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Editorial

Why is philosophy important to us? Over time, the specifics of science, technology, art and cultural values change, but the core questions that were being asked three thousand years ago still are intensely relevant and, to a great extent, still intractable. How can we know? How should we live? How should we be governed? It was these questions that the Ancient Greeks struggled to resolve, that we still struggle to resolve today.

As students, we must constantly strive to discern not only the facts, but also to distil from them knowledge and even wisdom. Through my studies this year of the 'ways of knowing', the power of paradigm and the differences between faith and belief, I have seen that many things taken for granted are in fact more questionable than they would appear. In this new Information Age, the ancient problem of knowledge has never been more vital: it is fortunate, then, that as philosophers we can refer back to two and a half thousand years of thought on the matter.

That last point is one of the greatest strengths of philosophy: ideas in philosophy age well. While times have changed, the dialogues of Plato and ideas of Nietzsche, the works of Isocrates and Rousseau, still hold their power. How is it that there are still Marxists when Karl Marx himself is long dead – or Platonists for that matter? It speaks to the power of ideas on the human psyche.

Therefore, I welcome you as readers of the arguments and ideas of Prince Alfred's philosophers. You may just experience a paradigm shift.

Theo Squires

Jason Wright

Year 12

Is the ultimate protection against research error and bias is supposed to come from the way scientists constantly re-test each other's results?

The natural and human sciences have advanced considerably over past centuries as scientific method has become more rigorous and resistant to errors and bias. As a result, significant developments in these sciences have occurred due to this increase in the precision and objectivity of scientific knowledge. One development in scientific method that has improved the quality of scientific knowledge has been the process of scientists 'constantly re-testing each other's results' - which can be interpreted as the combination of re-testing results and the 'peer-review' process. The 'peer-review' process is defined as the evaluation of scientific, academic or professional work by others working in the same field[1]. This process has become widely used in the human and natural scientific disciplines, since its initial implementation in the 17th century[2], and is used to guard against research error and bias. However, the assertion that the 'ultimate protection' against error and bias in scientific research is *supposed* to come from constant re-testing and the peer review process is a strong statement. Therefore, in order to evaluate the validity of this statement, the strengths and limitations of the re-testing and peer-review processes will be assessed as well as the knowledge claim that they are the *ultimate* protection against errors and biases in the natural and human sciences.

Firstly, it must be determined to what extent re-testing results and the peer review process protect against error and bias in human and natural sciences. For the purposes of this essay, research error will be defined as the collection of inaccurate/imprecise data resulting in inaccurate/imprecise conclusions and bias defined as the prejudice for or against certain results or interpretations in a non-objective manner. One of the principal benefits of a peer-review process is that it helps to identify unintentional errors in results or conclusions which are overlooked by the author(s) of the work. This is important because it is difficult for the author(s) of a scientific (natural or human) piece to recognize all mistakes or errors present in their work – with the alternate perspective of a peer allowing for previously unknown research errors to be identified. Therefore, a significant benefit of peer-review is protecting against research error that is overlooked from the limited perspective(s) of the original author(s). I have personally experienced this benefit of peer-review numerous times with regard to the proof-reading of my work. It is often the case that I can read a sentence and do not notice an error yet this mistake is easily identified by a teacher or peer. Additionally, the use of the peer-review process will improve scientific knowledge by reducing the effect of expectations and confirmation biases on scientific works. Expectations can cause errors and biases when individuals' are inadvertently biased towards certain results which are expected through prior knowledge or experience. Similarly, scientists may favour certain results because they support their theory or

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[1] Oxford Dictionaries Online, Oxford University Press (2012), [viewed 28/05/2012] available at: http://oxforddictionaries.com/definition/peer%2Breview?q=peer+review
[2] House of Common Selected Committee Report, 'The origins of the scientific journal and the process of peer review' (2004), [viewed 28/05/2012] available at: http://eprints.soton.ac.uk/263105/1/399we23.htm

conjecture – resulting in confirmation bias. The use of the peer-review process may protect against expectations and confirmation biases by allowing other scientists with differing perspectives to assess the work and to hopefully identify if any results were unduly favoured. This is especially important in the human sciences where the use of peer-review may allow a scientist from another culture to review a piece of work – allowing the validity of the work to be considered from a different cultural perspective. In addition to the peer-review process, the re-testing of results can also serve to protect against research errors and biases simply by providing a greater quantity of data for consideration. This greater quantity of data can be essential in reducing random errors and allowing for a more accurate conjecture to be proposed. Overall it appears that peer-review and re-testing are beneficial in both the natural and human sciences, and provide some degree of protection against errors and biases by offering new perspectives, insights and data.

Despite their benefits, the processes of peer-review and re-testing are not without flaws, and in order to determine if they are the *ultimate* protection against errors and biases in sciences, these flaws must be considered carefully. Firstly, it is not assured that the individuals involved in a peer-review process will be from differing cultural-backgrounds. In fact, it is common for scientist's work to be reviewed within their own research institution or by other peers in the same field that are located nearby[3]. Because of this, a diversity of perspectives or culture is often not achieved in the peer-review process and therefore this principal benefit of the peer-review process is forgone. In addition, because the vast majority of scientists (especially in the natural sciences) operate within the same paradigm, the issue of paradigm bias is problematic. This bias usually occurs when established scientists are unfairly biased against new work that undermines current scientific paradigms. This bias can be largely attributed to the fact that established scientists are likely to have considerable investment in current paradigms and do not wish for their work to be proven irrelevant by new 'paradigm-shifting' theories. The effect of paradigm bias can be seen in the case of German logician Gottlob Frege. Frege's *Begriffsschrift* (published in 1879) is currently seen as one of the most important works in the field of mathematical logic, however he was initially criticised in the peer-review process – with his work thought to be of little use by many of his peers at the time[4]. Thus, due to paradigm bias, the peer-review process may bias against works that query or oppose current paradigms – inhibiting the advancement of scientific knowledge. The process of re-testing can also be problematic in the human and natural sciences. In the human sciences, experiments are often conducted on highly complex real-world situations, with numerous variables. As a result, there are usually too many variables to feasibly control and thus re-testing does little to identify or eliminate errors. Moreover, the qualitative nature of results in many human sciences often inhibits the use of re-testing. For instance, a psychological experiment on peoples' opinion of a movie would be so varied and subjective that re-testing wouldn't provide any meaningful improvement. In natural sciences, the act of re-testing the results of a given experiment often only provides protection against random errors – and not systematic errors that are resultant of the experiment's method. In this respect, it is clear that whilst re-testing and peer review offer a degree of protection against significantly flawed work, they may also wrongly protect against revolutionary ideas and fail to protect against error and bias in some cases.

