Are disputes over knowledge claims within a discipline always resolvable? Answer this question by comparing and contrasting disciplines taken from two AOKs.

Disputes over knowledge claims within disciplines constantly arise as man constantly pushes the boundaries of our knowledge. Disputes arise when facts within the domain are either unexplainable or contradictions exist between propositions. Discussing whether disputes over knowledge claims are always resolvable would shed more light on how to go about addressing future disputes, and important factors to consider when faced with contradictory claims. In this essay, theoretical and practical disputes will be discussed. Theoretical disputes are differing knowledge claims, arrived at using prior theories and unsubstantiated by empirical evidence. Practical disputes refer to contradictions between claims that are formulated from empirical data. 'Resolvable' is the act of dismissing or reconciling conflicting claims. In this essay, the discipline of Physics from the Natural Sciences and the discipline of Psychology from the Human Sciences will be compared and contrasted to justify the perspective that the resolvability of a dispute within a discipline largely depends on the nature of the dispute.

Theoretical disputes may be resolved using evidence obtained through experimentation. The implementation of the scientific method in both disciplines dictates that scientific knowledge claims are testable, which means they can be falsified through empirical evidence. The scientific method is a systematic process in which scientists make use of experimental and empirical data to substantiate their observations and support their hypothesis. [1] This then leads to either the abolishment, strengthening or replacement of an existing theory.

In the area of Physics, the Cassinis claimed that the Earth was a prolate spheroid - a sphere that is elongated at the ends. Whereas Newton deduced that the distance to the Earth's centre was slightly greater at the equator, and therefore, theorised that the Earth was an oblate spheroid- a sphere squashed at its poles and swollen at the equator. This dispute was eventually resolved by the Lapland and Peru geodetic expeditions, where researchers measured the precise

[1] Andersen, H., & Hepburn, 8. (2015, November 13). Scientific Method. Retrieved August 5, 2018, from ht1ps://plato.stanford.cdu/cntrics/scientific-meU1od/#Con

length of one degree latitude at these two locations and eventually proved Newton's model of the Earth to be true.

An example in Psychology, would be the famous Nature vs. Nurture debate. In his 1874 publication of *English Men of Science: Their Nature and Nurture*, Francis Galton argued that intelligence and character traits were hereditary, which is the "nature" argument. In contrast, an earlier theory by John Locke in 1690, stated that humans acquire all or almost all their behavioural traits from environmental influences. This dispute was eventually resolved by the Twin Study, which enabled researchers to quantify the exact degree to which a trait could be attributed to genetic or environmental factors. The experiment found that both genetic and environmental influences were approximately of the same magnitude.

The rigorous nature of the scientific method, ensures that data collected from experimentation can validate, refute and even shed light on new findings. Furthermore, as the epistemological basis of the process is the philosophical view of empiricism, which entails that all knowledge must originate from experiences and the senses[2], only the view which adheres more closely to the observed phenomena is accepted, allowing for the resolution of disputes and the acquisition of knowledge. Discovery of additional empirical data from the Lapland and Peru expeditioners and Twin Study researchers allowed for the disputes in both disciplines to be resolved. In Physics, the Cassini view did not adhere to the new evidence and was rejected. In Psychology, the empirical evidence did not cohere to either view and hence the conflicting claims were integrated into a more coherent theory and understanding of the human mind.

Though personal biases or emotion may come into play, sense-derived knowledge is generally objective and reliable as it follows a logical flow of one premise being true, because a previous premise is true. This ensures that every premise and deduction made is well substantiated with verified facts and truths obtained from experimental results of prior knowledge. In this way, experimental findings render a theory useless by removing its explanatory power. Therefore, in both the natural and human sciences, theoretical disputes are always resolvable using scientific experimentation, as experimentation produces irrefutable proof that can falsify knowledge claims of that time. The increased falsifiability of knowledge claims ultimately brings knowers closer to the truth, which is justified true belief.[3]

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[2] Duignan, B., Quinton, A. M., & Fumerton, R. (2016, July 22). Empiricism. Retrieved August 4, 2018, from https://www.britannica.com/topic/empiricism

[3] Mattey, G. J. (n.d.). Lecture Notes, UC Davis Philosophy 102, Theory of Knowledge: Ancient Epistemology. Retrieved from http://hume.ucdavis.edu/mattey/phi102f03/ancients.html

That being said, as the scientific method is grounded in the empiricist view, it can only be applied to knowledge claims made regarding specific knowledge within the discipline which can be substantiated through physical observations and inferences. On the other hand, knowledge claims that are concerned with the nature of the knowledge itself is unable to be subjected to the scientific method as they cannot always be supported by empirical data.

