Driving The Future

The Relation Between Driving and Prospective Memory in Adults With an Autism Spectrum Disorder

Veerle Ross¹, Ellen M. M. Jongen¹, Kris Brijs¹, Giovanni Vanroelen², Altgassen, A. Mareike³, Karin Van Vlierden¹, Martijn van Beers¹, Tom Brijs¹, and Geert Wets¹

¹ Transportation Research Institute (IMOB), School for Mobility Sciences, Hasselt University; ² Faculty of Applied Engineering Sciences, Hasselt University; Diepenbeek, Belgium
³ Donders Institute for Brain, Cognition and Behaviour, Centre for Cognition, Radboud University Nijmegen; ⁴ Faculty of Psychology and Neuroscience, Maastricht University, The Netherlands

Driving
- Important to gain autonomy
- Complex goal-directed task
- Requires multitasking
- Involves situations of increased cognitive load
- Beside vehicle handling, navigation through different environments while remembering appointments and obeying a schedule

Autism spectrum disorder (ASS)
- Difficulties with coordinating and sequencing activities, and with planning ahead
- Indications of prospective memory deficits

Prospective memory
- Ability to remember to carry out intended actions in the future while being engaged in other ongoing activities
- Two subtypes of PM are event-based PM (EBPM) and time-based PM (TBPM)

Participants and procedure
- 19 ASS (official diagnosis) & 20 control:
  - Data collection ongoing
  - No difference gender or age
  - Diagnosis confirmed by SRS and AQ-10
  - Age: 18-62 years old
  - At least 20 hours of driving experience
  - All tasks counterbalanced (2 hours)
  - Reward of 15 euro

PM performance
- EBPM: No differences
- TBPM
  - Group differences
    - ASS responds earlier (but also closer to target time)
    - Interaction group planning
      - ASS: not dependent on planning ability
      - Control: dependent on planning ability

Virtual reality (VR) PM city task
a. 4 EBPM (2 strong 2 weak link intention and act)
   Eg. Stop at gas station for fuel
b. 2 TBPM
   Eg. Indicate when 5 min. have passed
c. Standard driving measures (e.g., lights, hazard)

Computer tasks assessing cognition
1. Working memory: visuospatial and reversed digit span
2. Planning: Tower of London
3. Shifting: Trail making test – B
4. Theory of mind: Triangle task

Driving performance
- Yellow light
  - Young age → light running
- Crashes
  - ASS crashed more
  - Interaction group and shifting
    - ASS: not dependent on shifting ability
    - Control: dependent on shifting ability

Presented results are preliminary but indicate subtle group differences in both PM and driving performance

Next steps
- Additional data collection
- Analyses of additional PM simulated drive
  - Contextualized PM tasks
  - Eg. EBPM: Remember to take an exit after a distracting event (exit = cue)
  - Eg. TBPM: Ask for route information after 3 minutes