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[3] University of Kent, 2004, 'the peer-review system' [viewed 18/07/2012], available at: http://www.kent.ac.uk/uelt/ced/themes/archive/files/peer-review.pdf
[4] Professor Donald Gillies, 3 March 2011 [viewed 19/07/2012], available at: http://www.publications.parliament.uk/pa/cm201011/cmselect/cmsctech/writev/856/m22.htm

The notion of a single, 'ultimate' protection against research error and bias in the natural and human sciences is a strong claim and so the appropriateness of such a concept must be examined further. Firstly, it should be noted that many immensely important scientific discoveries were made prior to the introduction of the peer-review process into common scientific method. For instance, Sir Isaac Newton's '*(Philosophiæ Naturalis) Principia Mathematica'* was first published in 1687 without the use of a formal peer-review process and is still regarded as "one of the most important works in the history of science"[5]. In this respect, the many high-quality scientific works that were developed without the use of a formal peer-review process (or external re-testing) demonstrate how the act of "constantly testing each other's results" is not always necessary to avoid errors and biases. Furthermore, the fact that scientific knowledge is largely determined through inductive logic (extrapolating a conjecture about a given data set to all cases) means that there cannot be a truly "ultimate" protection against research error – as no matter how much scientific knowledge is peer-reviewed or re-tested, it can always be queried due to its intrinsic reliance on inductive logic. Finally, the notion that scientists are 'supposed' to protect against research error and bias with the single 'ultimate' protection is problematic in itself. This is largely because a single 'ultimate' protection that is used ubiquitously by all scientists is likely to generate its own biases. From the discussion in above paragraphs, it appears likely that if all scientists "constantly re-tested each other's results" that there would be a considerable bias towards current paradigms and the proposal of paradigm-shifting ideas would be repressed.

Overall, the processes of re-testing and peer-review both provide protection against research errors and biases in both the human and natural sciences. However, it is also apparent that re-testing and peer-review both have considerable flaws, which have the potential to perpetuate errors and biases. For these reasons, the idea of these two methods providing an 'ultimate' protection against error and bias is erroneous. This is because ultimately, the success of human and natural sciences has come largely from the *numerous* protections in-built in scientific method (including peer-review and re-testing) – thus providing a broad protection against numerous forms of bias and error. In this regard, it is clear that the ultimate protection against research error and bias in science does not come from a single process, but rather from the culmination of many processes together, and therefore the claim that the "ultimate protection against research error and bias is supposed to come from the way scientists constantly re-test each other's results" is inherently flawed.

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[5] J.M Steele, University of Toronto, *'Reading the Principia'* [viewed 21/07/2012] available at: http://www.cap.ca/brms/Reviews/Reading-Steele.html

Jason Wright

Year 12

Is science the truest form of knowledge?

In modern society science is widely regarded as an accurate and reliable form of knowledge, and information obtained through scientific method is often considered superior to information from other sources. Society's trust in science is predominantly caused by the success of science in the creation of modern technology. Such feats as landing man on the moon, the creation of computers and the internet are all obvious examples of the success and brilliance of science. Because of this, some may view science as being the most accurate, reliable and important source of knowledge – and therefore, the *truest* form of knowledge. However, there are numerous issues pertaining to scientific knowledge and therefore the truth of this knowledge must be considered carefully.

Before the truth of scientific knowledge can be compared with that of other areas of knowledge, the idea of truth must first be defined. The concept of truth is one that depends largely on the specific beliefs of an individual, and thus, does not have a universally accepted definition. However, the most popular definition of truth in the modern era is the Correspondence theory[1]. According to the Correspondence theory, 'a statement is true if it corresponds to fact and therefore to reality'[2]. However, one cannot consider the Correspondence theory to be the only relevant definition of truth. Firstly, the Correspondence theory is inherently biased towards science as an area of knowledge, due to the theory's premise that the accurate perception of reality is truth – the premise on which scientific method is based. Secondly, the Correspondence theory is imperfect as it relies on the assumption that a definite reality exists and that this reality can be perceived accurately by humans. Because everyone perceives reality independently and an individual's perception of reality cannot be verified by another, it cannot be assumed that everyone's perception of reality is analogous. Furthermore, the fact that humans can only experience reality through their own senses means that the actual existence of a reality cannot be verified. This is because in order to verify reality humans would have to experience it from 'outside' of their senses – which is currently impossible. Another criticism of the Correspondence theory is that because language is fundamentally inaccurate and variable, the 'truth' of something that is described can never be as accurate as the 'truth' of something experienced – as in a photograph will always be less accurate than actually experiencing a scene. In this way, there can only exist *degrees* of truth and not definite facts – undermining the idea that a (scientific) statement can correspond to definite facts.

In addition to the Correspondence theory, there are other definitions of truth – such as the Coherence theory which states that something is true if it is 'coherent with one's overall set of beliefs' and the Pragmatic theory which states that something is true if it 'is useful and works in practice'[2]. Firstly, the Coherence theory may be useful as a *negative* test of truth – as in one can determine that something is false by considering its circumstances and concluding that it is inconsistent with a certain belief system. However this idea can very easily lead to complacency, as new ideas often defy old paradigms and require a new system of beliefs. In this way, the Coherence theory is not sufficient in determining truth – as new facts are often incongruent with existing beliefs and fallacies can often be explained logically with a certain belief system even though they are incorrect. For instance, in the

[1]Philpapers, David Bourget, 2010, viewed 14/01/2012
http://philpapers.org/surveys/results.pl?affil=All+respondents&areas0=0&areas_max=1&grain=medium
[2] Theory of Knowledge (for the IB Diploma), Richard van de Lagemaat, Cambridge University press, 2010.

1800s it was thought that there existed a weightless and invisible substance called 'caloric' that flowed from hot objects to cold objects – explaining the transfer of heat. This idea was largely accepted by the scientific community at the time, whilst the mechanical theory of heat (that the vibration of particles is the cause of 'heat') was not accepted until much later due to the scientific community's poor development of the atomic theory. In addition, the Pragmatic theory is also problematic as its definition of truth is often inconsistent and indefinite. For instance, the Pragmatic theory allows multiple (possibly conflicting) beliefs to be true simultaneously. For example, science and religion can both be useful to individuals and can *work in practice* to people who believe in them – therefore both belief systems are true according to the Pragmatic theory. However, it is obvious that science and (most) religion conflict on many fundamental principles and therefore both beliefs cannot be true if the system is to remain consistent. Furthermore, they are many scenarios where a statement can be useful and *not* true as well as statements that are true and *not* useful – the fact that I have Colgate toothpaste is not useful for most people, but that doesn't make it false. Likewise, $\pi = 3.142$ is a useful fact but one that is not *true* (as the number pi is irrational and extends indefinitely). Therefore, the Pragmatic theory is too vague and inconsistent to base the definition of truth upon. Overall, whilst there are multiple possible definitions for truth it is clear that the Correspondence theory is the most logical and consistent theory – thus, it will be the basis for my analysis of the truth of science. However, it should be noted that the Correspondence theory appears to be the most logical definition from my perspective and I have been heavily influence by scientific reasoning due to my education and the era I live in. For this reason, my bias towards science may affect what I reason to be the most logical definition of truth.

