

isolated from human blood and plasma samples via direct immunoprecipitation using biotinylated antibodies for proteins known to be expressed in neurons (Contactin-2, i.e.) and astrocytes (glial-glutamate-aspartate-transporter, i.e., GLAST). Once isolated, protein concentrations in the EV samples were analyzed via ELISA assay, EV abundance was measured using ViewSizer Nanoparticle Tracking analysis, and EVs were visualized via Transmission Electron Microscopy. EVs were then analyzed for metal contents using a Perkin-Elmer NexION 350S via an ICP-MS/MS dynamic reaction cell method. RESULTS/ANTICIPATED RESULTS: Preliminary results demonstrate that it is feasible to quantify the metal contents of these CNS-derived EVs, particularly in terms of toxic metals known to be associated with neurodegenerative disorders, including copper, zinc, lead, aluminum, manganese, and iron. DISCUSSION/SIGNIFICANCE: CNS-derived EVs isolated from peripheral blood draws show promise as a potential biomarker of real-time metal load in the brain and spinal cord, with promising applications in predicting future development of neurodegenerative disorders (i.e., ALS) among patients with relevant elevated CNS metal loads.

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Interest in and Perceived Effectiveness of Contingency Management Among Alcohol Drinkers Using Behavioral Economic Purchase Tasks^{*,†}

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OBJECTIVES/GOALS: The purpose of this study was to develop behavioral economic purchase tasks to assess interest in CM as a function of treatment cost and perceived effectiveness of CM as a function of abstinence incentive size in alcohol drinkers. Additionally, these purchase tasks are being assessed for their clinical utility in an ongoing clinical trial. METHODS/STUDY POPULATION: Alcohol drinkers recruited from Amazon Mechanical Turk completed behavioral economic purchase tasks measuring demand for CM based on targeted abstinence intervals and treatment effectiveness and alcohol use disorder severity assessments. Nonlinear mixed effects modeling was used to fit demand curves and assess the relationship between individual characteristics and demand metrics for CM. Ongoing analyses involve administering the same behavioral economic purchase tasks in heavy alcohol users in the ongoing clinical trial, which is aimed at reducing alcohol use through remotely implemented CM. RESULTS/ANTICIPATED RESULTS: Mechanical Turk participants reported higher probability of abstinence when offered larger incentives and required larger incentives when duration of abstinence required to earn the incentive was increased. Additionally, willingness to pay for treatment increased as effectiveness of treatment increased. It is anticipated that these patterns will be observed in the clinical trial participants. DISCUSSION/SIGNIFICANCE: Abstinence interval and treatment effectiveness are important features to consider when developing effective CM for widespread use, as these variables affected participants likelihood of being abstinent and their interest in treatment. We are currently working on verifying the results of these assessments in clinical trial participants.

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Resting state fMRI connectivity in individuals with aphasia and the role of the inferior frontal gyrus

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OBJECTIVES/GOALS: This poster will explore lesion-symptom mapping and resting state functional magnetic resonance imaging (rsfMRI) in participants with aphasia. This analysis aims to reveal the behavioral impact of distinct lesions to the left inferior frontal gyrus (LIFG) and the potential for rsfMRI to provide evidence of cortical reorganization. METHODS/STUDY POPULATION: The analyses will be conducted on a small sample of approximately six participants with post-stroke language impairment (i.e., aphasia) recruited as part of an ongoing study. Lesion load in the anterior LIFG (aLIFG), consisting of the orbital (BA 47) and triangular (BA 45) parts, and the posterior LIFG (pLIFG), consisting of the opercular part (BA 44) will be correlated with performance on tasks of semantic and phonological processing. Functional connectivity will be determined between regions of interest (i.e., anterior superior temporal, posterior middle temporal, angular, and supramarginal gyri) in the left and/or right hemispheres based on rsfMRI data. RESULTS/ANTICIPATED RESULTS: Lesion load in the aLIFG is expected to correlate to performance on the semantic task, whereas lesion load in the pLIFG is expected to correlate to performance on the phonological task. For participants whose behavioral performance exceeds expectations based on lesion load (e.g., larger aLIFG lesion load, yet better semantic task performance), rsfMRI connectivity is expected to be greater (e.g., between the posterior middle temporal and angular gyri), suggesting cortical reorganization. DISCUSSION/SIGNIFICANCE: If our hypotheses are supported, our results will corroborate evidence of a functional spectrum (i.e., semantic-phonological) in the LIFG. Future work will compare rsfMRI connectivity to neurotypical controls and sites of connectivity may be used as targets in studies of non-invasive brain stimulation as an adjuvant to behavioral therapy.

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Investigating the Architecture of Speech Processing Pathways in the Brain

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OBJECTIVES/GOALS: Speech production requires mapping between sound-based and motor-based neural representations of a word – accomplished by learning internal models. However, the neural bases of these internal models remain unclear. The aim of this study is to provide experimental evidence for these internal models in the brain during speech production. METHODS/STUDY POPULATION: 16 healthy human adults were recruited for this electrooculography speech study. 20 English pseudowords were designed to vary on confusability along specific features of articulation (place vs manner). All words were controlled for length and voicing. Three task conditions were performed: speech perception,