = 4.2, p = 0.049$ ) difference with the drivers with ASD having higher driving performance scores than their NT counterparts. No significant interaction effects were found. When comparing the two groups (ASD, NT), the drivers with ASD scored higher on both drives (hazard, wayfinding) regardless of the music condition. Both groups scored higher on the wayfinding drive compared to the hazard drives.

**CONCLUSION:** Results showed that music does not significantly affect driving performance, contradicting previous studies. However, most previous studies used novice drivers. Thus, it is likely experience makes a difference. More interesting is the higher performance of the drivers with ASD over their neurotypical peers. This suggests that experienced drivers with ASD may be better drivers with sufficient experience as they are more likely to drive following rules of the road and speed limitations. Implications for occupational therapy will be described.

**IMPACT:** As a critical IADL, driving is highly valued by clients with occupational therapy being the "go-to" profession for driving. OTs offer a distinct valued service to novice drivers with ASD. This study contributes to the science of serving this population by being the first study to look at experienced drivers and how they perform on navigational and wayfinding tasks.

## References

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