Science can be defined as a body of knowledge obtained through systematic use of observation and experimentation. It is this systematic observation and experimentation that forms scientific method - the fundamental principle of science as a form of knowledge. The basis of scientific method is *observation, hypothesis, experimentation, prediction* and then *theory*. The reason why science has been so successful in recent times is that scientific method is so rigorous that inaccurate and fallacious knowledge is identified before theories are presented. Initially, observations are made by a scientist who forms a hypothesis as to the underlying phenomena (although some have debated whether the observation or the idea comes first).The scientist will then devise an experiment that exhibits the underlying phenomena and ensures *controllability*, *measurability* and *repeatability*. The results of the experiment are then analysed and tentative theory is formed that can make predictions – if these predictions are correct and other scientists cannot fault the theory's legitimacy, then an official theory is formed and accepted as scientific knowledge. Unlike other forms of knowledge, scientific knowledge is intensely examined and any claims made by scientists must be repeatable, measureable and able to make predictions. Because of this, (mostly) logical and well-supported theories that are functional in reality are formed and fallacious knowledge is identified and discarded.

Despite the benefit of scientific method and the success it has experience in the modern era, science is not without flaws. It is obvious that observation is a fundamental aspect of scientific method – however, there are numerous problems associated with science's use of observation. One of the main issues with observation is that an individual will always have expectations when making observations. Because of this, people may claim to perceive things that are inaccurate or false because they have a strong expectation of an occurrence or phenomena. In addition, observers may overlook information and events because they have reason to believe they are irrelevant. For instance, if a scientist was measuring the height a ball bounced when dropped from a specific height he may neglect to measure the temperature as he believes it to be irrelevant – when in fact, the temperature could affect the physical properties of the ball. In this way, expectations and relevance are a result of a lack of objectivity in the observer – due to the bias of prior knowledge which may or may not be accurate. As a result, the idea of science being entirely objective in its approach to knowledge is not true in actuality – whilst scientists may attempt to remain objective, the fact that they have any sort of prior knowledge prevents them from being entirely objective. In addition, the observer effect describes how the very act of observation for the purpose of measurement can alter results significantly. For example, when measuring the temperature of a glass of water, the act of placing a thermometer in the

water will alter the temperature of water – rendering the measurements inaccurate. Moreover, science has the central issue of inductive logic, whereby a small set of data in used to describe a far greater set. In the case of science, results from experiments are often used to formulate laws which describe the universe. The problem with inductive logic is that something can never be *proved* through induction as additional evidence opposing a theory could always be found. In this way, it is clear that while scientific method ensures that scientific knowledge is accurate and precise, there are many issues associated with science that prevent its knowledge from being provable and therefore, the *truth*. Science's use of inductive logic is contrasted with mathematics' use of *deductive* logic – which allows mathematicians to prove mathematical theorems to be correct in all cases in accordance with the mathematical axioms. In this way, many argue that mathematics is more absolute (and therefore more truthful) than science as the ability to prove something is vital when considering whether it is in accordance with reality. However, Gödel's incompleteness theorem has shown that no sufficiently complex logical system can be both complete and consistent. In other words: there cannot be a proof for every logically valid statement *and* no contradictions within the axiomatic system of a sufficiently complex logical system. As a result, even in mathematics there exist statements that cannot be proven or statements that create contradictions in logic – demonstrating how flaws exist in every area of knowledge.

In conclusion, science is an area of knowledge that is based on observation, experimentation, logic and rigorous method for the purpose of explaining the universe as accurately as possible. As a result, science has become of vital importance to human civilisation and has been the base of which modern technology is based. However – despite the success of science – the issues of expectation, relevance, confirmation bias and the observer effect are inherently detrimental to science and could only be resolved from the exclusion of humans from all aspects of a theory (which is illogical). Moreover, science's reliance on inductive logic means that no scientific knowledge can be *proved* – rendering science less absolute than mathematics. However, mathematics has always been a part of science and has become a fundamental tool for scientists in the modern era. For this reason, the absoluteness of mathematics could be seen to strengthen science as an area of knowledge as science is heavily depended on mathematics. Therefore, I would consider science's extensive use of reason, perception (to a lesser extent in modern science) and a rigorous method as more likely to lead to an accurate representation of reality than any other form of knowledge (when mathematics is considered an intrinsic aspect of science).

Alex Mansell

Year 12

The Limits Of Enfranchisement: From Ancient Athens To Modern Australia – To What Extent Should Democratic Enfranchisement Be Determined By The Principle Of Equality?

Introduction

The ideal of democracy has dominated a great deal of political thought, especially in the 20th and 21st Centuries, however this idea of 'government by the people' has been in practice for thousands of years, most prominently in Ancient Greece, and especially Athens. The idea of enfranchisement – who should be able to participate in a democratic government – leads to differing methods of determining who should be enfranchised. The question to be examined is thus - *to what Extent should Democratic Enfranchisement be Determined by the Principle of Equality?* In modern society, the basis of democracy is often assumed to be equality; however this is far from the founding principle.

The origins of modern democracy can be seen in Ancient Athens, where large elements of the population were unable to be involved in government and policy-making. Since Ancient Athens, however, there has been a distinct move towards egalitarianism in democracy, most notably in the areas of gender and race. With this ideal of equality being so intertwined with democracy within a modern context, it is important to examine the value of this relation. Furthermore, different methods of enfranchising elements of a population will be examined with the objective of understanding whether this ideal of equality is beneficial for creating a functional democracy. It is important to question this commonly held modern ideal to understand its value, and examine modern democracy and views of enfranchisement to compare this with past ideals.

Terminology

Democracy is generally taken to mean 'rule by the people' – its etymology being Ancient Greek dēmokratía, made up of dēmos (people) and kratia (rule).[1] In the majority of the modern first world, democracy is taken to mean a multi-party government, where all adult citizens are able to vote either for candidates or parties, however this was far from the original understanding of democracy. This is not, of course, merely a change in the meaning of the word, but rather a change in political thought as a whole.

While we cannot necessarily equate democracy with equality, as is clearly evident in its Greek inception, there has since emerged the notion of universal suffrage: the idea of enfranchisement as grounded on equality.

Two entirely different forms of democracy are predominantly evident, defined as direct (or pure) and representative democracies. A direct democracy involves (theoretically) all citizens personally participating in government, and directly voting on policy[1]. This presents clear

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1. Thomas Cronin, *Direct Democracy: The Politics of Initiative, Referendum, and Recall*, Harvard University Press, 1989, page 4

logistical problems when large populations are involved. Contrarily, a representative democracy is that seen in most modern democracies, where the electorate votes for a group of representatives, who then vote on policy in an organised manner.[2] This can be argued to be less democratic, as their representative will inevitably fail to adequately represent the entire electorate for every given issue. Modern political issues, such as the legalisation of gay marriage, for example, have divided not only the population, but entire political parties.

