training classes. Future areas of research include objective measurement of class engagement as well as the incorporation of nuanced adherence metrics to further elucidate the relationship between these factors and cognition in MCI.

Categories: Cognitive Intervention/Rehabilitation
Keyword 1: cognitive rehabilitation
Keyword 2: mild cognitive impairment
Keyword 3: dementia - Alzheimer's disease
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4 Associations Between Glycemia and Cognitive Performance in Adults with Type 1 Diabetes (T1D) using Continuous Glucose Monitoring (CGM) and Ecological Momentary Assessment (EMA)

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Objective: Despite associations between hypoglycemia and cognitive performance using cross-sectional and experimental methods (e.g., Insulin clamp studies), few studies have evaluated this relationship in a naturalistic setting. This pilot study utilizes an EMA study design in adults with T1D to examine the impact of hypoglycemia and hyperglycemia, measured using CGM, on cognitive performance, measured via ambulatory assessment.

Participants and Methods: Twenty adults with T1D (mean age 38.9 years, range 26-67; 55% female; 55% bachelor's degree or higher; mean HbA1c = 8.3%, range 5.4% - 12.5%), were recruited from the Joslin Diabetes Center at SUNY Upstate Medical University. A blinded Dexcom G6 CGM was worn during everyday activities while completing 3-6 daily EMAs using personal smartphones. EMAs were delivered between 9 am and 9 pm, for 15 days. EMAs included 3 brief cognitive tests developed by testmybrain.org and validated for brief mobile administration (Gradual Onset CPT d-prime, Digit Symbol Matching median reaction time, Multiple Object Tracking percent accuracy) and self-reported momentary negative affect. Day-level average scores were calculated for the cognitive and negative affect measures. Hypoglycemia and hyperglycemia were defined as the percentage of time spent with a sensor glucose value <70 mg/dL or > 180 mg/dL, respectively. Daytime (8 am to 9 pm) and nighttime (9 pm to 8 am) glycemic excursions were calculated separately. Multilevel models estimated the between- and within-person association between the night prior to, or the same day, time spent in hypoglycemia or hyperglycemia and cognitive performance (each cognitive test was modeled separately). To evaluate the effect of between-person differences, person-level variables were calculated as the mean across the study and grand-mean centered. To evaluate the effect of within-person fluctuations, day-level variables were calculated as deviations from these person-level means.
Results: Within-person fluctuations in nighttime hypoglycemia were associated with daytime processing speed. Specifically, participants who spent a higher percentage of time in hypoglycemia than their average percentage the night prior to assessment performed slower than their average performance on the processing speed test (Digit Symbol Matching median reaction time, b = 94.16, p = 0.042), while same day variation in hypoglycemia was not associated with variation in Digit Symbol Matching performance. This association remained significant (b = 97.46, p = 0.037) after controlling for within-person and between-person effects of negative affect. There were no significant within-person associations between time spent in hyperglycemia and Digit Symbol Matching, nor day/night hypoglycemia or hyperglycemia and Gradual Onset CPT or Multiple Object Tracking.

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Conclusions: Our findings from this EMA study suggest that when individuals with T1D experience more time in hypoglycemia at night (compared to their average), they have slower processing speed the following day, while same day hypoglycemia and hyperglycemia does not similarly impact processing speed performance. These results showcase the power of intensive longitudinal designs using ambulatory cognitive assessment to uncover novel determinants of cognitive variation in real world settings that have direct clinical applications for optimizing cognitive performance. Future research with larger samples is needed to replicate these findings.

Categories: Cognitive Neuroscience
Keyword 1: ecological validity
Keyword 2: cognitive functioning
Keyword 3: diabetes
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5 Examining the Cognitive, Vascular, and Lifestyle Profiles of Older Adults with Late-Onset Epilepsy

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Objective: Older adults represent the fastest-growing population of individuals with epilepsy with an incidence that peaks after age 65. Patients with late-onset epilepsy (LOE) have a multitude of risk factors for accelerated cognitive and brain aging, including vascular and metabolic risk factors. Despite this, there are few studies investigating the cognitive profiles of older adults with LOE, a neglected area in aging research. We examine the cognitive profiles of older adults with LOE and determine the contribution of demographic and vascular risk factors to impairment.
Participants and Methods: Participants were part of the Atherosclerosis Risk in Communities Study (ARIC) and the incidence of epilepsy was identified using ARIC hospitalization records and Centers for Medicare and Medicaid Services claims data from 1991 to 2015. Approximately 1.8% of the participants with sufficient Medicare coverage data were classified as having LOE (LOE n=281; Non-LOE n=9808). Vascular, lifestyle, and cognitive data were obtained from the ARIC Neurocognitive Study (ARIC-NCS) which consisted of three visits since 2011. Participants with ARIC-NCS visits completed after the onset of seizures were included in the final sample. Non-LOE participants with normal cognition (Black: n=603 and White: n=2543 participants independently) were used to generate z-scores across tests of language, memory, executive function, and processing speed/attention. Impairment was defined as <1.5 standard deviations below the mean of the normative sample. Stepwise regressions were conducted to examine the contribution of demographic (age, race, sex, education) and vascular risk factors (hypertension, diabetes, hyperlipidemia, obesity, smoking) to cognitive performance.
Results: Average age of first seizure of all LOE participants (n=281) was 76.23 (SD=6.24), 55.9% female, 30.7% Black/African American, and the majority had either a college (28.1%) or high school degree (26%). Fifty-six LOE participants had ARIC-NCS visits after the onset of seizures (average age=79.84, SD=5.17, 57.1% female, 32.1% Black). Approximately 67.9% of the sample had at least one vascular risk factor with 81.5% having hypertension, 37% diabetes, 26.4% hyperlipidemia, 20.4% obesity (BMI>30), and 4.5% current smoker. The most frequently impaired domains were language (naming=29.7%; animal fluency=20%; letter fluency=30%) and memory (prose immediate recall=18.4%; prose delayed recall=44.7%; word delayed recall=19.4%). Higher education was associated with better naming (b=0.801, p=0.040). Female sex (b=-0.799, p=0.017) and lower education levels (b=0.418, p=0.050) were associated with poorer immediate prose recall. Older age was associated with poorer delayed prose recall (b=-0.191, p=0.036). Hypertension was associated with worse digit span backward (b=-0.942, p=0.002).
Conclusions: In older adults with LOE, language and memory were the most commonly impaired cognitive domains, similar to studies in early onset epilepsy. Vascular risk factors were prevalent among LOE and hypertension was associated with worse working memory. Further, important demographic factors (sex, education, and age) were associated with the extent of cognitive impairment. Characterizing cognitive profiles in LOE and determining the contribution

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