Practical disputes may arise from differences in interpretation, and this affects the resolvability of the knowledge disputes. Interpretations of the same data may be influenced by prior theoretical knowledge and/ or experiences. Data collection is primarily based on observation, and uses sense perception. Sensory information obtained by the observer during experimentation is processed in the brain, but are often ambiguous, incomplete and discontinuous. According to a theory by Helmholtz, our brains complete this picture using prior knowledge gathered from previous experiences. This problem of completing data interpretation using prior knowledge is worsened when concerning complex stimuli.

Physics, as a discipline under the natural sciences, adheres strictly to the observations of objectively measurable phenomena.[4] This entails that all Physics related knowledge must be consistent with phenomenon in the physical world. However, there are instances in Physics that lead to a dispute being unresolvable. One such instance is contrastive underdetermination. Contrastive underdetermination occurs when there are multiple theories that can support the presented empirical evidence while concurrently not being able to falsify each other.[5] Hence, the dispute over which theory is accurate would remain unresolvable. This is evident when examining the Copenhagen Interpretation versus the Many Worlds Interpretation arising from Feynman's double slit experiment, that aimed to explore the wave-particle duality of a photon. Niels Bohr first claimed that photons sometimes seem like particles and sometimes like waves because our experiments dictate what we see (ie. the nature of photons are dependent on our experiment). Copenhagenists believe that all but one state disappears and the wave function collapses. Conversely, the Many Worlds Interpretation states that the "various measurements

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[4] Natural Science. (2018, July 18). Retrieved August 7, 2018, from https://www.merriam-webster.com/dictionary/natural%20science

[5] Stanford, K. (2017, October 12). Underdetermination of Scientific Theory. Retrieved August 7, 2018, from https://plato.stanford.edu/entries/scientific-underdetermination/#ConUndBacDuh

could cause a split into multiple universes"[6], where there is one universe for each possible outcome of the measurement. Many Worlds Interpretation claims that the wave function never collapses and both the particles involved and the observer are in multiple "worlds" existing in parallel at the same space and time. From Feynman's double slit experiment alone, two directly opposing claims were made. Both interpretations seem to be valid and there is also no evidence to refute either claim. Therefore, the dispute over the differing theories remains unresolved.

In contrast, although the aim of Psychology is to be as objective as possible, it is ultimately dealing with the subjective nature of the human mind. Furthermore, empirical evidence collected in Psychology is unable to establish direct causes for observed phenomena due to the plethora of stimuli that could affect the response from the human brain. This introduces human interpretation, and by extension subjectivity, into the formation of knowledge claims. An experiment conducted by Raphael Silberzahn and Eric L. Uhlmann distinctly shows how human scientists may have multiple interpretations for the same set of data. 29 teams of researchers were provided with the same research question: "Are football referees more likely to give red cards to players with dark skin than to players with light skin?"[7] Each team independently approached the data and question with different analytical techniques and hypotheses. 20 out of the 29 teams concluded a "significant correlation between skin colour and red cards"[8], but the extent of correlation varied greatly, from a non-significant to strong tendency. Although it may seem like this dispute was unresolved, it actually gave researchers a more nuanced view on the research question. Silberzahn and Uhlmann found that "any single team's results are strongly influenced by subjective choices during the analysis phase"[9] as

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[6] The Many World Interpretation or the Copenhagen Interpretation. (2014, July 14). Retrieved May 5, 2018, from https://futurism.com/the-many-world-interpretation-or-the-copenhagen-interpretation/

[7] Silberzahn, R., & Uhlmann, E. L. (2015, October 7). Crowdsourced research: Many hands make tight work. Retrieved May 6, 2018, from https://www.nature.com/news/crowdsourced-research-many-hands-make-tight-work-1.18508

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processing of experimental results are more susceptible to bias due to the involvement of humans. Therefore, practical disputes in the human sciences that arise from differences in interpretation may not be resolvable, but if the many researchers can come to a group consensus, not only will the dispute be resolved, the findings may be better substantiated than before. In the natural sciences, if there is sufficient empirical evidence to support both claims, the dispute will remain unresolved.

In conclusion, whether disputes between knowledge claims are always resolvable or not, largely depends on the nature of the dispute and the nature of the AOK that the dispute falls within. Theoretical disputes can be resolved using scientific evidence obtained through experiments, as it provides irrefutable proof for or against one of the knowledge claims. When practical disputes arise from differences in interpretation, it is more difficult to resolve them in the natural sciences. In physics, this is due to the fallibility of the scientific method in which the empirical evidence is unable to explicitly falsify multiple theories. In psychology, the inherent subjectivity of the discipline makes it vulnerable to differences in interpretation and possible human bias. Hence, it would be easier to resolve disputes over a difference in interpretation in the natural sciences as it only deals with physical phenomena. However, in the human sciences, multiple interpretations may be ultimately beneficial as it provides researchers and the public with a more comprehensive take on the subject matter at hand.

Word Count: 1599 words

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