Classical Athens
The democracy that developed in the Ancient Greek city-state of Athens around 508BC is likely not the first democracy,[3] however it is a prime example of a stable and powerful democratic state near the ideal's inception. As such, it will be treated, for analytical purposes, as the ideological starting point of democracy. Greek city-states were in an experimental phase in political thought, and indeed many of their political structures were trials than perceived perfect states. The specific time of Athenian democracy in focus will be that under Eucleides (403 – 402BC), as this is the most documented period.[4]

Enfranchisement in Athens was severely limited, leading to its modern branding as 'undemocratic'. Despite estimates of the population in Athens being up to 300,000 at times, it is estimated that numbers of those entitled to vote – citizens – was only approximately 30,000.[5] Groups who were not able to vote included slaves, freed slaves, children, women, and metics, as well as males who had not participated in the ephebeia.[6] Metics were resident aliens who were not classified as citizens, and had limited rights.[7] The ephebeia was an organisation and process for Greek adolescent males to be trained as soldiers and built into citizens.

Disenfranchisement was also a form of punishment in Athens, through a process known as Atimia. A person was made atimos, literally without honour or value, for crimes such as adultery or not repaying a debt or fine to the state. There was no upper limit to fines imposed by the state, and debt was inheritable in Athens, as was the status of atimos, making this an often debilitating punishment.[8]

Athens was seen as a radical democracy at the time, due to the relatively large proportion of the population who were enfranchised, despite socio-economic boundaries for citizenship. Critics of the Athenian democracy in modern times often cite the limitations of citizenship as undemocratic, however people at the time had the contrary view. The contemporaneous criticism of Athenian democracy as almost 'too democratic' is misleading, and likely does not represent a popular opinion at the time. Rather, authors of this period were necessarily

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2 Michela Redoano, T*he Political Economy of Policy Centralization: Direct Versus Representative Democracy*, University of Warwick, 2001, page 2
3 Kurt Raaflaub, *The Breakthrough of Demokratia in Mid-Fifth-Century Athens*, University of California Press, 2007, page 3
(Raaflaub outlines the fine line between tribalism leading into 'proto-democratic' states seen in pre-Bablyonian Mesopotamia and Egypt long before the explicit democracy in Ancient Athens)
4 Eric Robinson, *Ancient Greek Democracy: Readings and Sources*, Blackwell Publications, 2003, page 7
5 Robin Osborne, *Athens and Athenian Democracy*, Cambridge University Press, 2010, page 9
6 Ibid, page 7
7 Martti Weilo, *Partnership of Citizens and Metics: The Will of Epicurus*, Cambridge University Press, 1999, page 161
8 Kenneth Dover, *Greek Popular Morality in the Time of Plato and Aristotle*, Hackett, 1994, page 17

well educated, and nearly always from an elitist background.[9]Clearly, Athenian enfranchisement was not based on the principle of equality – its limits were otherwise determined.

Modern Australia

The current Commonwealth of Australia is a federal constitutional monarchy under a parliamentary democracy. It exists at federal, state, and local levels, with each subdivision possessing separate responsibilities. The federal government is separated into the House of Representatives and the Senate, in the same way as the British House of Lords and the House of Commons, however the Senate is voted on similarly to the House of Representatives.[10]

Enfranchisement in Australia is similar to that in the United Kingdom, where any citizen of the country who is over the age of eighteen, deemed to be 'of sound mind', and is not in prison for a period of more than three years is eligible to vote.[11] Furthermore, the issue of the right of immigrants has become more of an issue over recent years. Australian Citizenship needs to be acquired by immigrants before they are able to vote. The restrictions of becoming a citizen, as a general rule, are restricted to those who are "permanent residents [...and] are of good character".[12] The judgement of 'good character' is conducted by a basic interview, and essentially is aimed to disallow undesirable people. Thus, the only restrictions on enfranchisement are determined to be age, sanity, migratory status and legal incarceration. Apart from these limits, equality in suffrage is the ostensible priority of the system.

Comparison

The original question of this paper concerns the grounds on which enfranchisement is determined, opening room for debate on the legitimacy of different methods of determining enfranchisement from a philosophical perspective. To begin this, the two democracies described above will be analysed with respect to this question.

In the two aforementioned governments, there exist defined qualifiers that establish who is enfranchised, and thus who is disenfranchised. It seems logical that these qualifiers, or at least some defined qualifiers, must exist for a government to function, regardless of how much this limits the rights of some parties with respect to concerns of equality as prerogative. Democracy being defined as 'rule by the people' implies influence by the people, however surely limiting the enfranchisement of any of 'the people' is contrary to the equal suffrage toward which recent democracy aspires. The following is a critical analysis of a variety of possible methods of determining enfranchisement. The clear transition between Ancient Athens and modern Australia is in the change from elitist enfranchisement in Athens – based on gender, wealth, land, and honour – into the modern system of near-automatic adult enfranchisement. This transition from a democratic basis of the delegation of power and greater power in the upper-middle classes into a foundation of equality associated with the same system has been gradual, and reflects changes in political views.

Parameters of Enfranchisement

9 Loren Samons, What's Wrong With Democracy? From Athenian Practice to American Worship, University of California Press, 2007, page 39
10 John Uhr, Deliberative Democracy in Australia, Cambridge University Press, 1998, page 4
11 Ibid, page 37
12 Ibid, page 7

Enfranchisement based on Age

This ideal of equality gives rise to the issue of children. Traditionally, minors have not been enfranchised due to a combination of their arguable inability to understand politics and the voting process, as well as their dependency on their parents. Many governmental policies directly involve the lives of children, yet these children are unable to vote. A 2011 proposition from the right-wing Fidesz Party in Hungary aimed to give mothers of below-voting-age children extra votes to account for this.[13] Faced with considerable opposition, they were forced to withdraw their proposition; however it raised an interesting point in global politics. "Some 20% of society are children",[14] said József Szájer, a senior Fidesz official and MP, "The interests of these future generations are not represented in decision-making", he continued. American demographer Paul Demeny proposed a system named 'Demeny Voting', in which each parent is given half a vote for each child.[15] Circumventing the disenfranchisement of children by allowing parents to vote as a proxy suggests that the parent will use this extra vote in their child's best interests, however this is not always likely, or even possible. It can be argued, however, that these same parents are incapable of making decisions in their own best interest. It is likely, too, that a three-year-old child, for example, is psychologically incapable of knowing what is best for them. Regardless of the parents' genuine concern for the welfare of their child, they are nevertheless equally unable, because of their inability to anticipate all future governmental developments, to fully represent their interests.

This gives rise to the problem – is anyone capable of deciding what is best for themselves? People consistently fail to understand the wider implications of many decisions, even if these were always predictable. In politics, especially with relation to the creation of policy, the creation and implementation of policy can have widespread effects that most people are simply unqualified to anticipate. In a hypothetically equal democracy, people may have to vote on the contents of a national budget, as is created by the Australian government annually. The majority of people in this state would vote on matters that they do not understand, with the vast majority of the electorate making a decision that they do not understand. This same situation can be applied to parents voting on behalf of their children – parents would be expected to make decisions that they are not qualified to make.

