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**"Reliable knowledge can lack certainty," Explore this claim with reference to two of your IB subjects. You must justify your claims and counterclaims with examples. (Word count: 700-900)**

Reliable knowledge can lack certainty, as well as deficit a lack of certainty. The concept of understanding can be generalized to a spectrum of certainty and uncertainty. Uncertainty inherently comes along with reliable knowledge in many cases. Reliability in itself doesn't point to the connotation of factual but speaks to the idea that there is a consensus of understanding surrounding it. Using two IB classes as examples consider computer science. As most areas of this topic were developed from the ground up by humans and human logic, there isn't a done of real room for questioning the reliability of it. It's such a new technology that all the questions raised around it can be immediately answered and in general, there is a lack of naivety surrounding the subject. Computer science is interesting in the way that it transcends the bounds of what is considered to be an actual "science." This in itself sparks the idea of what is reliable knowledge and how even deciphering the name of a subject can involve critical thinking processes. Computer science has a profound sense of reliability as it was fabricated through induction and building as a medium of communicating with computers. In seeing an example of a simple "Hello world," it is seen that there is absolutely no way to prove it wrong as it purely exists in itself. No greater or less than what it is presented as. If understood properly there is no way to falsify the facts presented by it. In this way, computer science does not lack certainty in any form. At the opposite end of the

spectrum of certainty and uncertainty is psychology. Psychology is an IB class that instigates many opinions on whether or not it is a science and if there is even any reliability in the subject itself. It's hard as in the study of psychology there is so much theoretical and unseen information. In modeling the stores of memory, which are depictions of the cognitive processes that allow for the transformation of stimuli to memory there have been inferences made on what diagrams represent this the best. The multi-store model is the more general but foundational way of showing how external stimuli have the potential to transform into long-term memory. This sparks an interesting question as there is no way to physically see these stores of memory and it can only be hypothesized that they exist through experimentation. This method of deduction allows for the support of a theory but no full understanding of the subject matter which is why psychology lies on the more unreliable side of the uncertainty spectrum. Through the studies of things such as cold, hard, factual computer science, and perhaps a more deductive subject such as the cognitive studies in psychology, it is clear that in all the reliability of knowledge can be imagined as a spectrum, with different areas of study at different points on it.

Computer science is a medium of technology that was developed from the ground up by humans. This fact in itself adds a substantial amount of certainty to the subject. People consider computer science to be a subfield of mathematics. As mathematics is yet another study that has been developed purely by humans it's deemed as one of the rare things that can be described as objectively true. In simpler terms, there is no proving that  $1+1 = 2$  is wrong as these axioms and assumptions were initially developed in a theoretical sense. Induction often comes with a sense of certainty as you are developing

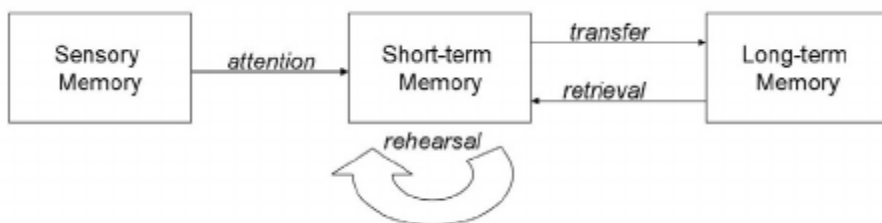
a full idea with little room for holes or misunderstanding. This use of induction allows us to understand that in the medium of computer science there is no real questioning at a foundational level. Yes, there may be questions about how to create things but in a general sense, there is absolutely no way to disprove the nature of computer science as it was created through induction. Take the example of the “Hello world,” program. Besides being a sort of tradition that coders take part in while learning a new language, simply printing the words hello world, also gives one of the purest and basic programs ever.

```
1  <!DOCTYPE html>
2  <html>
3  |   <body>
4  |   |   Hello world
5  |   </body>
6  </html>
```

There is no way to disprove this code or rewrite it as it follows to constraints of the given language it was written in. There isn't a way to change it or write the program differently as it will not yield the same results. When

writing the hello world code one must follow the basic syntax (grammatical rules of the given code) for it to output properly. If the rules are not followed, the code will not be executed. Simple as that. No room for error allows no room for uncertainty if the concept is fully understood which allows for a sense of beauty. This area of study doesn't lack certainty in the sense that if you understand it to an extent and grasp the different rules, there is no limitation or extraneous variables that can affect the code you are writing. As computer science was developed through the use of induction, it is near impossible to disprove the rules and constraints that it sets up.

Besides the biological aspect, psychology is purely based on theories and assumptions about how cognition works. There is absolutely no way to dissect a brain and be presented with an image of the multi-store model or the working memory model but rather rely on reliability itself to develop these depictions of how human thinking works. Throughout understanding how psychology works it is evident that to formulate these understandings about how cognition works you must experiment on individuals through studies to come to a consensus. After this consensus is reached then can you take a step back and understand the psychological process. This conclusion that you have come to in a way is the reverse of the process of computer science. In computer science, you start with a specific set of rules and instructions that are cold hard facts. Then you can use this toolset to your heart's content to build ideas and to relate things to psychology even such things as artificial intelligence and emotion. You start with the background and then use it to build something through using induction. In psychology, you must use deduction to obtain information and use small bits to formulate a whole idea. Deduction often comes along with uncertainty which is why it becomes so tedious to study areas that were developed through it. The study of patient HM was a groundbreaking experiment that allowed psychologists to support the hypothesis that



memory can be divided into different stores. In seeing how after an accident he was able to retain some long-term

memories but not form new short-term ones, it was clear that the processes of memory can be seen as different sections. This was significant as it supported a hypothesis that

was developed through induction. Take note of the word supported as no theory such as this can be proven but merely supported with evidence. There is absolutely no way to see or interact with the different stores of memory in our current position with modern technology. Through making educated inferences to build a hypothesis and study it, psychologists can get closer to understanding processes of memory. These studies are reliable in the way that they support hypotheses using evidence yet they still lack much certainty which is why they are still being studied. Psychology is a prime example of reliable knowledge lacking certainty as there is a solid foundation of evidence in the field however, no amount of research will give experts one hundred percent understanding of the subject matter and that is just something that comes along with areas of study that involve deduction.

The reliability of subjects is heavily varied based on whether concepts were developed through induction or deduction. It is evident through the two examples of computer science and cognitive psychology that reliability is heavily varied. While there is a substantial amount of evidence to support models of memory and how they function, there is no amount of dissection to locate these processes within the human brain. It can only be inferred through studies how your memory works as there is no clear roadmap printed into your temporal lobe. Based on the evidence given psychologists make diagrams that contain information inferred from trials to test the properties of the brain. Through the famous study of patient HM, psychologists could establish that memory could be divided into different stores and in analyzing the results of studies done on patient KF, were able to see how specific stores of memory hold even

deeper subsets of functions than thought before. In stark contrast to this is the subject of computer science which was developed from the ground up by humans with means of creating algorithms for computers. Computer science was created using induction with the end goal of creating compute languages to communicate with web servers and build things on the internet. It is beautiful in the way that if fully understood, lacks room for error. There is no disproving computer science as since it was made by humans, most general properties of it are fully understood and in this sense makes it near impossible to disprove therefore lacks and lack of certainty. In understanding how different areas of study come to be it can be deduced that the reliability of knowledge is varied depending on the subject matter and oftentimes, subjects that are developed through inductive reasoning are more understood and grasped than those reasoned by deduction.