San Juan College High School

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Area of Science: Artificial Intelligence and Psychology

Title: Intelligence VS Cognition

I. Basic Outline

Our problem is figuring out if different amounts of certain traits (i.e. intelligence, cognition, communication) will trigger different reactions in the fight or flight response. Our hope is to figure out if certain mindsets will create certain responses, and to use that to predict responses to future events.

We made our program using NetLogo. We thought this would be the best program to use due to its simple user interface and easy to learn code. We made a puzzle with different pieces that represented different traits and skills. The plan is to have the pieces arrange themselves into different categories in a set time period. If it solves the puzzle within that time period, it created a fight response. If it runs out of time, it created a flight response.

II. Executive Summary

Often, people with high intelligence are thought to have high cognition, and vice versa. Much psychological research says otherwise. Dr. Winston Sieck states that "…whatever it is that intelligence tests actually get at, they do not measure the extent of a person's cognitive bias or rationality" (Sieck, 2017). Will having a high amount of cognition but a low amount of intelligence allow a test subject respond differently than a person with high intelligence but low cognition?

We will use a simulation with a simple AI system to solve our problem. Using different amounts of cognition and intelligence in definite amounts, we will create a puzzle for the AI to solve. The response the AI chooses depends on how long it takes it to solve the puzzle.

III. What is our project?

As time passes and death rates rise, scientists have wondered whether there is something causing this besides physical aspects. Many scientists have turned to psychology and human behavior. While we need to be physically strong, our stimuli need to be able to respond in a way that will keep us alive. Our reaction to these situations could result in the "Fight-or-Flight" response, which is the physiological "response… [that] helps someone to fight the threat off or flee to safety" (Harvard, 2016). This response could ultimately keep people alive in the face of danger (Cherry, 2017).

Fight or Flight is our body's natural response to danger. If we face any situation where we feel threatened or a rush of adrenaline, our body produces a stimulus in hopes of keeping us alive. This situation could be something physical or psychological (Cherry, 2017). The purpose of this project is to see if the way we think and out attributes affect our body's response to a threat. Using different ratios of Intelligence and Cognition as our variables, we will see how the different combinations provide different mindsets. These mindsets will be created using an AI puzzle and solved in a limited amount of time. This project could be useful to help scientists find out if people who think a certain way have a higher rate a specific response (fight, flight). It was hypothesized that a person with a higher cognition with any level of intelligence is more likely to fight than a person with high intelligence and no cognition.

IV. Methodology And Obstacles

Due to the fact that this is Supercomputing Challenge, all that we need to actually experiment is a supercomputer. Along with that, we have used many resources to research how the Fight or Flight response works, as well as the major differences between a person's IQ and their problem-solving skills.

As for our methods, we are using NetLogo. We meant to use StarLogo, but changed accidently and decided to stick with it. StarLogo is a block based program, making it very simple to use. However, it is web based and with simple code comes simple problems. As our problem and plan to solve it is extremely complex, we needed something that could hopefully store our code and data, whilst still being functional. NetLogo seemed to be able to hold more information while still being a simple code and being an easy concept to grasp (turtles and patches). We made our puzzle and pieces, though we stumbled upon many struggles. We started with too many variables, though we were able to decrease and focus upon a few precise ones. We worked together to get our code, and got it up and functioning. It was functioning, but not functioning the way we wanted it to. By late March, in which one of our group members, the head coder, became ill, we realized that NetLogo was unable of processing the amount of information. We created a puzzle that could be solved, but the AI could simply not solve it in the way that we had expected.

V. Discussion of Results

After finishing this project, we reject our hypothesis. We hypothesized that higher amounts of so called cognition would cause the fight response to occur. However, we have noticed that there is no noticeable correlation between the specified traits and the

occurring reactions. This shows that either a) intelligence and cognition do not affect the reactions in the fight or flight response or b) our code was too complex to obtain adequate results.

VI. Conclusion

After completing this project, we reject our hypothesis. We have found that there is no correlation between the specified traits and the reactions of the fight or flight response. If we were to do this project again, we would reduce the amount of variables and use a more capable program such as C++. If I decide to continue to build off of this program and use it in next year's competition, I would transfer it into a language and change the variables into something much more measurable. I would also consider using predesigned mindsets that occur as a result of specific mutations and disabilities (i.e. Asperger's, Down Syndrome).

VII. Personal Statement

I am most proud of myself for learning how to do research in the first place and find a way to apply it to something in real life. I am also proud to have completed this project (or at least this first step with it) and have been able to be introduced into the world of technology, supercomputing, and science.

VIII. Acknowledgments

I would like to thank my sponsor, Dena Burgert, for all the help she has offered us and for helping us stay on top of things.

I would like to thank Brendon Johnson, Cameron Collyer, Johndenmyr Mendoza, and Samantha Sanchez for always checking in on me and giving me the motivation to finish this project when I wanted to quit. This could have never been completed if it wasn't for your support.

I devote a huge amount of thanks to my fantastic co-worker and peer, Alex Hamilton, for all that he has done for this project. Not only has he had to deal with the stress of pure Supercomputing Challenge, he has had to deal with my constant breakdowns (and try to mentor me during those horrific tantrums). Thank you, Alex. Your work and help in this project could not be more deeply appreciated.

I would like to thank my parents for supporting me through this project, for being there when I stayed up until 11 o'clock at night working on it.

And, last but nowhere close to least, I would like to express my deepest gratitude to Brevan Romaro. Even with his chaotic schedule, he was able to help me brainstorm and shoot ideas at me until I finally knew what project was right for me. Thank you. This project would not exist without you.