Children were, naturally, not enfranchised in Ancient Athens, nor are they in contemporary Australia, however the issue is still important to examine in relation to the origins of the parameters of enfranchisement. Children traditionally do not possess equal rights with adults, and for many centuries there has been the idea of 'Coming of Age' to define the procession of a person into adulthood.

It can be argued that children not being enfranchised is justified, due to their dependency on their guardians, as well as a high likelihood that they will not fully understand the voting process or the importance of voting. Furthermore, the unique state of children wherein they

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13 Leigh Phillips, "Hungarian mothers may get extra votes for their children in elections", The Guardian, 18 April 2011, pg 1
14 Leigh Phillips, "Hungarian mothers may get extra votes for their children in elections", The Guardian, 18 April 2011, pg 1
15 Stefan Olsson, Children's Suffrage: A Critique of the Importance of Voters' Knowledge for the Well-Being of Democracy, The International Journal of Children's Rights (vol 16), 2008, page 2

will later be given the right to vote, as a product of time, can be used to justify them not being enfranchised as minors. Here is a good example of the principle of equality not being used as the sole qualifier for enfranchisement, and this state being justified. When it can be justified that one party not be enfranchised, it follows that a universal equality is not a necessary step for enfranchisement to take.

Enfranchisement based on Decency

The enfranchisement of prisoners in modern democracies is still an issue of contention. Prisoners in Ireland were enfranchised in 2006, with those in Canada being enfranchised in 2002.[16] From a philosophical perspective, a number of views can be considered. A utilitarian view might suggest that criminals be allowed to vote on the grounds that the inclusion of voting might dissuade criminals from re-offending; however no serious research has been conducted in this area. Many of those supporting felony disenfranchisement reference the idea of the social contract.[17] The social contract is an intellectual construct which suggests that individuals consent to submit to the authority of an elected ruler (and in so doing, surrender some freedoms) in exchange for the protection of their natural rights by the state. Social contract theorists suggest that by breaking this social contract, criminals give up their right to participate in the society. In response to this, one might suggest that surely the removal of the rights guaranteed by the social contract on one side must make the state unable to punish the offender due to the apparent cancellation of the social contract. This, however, results in an impractical situation in the modern world. This mutual cancellation of the social contract is akin to the Centuries-old process of exile, wherein a person was essentially forced to leave the society. The modern equivalent of imprisonment is, instead, a temporary removal of rights and freedoms in response to the 'crime'. This mutual temporary removal of rights suggests that criminals should be unable to vote, however this point is still contentious. Whether these ideas should be set aside in the interests of equality would likely prove inconsequential for the functioning of a society, as the numbers of criminals is a relatively very small portion of the population. Bearing in mind this theory regarding the breaking of a social contract, it can be seen that the enfranchisement of criminals should not be performed, regardless of the aspects of equality that this would lead to.

Enfranchisement based on Sanity

The idea of enfranchising those of 'unsound mind' seems curious in modern society – why would those unable to fully understand reality be able to participate in government? The largest philosophical problem to come out of this involves defining who is of 'unsound mind'. The M'Naghten test for insanity was used in criminal cases during the Nineteenth and Twentieth Centuries, and concluded that a defendant should not be held responsible for his actions if he (i) "did not know that his act would be wrong", or (ii) "did not understand the nature and quality of his actions".[18] This definition limits the meaning of insanity to the situations where criminal punishment is occurring, however. In the United States, those of this situation who are disenfranchised are defined as either "mentally incompetent, mentally incapacitated, or not quiet and peaceable".[19] In reality, a person is generally disenfranchised for this reason due to diagnosis of a known mental disorder that has been determined to lead

16 A History of the Vote in Canada, Chief Electoral Office of Canada, 2007, page 4
17 Alan Brown, Modern Political Philosophy, Penguin Books, 1986, page 97
18 Carl Elliott, The Rules of Insanity: Moral Responsibility and the Mentally Ill Offender, SUNY Press, 1996, page 8
19 Frank Schmalleger, Criminal Justice: A Brief Introduction, Prentice Hall, 2001, page 14

to a lack of understanding of the political process. If a person claims, themselves, to be aware of the voting process and able to vote, this does not necessarily make it so, and those who are unable to communicate that they understand the process can still be entirely aware of it. The widening clarification of mental disorders has made the classification of those who are of 'unsound mind' all the more difficult. A 1992 paper described a proposal to "classify happiness as a psychiatric disorder",[20] due to its discrete cluster of relevant symptoms and association with "a range of cognitive abnormalities". With this in mind, the difficulty in the clarification of sanity and psychiatric disorders has led to a situation wherein enfranchising the 'insane' would necessarily result in enfranchising all those suspected of being insane. The practicality of this is questionable, as some in this category are such that they are incapable of proper communication. Despite this, efforts to enfranchise all but the most intensely afflicted could be made in the interests of equality however these people may, once again, be unable to understand the voting process.

Enfranchisement based on Intelligence and Understanding

Perhaps to ensure a smaller electorate, and thus a simpler direct democracy, a test could be introduced to assess the effectiveness of each citizen to ensure a sufficiently informed electorate for responsible decision-making. Such a test could be open to all prospective voters, from permanent foreign residents to children – thus every possible group would have the potential for enfranchisement, if not the ability to attain it. This seems more democratic in a way, due to the implied potential of enfranchisement for all, but significantly less democratic in that much less of the population would be able to vote. American States such as Virginia and Tennessee had literacy tests to determine enfranchisement up until as late as 1964.[21] Laws against literacy tests for this reason were made in the interests of equality. Another significant issue lies in the content of such a test. A definitive list of questions can scarcely decide a person's understanding of the voting process. Such a society of a minority privileged over all others is certainly not a new theme in modern society, rather a standard. It is conceivable, even, that such a society would run better than a society led by the relatively incompetent. This is a clear argument against the principle of equality as a basis for enfranchisement.

Enfranchisement based on Socio-Economic Status

The Athenian statesman Solon laid many of the foundations for the democracy in Athens, creating a very limited democracy. In his state, the electorate was divided into four different classes determined by a combination of economic wealth and military status to ensure graduating honour between the classes. The upper class was known as the Pentacosiomedimni, defined as those whose property or estate "could produce 500 bushels of wet or dry goods per year" and those judged capable of being a military leader.[22] In other words, those who were involved in politics had to have wealth such that they did not personally have to work, and honour such that they were politically minded. This was the only class eligible to participate in any of the councils or upper levels of government. This system was elitist, but also had a clear pragmatic rationale. Solon proposed that only those of

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20 Richard Bentall, *A Proposal to Classify Happiness as a Psychiatric Disorder*, Journal of Medical Ethics, June 1992, page 94
21. Daniel Goldman, *Modern-Day Literacy Test: Felon Disenfranchisement and Race Discrimination*, 2005, page 3
22. William Smith, *A Smaller History of Greece: From the Earliest Times to the Roman Conquest,* Harper Books, 1889, page 16

sufficient economic wealth that they need not work for their living were mentally detached enough from petty everyday problems that they were capable of utilitarian political decisions. Once a person reached this class, only then were they judged to be sufficiently politically minded.

