Developing cognitive and neurocognitive biomarkers for recovery from alcohol dependence (AD)

Anna Powell[1], Mark Tommerdahl[2], Cecil Kullu[3], Lynn Owens[4,6], Harry Sumnall[5,6], & Catharine Montgomery[1,6]

Scan Me

[1] School of Psychology, LJMU
[2] Department of Biomedical Engineering, University of North Carolina
[3] Mersey Care NHS Foundation Trust
[4] Royal Liverpool University Hospital
[5] Public Health Institute, LJMU
[6] Liverpool Centre for Alcohol Research

Alcohol is the 7th leading risk for death and disability [1], and there are an estimated 586,780 dependent drinkers in UK [2].

Treatment should be tailored and consider individual-level and structural determinants [3].

AD linked to impaired prefrontal cortex [4, 5, 6] and therefore impaired executive function [7, 8]. These impairments predict treatment outcomes [9, 10, 11].

Currently, formal comprehensive assessment or tracking of this is not used widely in AD treatment [12], though it could be useful when creating treatment plans.

Is Brain Gauge a device that could accomplish this, identify patients at risk of relapse, and complement treatment plans?

Brain Gauge has successfully tracked cognitive recovery after mild brain injury [13].

...which creates predictable reactions in adjacent areas of the cortex, affecting perception. Responses give insight into the state of the relevant mechanism.

Brain Gauge stimulates two adjacent fingertips [13]...

And has been able to highlight differences in chronic alcohol use against normative data [14].

Our pilot study found that Brain Gauge was able to highlight certain changes across early AD recovery [15].

We are now undertaking a longer study with a larger sample to find out more, and to learn whether Brain Gauge has predictive utility.

Planned Methods

N = 90 AD, 90 one-time controls
5 time-points (up to 5-7 months)

Measures:
- Brain Gauge
- EFI
- HADS
- AUDIT, SADQ, TLFB-A
- SURE

Planned Analyses

Within-groups:
RM analyses assessing EFI and Brain Gauge. Regression assessing predictability on recovery indicators

Between-groups:
Independent analyses comparing scores between AD and controls

References

1. Griswold et al. (2018). *The Lancet*
2. Public Health England (2018). *Public Health Dashboard.*
3. UK Drug Strategy (2017).
4. Harris et al. (2008). *Alcohol Clin Exp Res.*
5. Oscar-Berman et al. (2007). *Neuropsychology Review.*
6. Chanraud et al. (2006). *Neuropsychopharmacology.*
7. Day et al. (2015). *Current Drug Abuse Reviews.*
8. Smith et al. (2014). *Drug and Alcohol Dependence.*
9. Noël et al. (2002). *Alcohol and Alcoholism.*
10. Charlet et al. (2013). *Addiction Biology.*
11. Goldstein et al. (2011). *Nature Reviews Neuroscience.*
12. NICE (2011).
13. Favorov et al. (2019). *Military Medicine.*
14. Nguyen et al. (2013). *Brain Research.*
15. Powell et al. (2021). *Hum Psychopharmacol Clin Exp.*

NHS Health Research Authority

LIVERPOOL JOHN MOORES UNIVERSITY

LIVERPOOL CENTRE FOR ALCOHOL RESEARCH