

Perceptions of Adults With Spinal Cord Injury or Disease Before and After Riding in an Autonomous Shuttle

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PURPOSE: This study quantified perceptions of individuals living with a spinal cord injury or disease (SCI/D) regarding autonomous shuttles (AS). Individuals with an SCI/D have impaired mobility which can negatively impact their independence in community mobility and societal integration. Autonomous shuttles may increase transportation equity; however, we know little about individuals with SCI/D acceptance practices of this new technology as their perceptions have not yet been solicited. Acceptance is best promoted with knowledge and understanding and evidence suggests lived experiences can impact user perceptions. Therefore, we hypothesized that compared to controls, individuals with SCI/D would have greater hesitation and less initial trust before exposure to the AS. Actual exposure, in combination with surveys, may more accurately reveal the perceptions of individuals with SCI/D before and after riding in the AS. We expect that perceptions, values, hesitations, and beliefs of people with SCI/D will improve by the greatest magnitude after riding in the AS.

DESIGN: This study used an experimental pretest-posttest design. Eligible participants were adults (18 to 64 years old) with a SCI/D that were able to communicate in English and pass a cognitive screen. Individuals were excluded if the spinal cord injury or disease occurred within the last 6 months or sustained additional neurological injuries. Control subjects were age- and gender-matched counterparts.

METHOD: Participants completed a demographic information survey, Spinal Cord Independence Measure, Driving Habits Questionnaire, Life Space Questionnaire, and Autonomous Vehicle User Perception Survey (AVUPS) before riding in the AS. The AVUPS was completed again after the participant rode in the AS for a complete loop (15 minutes) through downtown Gainesville, FL. AVUPS scores ranged from 0 (strongly disagree) to 100 (strongly agree) and assessed four domains: (a) intention to use, (b) perceived barriers, (c) well-being, and (d) total acceptance. AVUPS scores were compared using a two-way mixed ANOVA with SCI/D as a between-subject factor and time (i.e., shuttle exposure) as a within-subject factor.

RESULTS: Sixteen participants with SCI/D (15 males; MAGE = 44.4 years; SDAGE = 16.1) ranged from 20 to 62 years old and were White/Caucasian (81%) or Black/African American (19%) whereas their age- and gender-matched counterparts (15 males; MAGE = 44.4 years; SDAGE = 16.4) ranged from 22 to 65. A time effect was observed for perceived barriers, $F(1,60) = 3.26$, $p = .025$. Perceived barriers decreased after riding in the shuttle ($M = 20.5$, $SD = 13.1$) compared to baseline ($M = 29.3$, $SD = 17.4$). No group effects or group by time interactions were observed. Prior to the shuttle ride, individuals with SCI/D expressed concerns (via open-ended AVUPS items) about the lack of control and potential AS malfunctions. After the ride, both SCI/D and controls reported increased trust in the AS.

CONCLUSIONS: Exposure to the AS had a positive impact on the perceptions of both individuals with SCI/D and controls. Information gained from this research informs clinicians, rehabilitation scientists, community partners, and AS manufacturers of opportunities and barriers to improve the acceptance practices of individuals with SCI/D.

IMPACT STATEMENT: Autonomous shuttles may promote participation in community mobility and may be a suitable option for those who have difficulty driving. Should individuals with SCI/D accept (and adopt) this new technology, their perceptions and feedback may lead to important steps toward transportation equity for individuals with disabilities.

References

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