Solon's method is based on an assumption of human behaviour - that humans make better decisions when detached from worldly troubles. Furthermore, the method results in a very clearly classed society, with the governing body also having the most wealth. If such a system were to function as intended, this would be clearly beneficial for society. As such, this is a clear and theoretically functional alternative to egalitarian enfranchisement.

Methods of Enfranchisement

Absolute Equality
A method of enfranchisement defined as 'absolute equality' can be seen as the logical realisation of equal suffrage. What this implies is the enfranchisement of all people, regardless of age, class, and all other factors. With regard to each of the limit cases described above, it would have to be concluded that these minorities must be enfranchised when following this method. The implications of this method are that all of those who are conceivably affected by the decisions of the government in question are allowed the right to vote. Does this right to vote then extend to immigrants to the country as well as its citizens? In following this path, it would be necessary even to enfranchise citizens of other countries who are affected by the decisions of the government. The President of the United States of America is often referred to as 'Leader of the Free World', however only citizens of the USA are able to vote for this leader. There also exists some very clear logistical problems of fairly conducting votes on every policy involving every person who would be affected by its implementation.

This method leaves parties that cannot effectively be enfranchised, and yet must be to ensure equality, such as children. Apart from this, however, it is also logistically unfeasible to hold elections involving all people, wherein some parties, such as children, would be inherently unable to understand the process of voting. As previously stated, such a system would prove even more difficult in a modern country with large populations. Such a system exists rather as a thought experiment to model the effects of overly broad enfranchisement, however, and reflects some of the immediate issues encountered when examining enfranchisement. With this in mind, prioritising equality above all other principles in the creation of a democratic government is impractical, and cannot lead to the creation of a functional state.

The Modern Normal
The form of enfranchisement defined as the 'modern normal' can be seen, with minor variations, in states such as Australia, Great Britain, and the United States. It entails limited enfranchisement of criminals and the insane, but without enfranchisement of minors. This form of democracy can be seen to be functional in several modern societies, and therefore entails limited logistical problems. Despite this, the problems discussed regarding the possible enfranchisement of children and criminals still pose a problem.

As the reconciliation of these issues poses a continuing problem for these democracies, they can be seen to be far from perfect. As well as this, these democracies are all representative, as opposed to direct democracies, and so can be argued to demonstrate equality to a lesser

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degree than a direct democracy would. The 'modern normal' method of enfranchisement consists of a great deal more equality amongst the population than the system seen in Ancient Athens, however a theoretically lesser degree of equality than the 'absolute equality' method seen above. Thus this method combines pragmatism and general equality, and results in a mostly functional state, at the expense of some inequalities. This is not a state without problems of enfranchisement, however, and these would need to be reconciled in order to create a more consistently egalitarian state. This method wrestles equally with the problems posed by an increasingly global society, and this forms another problem.

Significance
It is quite clear that none of these methods are perfect, all with similar but unique flaws. Politics, government, democracy, and especially enfranchisement are human constructs, not part of a natural order. It is a habit of humanity to search for the perfect where perfection cannot be achieved, and this appears to be the case with this issue. The enfranchised body has gradually grown since the inception of democracy, with women only becoming enfranchised through much of the world in the 20th Century. It seems logical, however, that this growth must have a beginning and an end point – the electorate cannot proceed to grow indefinitely. Although suffrage movements appear to have died out in Western society, this is not to say that the journey of enfranchisement is over, however, and problems will continue to be posed by changing global conditions and changes in technology, such as artificial intelligence.

Conclusion
Equality as a fundamental basis for enfranchisement has been shown to produce far more problems than it does solve them. It has been demonstrated above that a state holding the ideal of equality above all else is ultimately a thought experiment, and logistically and philosophically impossible to properly reconcile. The 'modern normal' has arisen as the current standard of democracy due to its inherent pragmatism, and as it has grown steadily out of several centuries of political and democratic growth into the state that it is in today. It must be reinforced that this method is not, and cannot, be a perfect form of democracy, and that the major problems of the enfranchisement of criminals and the mentally unstable continues to pose a problem. It can be seen throughout the discussion above that enfranchisement based solely on the rigid egalitarian principle of 'equality' encounters a number of problems. It can be justified, for example, that the enfranchisement of minors is likely not a wise decision, and due to a number of factors, cannot be justified despite the principle of equality.

In closing, equality is an important value to hold with regard to democracy, and indeed can be seen as one of the modern democratic ideals, however valuing equality above all other ideals is ultimately unfruitful.

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Alex Mansell

Year 12

Can we have beliefs or knowledge which are independent of our culture?

There is little doubt that culture has a profound effect on the beliefs and knowledge of all people; the assertion that no knowledge or beliefs are independent of culture, however, is rather a large step further. An emphasis is placed on culture in modern society; however the idea of countries defined by their culture is becoming increasingly less prominent as a 'global' society has emerged. The phrase 'beliefs or knowledge', contained in the title question can be taken to describe the primary contents of one's mind, and thus the question is really addressing the extent to which one's understanding of the world – either belief or knowledge – is culturally dependent. To address the above question, a number of areas will be explored, such as the origins of any knowledge, the question of whether any knowledge can be classified as 'independent', the influences of a dynamic global culture, and the validity of linguistic determinism.

The litigious definition of the word 'culture' leads into the question of how information is interpreted according to culture. The word 'culture' originates from the Latin 'Cultura', meaning 'cultivation' (The American Heritage New Dictionary of Cultural Literacy, Third Edition). The modern emergence of the word in eighteenth century Germany, however, brought on a new meaning, which has evolved into its current usage (Velkley, 2002). A definition, for the purposes of this essay, will be that culture describes the tangible and intangible products of a people or society. Thus the arts or food of a specific region could be seen as part of their culture; however these are reasonably external aspects of culture. It would appear that one's culture is not an inherent property, but rather a human constructs that covers the areas of language, customs, and religion in combination, among other things. A surface argument to suggest that beliefs and knowledge can be independent of culture could suggest that a visitor to another culture could then gain their culturally specific knowledge, and thus have knowledge outside of their own culture. The reason this is superficial is because despite the knowledge itself being apparently independent of culture, it is interpreted from the perspective of the visitor's culture, and the knowledge itself is almost inevitably altered as a result of this interpretation. This leads to the issue of interpretation. It would appear that the very act of interpreting information through the 'goggles' of one's own culture prevents it from being independent of one's own culture, however this may not be true for *all* knowledge or beliefs.

