OFFICIAL ABSTRACT and CERTIFICATION

Volumetric Measurements Provide a Differential Diagnosis of Schizophrenia from Related Disorders

Sanjana Ahmed

W. Tresper Clarke High School, East Meadow, NY, United States

There is a pertinent problem of misdiagnosing patients with psychotic disorders, specifically pediatric patients; due to their age, it can be difficult to differentiate between a child having an overactive imagination and a child suffering from hallucinations as a result of a psychotic disorder. While the physical attributes of the patient ' s brain and family history can indicate a possible disorder, neither can be used to definitively determine if a person suffers from a specific disorder. However, by utilizing both variables, a diagnosis can be more reliable with an increase in criterion being analyzed.

The hypothesis was that various volumetric brain measurements can be utilized as a reliable differential diagnostic tool in pediatric patients with schizophrenia from related disorders. By running segmentation of the T1-weighted magnetic resonance imaging (MRI) images of three pediatric subject groups (schizophrenic, family history of bipolar disorder, and family history of psychosis) through a three-dimensional segmentation software (CAT12), five different volumetric measurements per subject were produced: gray matter volume, white matter volume, global cortical thickness, cerebrospinal fluid, and total-intracranial volume. Individual t-tests were conducted to compare each variable of each disorder group, followed by a full factorial and receiver operating characteristic (ROC) analysis using the same data. These analyses indicated trends of strong deviations from normal when compared amongst all groups and the yielded AUC scores ranging from 0.92 to 0.97 per subject group. These findings show that volumetric measurements can accurately offer a differential diagnosis of schizophrenia from related disorders.

Category
Pick one only—
mark an "X" in
box at right

- Animal Sciences ☐
- Behavioral and Social Science ☑
- Biochemistry ☐
- Cellular & Molecular Biology ☐
- Chemistry ☐
- Computer Science ☐
- Earth Science ☐
- Eng: Electrical & Mechanical ☐
- Eng: Materials & Bioengineering ☐
- Energy & Transportation ☐
- Environmental Management ☐
- Environmental Sciences ☐
- Mathematical Sciences ☐
- Medicine and Health ☐
- Microbiology ☐
- Plant Sciences ☐
- Physics and Astronomy ☐

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

   ☐ human subjects ☐ potentially hazardous biological agents
   ☐ vertebrate animals ☐ microorganisms ☐ rDNA ☐ tissue

2. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only — ☒ Yes ☐ No

3. I/we worked or used equipment in a regulated research institution or industrial setting: — ☒ Yes ☐ No

4. This project is a continuation of previous research. — ☐ Yes ☒ No

5. My display board includes non-published photographs/visual depictions of humans (other than myself): — ☐ Yes ☒ No

6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work. — ☒ Yes ☐ No

This stamp or embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Scientific Review Committee.