complexity and remaining closer to a near-random structure. The school environment is strategic for the early identification of risk. A closer look at cognitive development using computational assessments in naturalistic school settings can enable early interventions to mitigate cognitive damages.

24.4 MOVING SPEECH TECHNOLOGY METHODS OUT OF THE LABORATORY: PRACTICAL CHALLENGES AND CLINICAL TRANSLATION OPPORTUNITIES FOR PSYCHIATRY

Terje Holmlund1, Peter W. Foltz2, Alex S. Cohen3, Jian Cheng4, Jared Bernstein4, Elizabeth Rosenfeld4, Brita Elvevåg5

1University of Tromso, Norway; 2University of Colorado, Pearson PLC; 3Louisiana State University; 4Analytic Measures Inc.; 5University of Tromso, Norwegian Centre for eHealth Research, University Hospital of North Norway

**Background:** Psychiatric patients, such as those suffering from depression or schizophrenia, often need to be monitored with frequent clinical interviews by trained professionals so as to avoid costly emergency care and unfortunate events (e.g., suicide attempts). Technological advances in the form of smart devices offer a mobile platform through which to provide the effective and affordable monitoring of clinical events. Novel speech technologies offer promise of increased efficiency, sensitivity and objectivity by the implementation of automatic speech recognition and natural language processing methods to facilitate in the tracking of the clinical state of psychiatric outpatients longitudinally and, when appropriate, alerting clinical staff to contact that patient. However, thus far most research that has leveraged such technology has been conducted within controlled laboratory or clinical environments, and as such it remains unknown how robust such methods would be when the data collection is in uncontrolled settings and controlled by the participants themselves. Yet if these methods are to truly have clinical translation value then they must be demonstrated to be user-engineered to nurture participation and to be tolerated by participants despite frequent use, and that the resulting behavioral responses - notably voice - that are collected in uncontrolled settings remain interpretable by speech recognition and natural language processing methods.

**Methods:** We developed a mobile tool that enabled participants to remotely self-administer daily interactions through a smart device. The application engaged participants in spoken and touch-based interactions to assess cognition, motor skill, and language. The speech samples were analyzed using recent technological advances in speech and language processing to recognize both the content and patterns in the speech. Our study was conducted in both the United States and in Norway, and thus occurred within different languages as well as cultural and legal settings. A total of 353 participants used the software application over three data collection trials. Of these, 219 were healthy volunteers and 134 were patients with a range of diagnoses of psychosis spectrum disorders, substance abuse disorders, and affective disorders.

**Results:** This talk will explore our experience of leveraging technological advances to move assessment of cognition, motor skill, and language out of the controlled laboratory and into real-world settings. We will discuss the necessity of excellent usability engineering, and the complex data security issues that arise with speech specifically, especially when data collection and analysis can - either intentionally or unintentionally - cross international borders. We will also illustrate the challenges of creating a clinically useful analytic framework for the numerous channels of data that now have the added temporal dimension.

**Conclusions:** In sum, although new technological frameworks - that leverage speech technology and natural language processing methods - provide unprecedented opportunities for remotely monitoring behavior, the challenge of creating a useful analytic framework for clinical purposes remains.

25. ACCELERATED AGING IN SCHIZOPHRENIA

Julia Sheffield

Vanderbilt University Medical Center

Decades of research have demonstrated evidence of premature mortality and increased physical comorbidity in patients with schizophrenia. This research provides support for the hypothesis that schizophrenia is a syndrome of accelerated aging, indicating patients’ vulnerability to experiencing normative aging processes earlier and/or at a more accelerated rate. This symposium presents three distinct approaches to testing the hypothesis of accelerating aging in schizophrenia, spanning biological systems, and exploring the impact of genetic burden and duration of illness on the subsequent findings. Dr. Nenadic will start early in the disease-process, focusing on patients at ultra-high risk for schizophrenia. Using machine-learning, Dr. Nenadic will demonstrate the impact of genetic liability on brain volume trajectories that are known to diverge in schizophrenia, resulting in altered morphometry. Dr. Sheffield will examine the integrity of resting-state functional connectivity networks that support higher-order cognitive ability and are known to exhibit reduced efficiency over the course of healthy aging. This research demonstrates a group by age interaction specific to these cognitive networks, and compares network efficiency in early and chronic psychosis, finding evidence of accelerated efficiency decline over the course of illness. Dr. Czepielwski will further emphasize the role of disease burden in accelerated aging by presenting evidence of shorter telomere length and increased pro-inflammatory marker CCL11 in patients with schizophrenia. These biomarkers are further associated with gray matter volume, memory performance, and duration of illness, elegantly combining multiple age-related systems in a single study. Finally, Dr. Kirkpatrick, a pioneer in the field whose 2007 article, “Is Schizophrenia a Syndrome of Accelerated Aging?”, was the first to outline research on this topic, will present on the current state of the field. He will further advocate for the future of accelerated aging research as one grounded in mechanistic pathways of aging. Topics from all four presentations will be synthesized by Dr. Eyler, an expert on the impact of aging on cognitive and biological processes in the context of schizophrenia, allowing for a discussion of current and future approaches to adjudicating the accelerated aging hypothesis in schizophrenia.

25.1 FUTURE RESEARCH ON ACCELERATED AGING IN SCHIZOPHRENIA AND RELATED DISORDERS

Brian Kirkpatrick1

1University of Nevada School of Medicine

**Background:** The hypothesis that people with schizophrenia and related disorders have accelerated aging has become a common topic of investigation.

**Methods:** A selective survey of studies of accelerated aging in schizophrenia will be presented, with an emphasis on future directions.

**Results:** A number of studies of accelerated aging in schizophrenia and related disorders have examined brain structure, metabolism, cognitive measures, or inflammation. Problems with matching and confounding undermine confidence in the validity of many of the findings. Other than inflammation and metabolic abnormalities, the mechanistic pathways of aging have received relatively little attention: epigenetic abnormalities, proteostasis, adult stem cell function, adaptation to stress, and macromolecular damage.

**Conclusions:** Study of the “neglected” mechanistic pathways of aging would be of considerable benefit for understanding the increased mortality found in people with schizophrenia and related disorders.