An aspect of culture that can be examined more simply is language. The idea of linguistic determinism suggests that knowledge is limited and determined by our language. Wittgenstein suggested that language not only limits one's ability to communicate an experience, but indeed our knowledge of the event. Language and culture can be argued to have a definite link (Nieto, 2002), such that language can be seen as the direct expression of a culture, and thus it can be argued that at least some knowledge cannot exist independently of language and culture. For this to be valid for all beliefs and knowledge relies on the question

– can beliefs or knowledge exist independently of language? An affirmative argument in favour of this exists in the area of knowledge of mathematics. It can be argued that mathematics is separate from language, and exists almost identically across cultures and languages. One argument for this independence comes from the idea of Platonic epistemology – that knowledge is innate. This theory suggests that knowledge exists independently of almost anything, assuming this separate 'world' of knowledge is universal. A variation of Platonic epistemology could suggest that knowledge is both culturally specific and innate, such that knowledge is entirely different in every culture. This does not immediately seem plausible, as surely the concept of cultural assimilation would present far more difficulties. Furthermore, the learning of another language, or more specifically 'thinking' in that new language would perhaps pose a greater problem. If it is agreed that language and culture are inextricably linked, then, it could follow that due to Platonic epistemology, knowledge can, and does, exist independent of culture, as this theory suggests that knowledge is independent of humanity generally. The potentially weak link in this logical chain, then, is that assertion regarding language and culture. A result of this assertion would be the curious result that one's culture is defined by one's language. A person taught as an infant to understand two languages simultaneously, as is common in, for example, the Netherlands, would have a separate culture from someone who speaks only Dutch. Alternatively, these people could belong to two cultures simultaneously. Due to the tenuousness of these arguments, the inherent link between language and culture would have to be questioned further to understand the independence of knowledge or beliefs to culture.

Before it can be determined whether beliefs or knowledge can be held independent of culture, the origins of beliefs and knowledge needs to be examined. It appears logical that most knowledge and beliefs must have an origin, a starting point upon which they were built. Does this apply to all knowledge, however? An argument could be proposed that no piece of knowledge can exist independently of all other knowledge. Knowledge related to a pop song, for example, is built upon knowledge of music, popular culture, and language, among many other things. This could be split into the areas of knowledge of 'the arts', the 'human sciences', and, to an extent, 'history'. Indeed, it could be argued that for any piece of knowledge, a number of connections to other pieces of knowledge could be made, which the original knowledge is dependent upon. There is one area of knowledge that may appear exempt from this, however: that of instinct. The reproductive instinct is a prime example of this. It is highly likely that 'human' reproduction occurred long before complex language, social convention, and even culture had developed. Hence, it could be argued that reproductive knowledge, and instinct, is independent of other knowledge, and hence independent of culture. One could argue against this by suggesting that reproduction requires, at the very least, knowledge of one's self – sentience. This would then be countered by evidencing reproduction between animals not dissimilar to humans, where animals could be argued to not possess sentience. A clear argument against the independence of instinctive knowledge, however, comes from the idea of genetically communicated knowledge, also referred to as 'fractal memory'. Instinct could be argued to be remnants of evolution, traces of knowledge from millennia previous, culminating from complex knowledge of previous generations. Perhaps, then, the idea of reproductive knowledge is rather a result of sensory perception, emotion, and reason from previous generations, and not an independent piece of knowledge. In examining the idea of knowledge independent of culture, it was first necessary to examine how knowledge originates and how it develops. From this, it could be argued that knowledge cannot exist independently, but rather as a web containing all knowledge, where

all knowledge is connected further to other pieces of knowledge. This argument can only really be valid if evolution is taken to be correct.

Understanding whether beliefs or knowledge can exist independent of one's own culture is a complex undertaking due to the difficulty of understanding what a singular piece of knowledge is or is not independent of. There are arguments which further cloud the entire issue, such as the suggestion that no piece of knowledge is independent of any other piece of knowledge – a view which would inevitably result in all knowledge relating back to culture. The validity of Platonic epistemology was taken into account previously, however the nature of such philosophical theories prevents them from being disproven, which suggest impossibility in adequately answering the original question. The abstract nature of culture, as well as the question of the independence of beliefs and knowledge from other pieces of knowledge ultimately makes it unable to be answered in an essay such as this.

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Albert Ngo

Year 12

Can video games can be considered as art, and do they constitute a new genre of art?

Introduction

The recent emergence of video games as an entertainment medium has led to a much debated question of whether video games can be considered art. For the purpose of this investigation, we will proceed by assuming that given the incorporation of multiple forms of art such as the incorporation of music to create soundtracks, the art design for characters, props and locations within the game, that the answer to this question is that video games are art, and then see how this assumption stands up to scrutiny. The art of cinema and narrative is also a major factor in many games, as a story is often the drawing factor, or appeal of many games. A second question then is: in so far as we can consider video games as art, do they therefore constitute a new genre? A key issue here is the level of interactivity video games enable. The key difference between video games and other forms of art has been considered to be the level of interactivity that the audience experiences. The question must then be asked, though, as to whether this conception is true. Do video games truly possess this capacity to immerse the audience where other forms of art do not? The concept of immersing an audience within a piece of art is not so recent a notion as it may seem, but video games provides, arguably, a much 'deeper' level of engagement for the audience.

In recent years, I have become aware of the continual debate as to whether or not video games can be classified as a form of art. Due to the possibilities of immersion that video games enable, I have been of the view that video games are definitely a form of art, but still very much unique compared to the other arts. Indeed, the entertainment medium of video games could be argued to be so distinctive in comparison to painting or music that it could usher in entirely new art forms, revolving around the use of new technology, even providing an idea of the future for art.

Definitions

For this investigation, parameters need to be set when discussing video games. The first and foremost criterion would be that video games are built from an original concept, though inspiration can be drawn from other sources like other video games or even from other forms of art. This means that video games are not merely imitative. Another criterion is that video games usually allow for multiple senses to be engaged and also incorporate diverse genre components, for example, music and visual art are incorporated in the majority of video games. Hence, with this definition, it can be said that other games such as chess or mah-jong do not qualify as video games as they are essentially electronic versions of a non-electronic game, and this would thus violate the first criterion.

In terms of art, the primary question is "how can art be identified?" What can be agreed on for art is that the boundaries are more fluid in comparison to other spheres of activity. Thus, it is more difficult to qualify what would count as art and what would not. In comparison to other areas of knowledge, for example maths or science, the ability to distinguish between

what is and is scientific is easier. Art deals with expressing human experience, which in turn makes the definition of art variable, depending on experiences that the audience feels with the art-piece. In terms of definition for "art" itself, Britannica Online defines art as ""consciously created through an expression of skill or imagination"[1]. However, there are art forms that do not strictly adhere to this definition, such as Jackson Pollock who used the method of "drip painting", which does not require as much skill as orthodox painting. However, his works still constitute as art, in terms of the message it is able to convey and the imagination associated with his paintings. What is perhaps more encompassing is Harold Rosenberg's remark. He believes that the "nature of art has become uncertain"[2], since "no one can say with assurance what a work of art is"[3]. It is with this very thought that art should not be so rigidly defined but instead have boundaries set to distinguish between what can constitute as art. One of the primary criteria is the intention behind the art-piece, whether or not the artist intends that the primary purpose of a work or performance is artistic. However, even this parameter is flawed, the prime example of this being the religious iconography and paintings done, where the primary purpose is not merely artistic.

