

**Nature of Science and Math: Analyzing the Presence in Everyday
Communication
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“Scientists Move Closer to Understanding Schizophrenia’s Cause” by Benedict Carey (2016), summarizes a new study founded by Steven McCarroll and Beth Stevens on the reasoning behind developing schizophrenia. The article mentions several former studies on the same topic. This new development is an addition to the previous studies.

Scientific Knowledge is Based on Empirical Evidence

Although there are a lot of unknowns, “Scientists Move Closer to Understanding Schizophrenia’s Cause,” does base the study findings on empirical evidence. Previous observations and studies were taken into consideration and then more research was completed. Carey stated, “The researchers pieced together the steps by which genes can increase a person’s risk of developing schizophrenia.” Previous to McCarroll and Stevens’ study, the conclusions were made that the cause of schizophrenia is located in the prefrontal cortex and that schizophrenia is related to synaptic pruning. McCarroll and Stevens took those observations and studied them further and concluded that there were four different variants within the MHC locus. The team used mice to try different theories and amounts of one of those variants-C4. Ultimately, this empirical evidence led them to their conclusion that schizophrenia is related to the amount of C4 in a person’s body.

Scientific Knowledge is Open to Revision in Light of New Evidence

Before McCarroll and Stevens completed their study on the cause of schizophrenia, other researchers had made observations and conclusions

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such as the placement in the brain of schizophrenia and that synaptic pruning had some sort of involvement with the development of the psychiatric disorder. McCarroll and Stevens used these observations and revised them after further researching the responsible genes. In the article, Carey reports, “People with schizophrenia have a gene variant that apparently facilitates aggressive “tagging” of connections for pruning, in effect accelerating the process.” By determining the correct genome, genes, and proteins produced by those genes, they were able to add to previous findings with new evidence. They admit that a lot more research and work needs to be done before producing a drug to reduce cases of schizophrenia, which means these findings will be revised again in the future when new evidence is found.

Science is a Way of Knowing

Science is always a way of knowing. In this case, scientists and researchers are trying to find a way to create a drug to slow pruning in people affected with schizophrenia. In order for that to happen, we (humans), have to find out as much as we can about the direct cause of schizophrenia in some people and not in others. Without “knowing” the direct cause, we will never “know” or create an effective medication. This study was done intentionally to discover new information with the end goal of “knowing” more about this disorder.

Makes Sense of Problems and Persevere in Solving Them

According to “Standards for mathematical practice” (2019), a person who is proficient in math will “...make connections about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt.” McCarroll and Steven’s study about schizophrenia seems to be in the pathway stages. The end goal of the study

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was to ultimately find a medication to slow pruning in schizophrenic patients, but by the end of the study, they knew they did not have enough data to produce such medications. In the article “Scientists Move Closer to Understanding Schizophrenia’s Cause,” Carey states:

“If the new study shows anything, it is that synaptic pruning is a delicate exquisitely timed process, and that it is still poorly understood. The team does not yet know, for example, why C4-A leads to a different rate or kind of pruning than C4-B. Any medication that tampered with that system would be a risky proposition.”

These researchers have made many connections and observations to form their conclusion, but know they are not ready to produce their solution, but rather, have started a solution plan and pathway.

Model with Mathematics

When McCarroll and Stevens reached a place in their research where they were focusing only on one location of human genome, the MHC, the researchers incorporated a visual. They created a bar graph to help display the research more clearly (Carey, 2019). This bar graph revealed obvious results about the quantitative data, “On a bar graph -called a Manhattan plot because it looks like a cluster of skyscrapers- the MHC looms highest” (Carey, 2019). This representation of the human genome, made the findings of this study more evident to not only the researchers themselves, but also to their readers/audience.

Construct Viable Arguments and Critique the Reasoning of Others

McCarroll and Stevens took previous conjectures and tried to make more in depth sense of them. While constructing their own conclusion (argument), they still considered the research that was previously done, which is what mathematically proficient people do according to “Standards

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for mathematical practice” (2019), “They make conjectures and build a logical progression of statements to explore the truth of their conjectures.” A concrete example would be that during their study, McCarroll and Stevens took into consideration the following prior research, “That property had given rise to speculation that schizophrenia might be a kind of autoimmune condition, in which the body attacked its own cells” (Carey, 2019). However, they found different results in their research. Therefore, they did construct a viable argument while critiquing the reasoning of others.

References:

Carey, Benedict. (January 27, 2016). Scientists Move Closer to Understanding Schizophrenia’s Cause [New York Times]. Retrieved from <https://www.nytimes.com/2016/01/28/health/schizophrenia-cause-synaptic-pruning-brain-psychiatry.html>

Standards for mathematical practice. (2019). Common Core State Standards Initiative [website]. Retrieved from <http://www.corestandards.org/Math/Practice/>