Purpose
Notable film critic Roger Ebert is known for his critical views on video games aspiring to be a form of art. "One obvious difference between art and games is that you can win a game. It has rules, points, objectives, and an outcome. Santiago might cite an immersive game without points or rules, but I would say then it ceases to be a game and becomes a representation of a story, a novel, a play, dance, a film. Those are things you cannot win; you can only experience them"[4]. However, this statement about video games is inaccurate to a certain extent. It can be agreed that there are video games that feature "competition" as a primary appeal, they provide the possibility of competing with other players to test each other's skill. However, not all video games are made with the intention of competition in mind. Some video games, in particular single-player games, may have a competition element to it, but the experience can feature a narrative purpose instead. This statement can be queried in that it suggests that art does not have any sort of competitive element to it. Even where artwork is done for the purpose of art itself, there are certainly underlying intentions of economic interest at play, such as. Artists hope for their work to be noticed, and to make money out of their art, and this suggests that there are other intentions involved. Similarly, there are certainly video games are noted for being produced with the primary intention of making money. The foremost example of this is the head of Activision Blizzard publishing company Bobby Kotick. His view on games is such that the company does not invest in game franchises that "don't have the potential to be exploited every year across every platform"[5]. This type of belief contradicts one of the parameters proposed for art, as a primary economic intent for a video game questions whether it can be classified as art or not. However, this criterion of intention is a problem for many works of art. There are a plethora of cases in art history, particularly modern and post-modern art where objects without an original intention for art have been displayed so. A popular example is the "Fountain" work by Marcel

[1]Encyclopaedia Britannica Inc, 2012, http://www.britannica.com/EBchecked/topic/630806/art
Accessed 4th May 2012
[2] Rosenberg H, New York: Horizon Press 1972,Page 12, Accessed 10th July 2012
[3] Rosenberg H, New York: Horizon Press 1972, Page 12, Accessed 10th July 2012
[4] Roger Ebert, "Video games can never be art" April 2010, Chicago Sun-Times,Accessed 21st April 2012
[5] Ryan Borek, "Avid Gamer", http://www.quora.com/Why-is-Bobby-Kotick-the-CEO-of-Activision-disliked-by-some-in-the-gaming-industry, Accessed 5th June 2012

Duchamp in 1917 depicting a porcelain urinal. So Mr Ebert's objection to the artistic status of video games on the basis of intention is questionable.

The artistic merit of video games has also been discussed by philosopher Aaron Smuts, who believes that only some video games can be classified as art. One of the evidence he puts forward to suggest video games can be art is because "there is a developing art world for video games"[6], which relates to the growing number of museum exhibits dedicated to video games. However, does putting anything 'on a pedestal' mean that it is automatically art? Using the example again of the "Fountain", does putting everyday objects up to be seen as art constitute it truly as art? By examining this issue using the criterion of artistic intention, it could be argued that video games can indeed be seen as artworks, but only limited to those that are displayed. This supports Mr Smuts' view that only some video games can be categorised as art.

Notable film critic Jack Kroll has criticised video games because they "can't transmit the emotional complexity that is the root of art"[7] This definition of art can be said to hold true in some respects. Gaming blogger and freelance writer Hilary Goldstein is of the opinion that one of the reasons video games aren't art is that it is "for the people", but in particular that they are for people who "need to disappear from the world"[8], essentially that video games are there as a hobby for many gamers. They play games simply as a form of escapism, where they do not need to face issues with emotions and the like. There is evidence to suggest otherwise though, as a plethora of video games deal with emotions and themes present in reality and thought-provoking. For example, the Kingdom Hearts franchise explores camaraderie and friendship, and even Grand Theft Auto shows exploration of humanistic themes. What is important is that this conveyance of themes is available more directly to the senses, as per the medium, which allows a greater sense of immersion. This then resents the possibility that video games could constitute a new genre of art entirely.

IV. Are video games a new form of art?

Philosopher John Hopkins addresses the common belief that "electronically mediated experience marks a decisive break in humankind's relationship to technology". It appears to be based on the belief that cyberspace is an unprecedented concept that man has not had much experience to. The idea of a new "cyberspace" should be further examined. One of its common definitions is that cyberspace is a "space for radical liberation from the self of the body", and thus this implies that interaction with video games does not actually involve the player being subject to immersion in the game. What this definition offers is an explanation as to the unique qualities of video games in relation to other art forms. If we take the assumption that video games do indeed create a "cyberspace" for the player to inhabit during their experience, then the idea that video games gives a player "radical liberation" can be true, but does not necessarily mean that it gives them a departure from themselves. Indeed, it can be argued that the depth of immersion that video games offers players a chance to explore different "selves" that they cannot indulge in in reality. The medium has the capacity to place players in extraordinary situations and give them the ability to do, within the game's limits, whatever they want. For example, in the case of Fallout 3, early in the game the player is

[6] Smuts A, Contemporary Aesthetics Inc. November 2 2005, http://www.contempaesthetics.org/newvolume/pages/article.php?articleID=299#FN6link Accessed 5th July 2012

[7] Kroll J, *Newsweek*, March 6, 2000, Accessed 8th July 2012

[8] Goldstein H, Published April 29th 2012 http://venturebeat.com/2012/04/29/games-are-not-art/ Accessed 8th July 2012

given the chance to blow up or save the town of Megaton. While it is acknowledged that this is an extreme case, it still provides players with the opportunity to explore a possibility outside their ordinary range of experience, and so may allow people to explore sides of them that they thought never existed. Thus, the term "radical liberation" suggests that whatever players experience within the cyberspace essentially liberates them from themselves, is not so much a radical liberation but an opportunity for expression of inner selves that is not always able to be explored in reality.

A major problem that should be addressed in terms of answering this question needs to be the idea of "subjectivity" As previously mentioned, humans are creatures that possess a vast number of variables, and this inevitably leads to a difference of opinion and difference in experience for video games and other forms of art. Even in the gaming community, there is disagreement as to whether video games are legitimately a form of art. Reviews for different forms of video games reveal differing opinions for video games that are often called artworks, such as the case of critically acclaimed game Braid, where one gamer describes how creator Jonathan Blow "created a game with a clear purpose to set a new standard for artistry in gaming and show that video games can indeed be high art"[9]. As mentioned before as well, going back to the case of immersion, different people might take immersion differently. Some might consider a good storyline to engross them as immersion, while others might believe that realism is what results in absorption into a game. The same applies for other forms of art. The memories, experiences and personalities that people possess are all varied, and changes the way someone responds to artwork. They can draw from what they know and use it to relate to the art in question. People's expectations of art will inevitably affect their willingness to become immersed.

Within the gaming magazine Hyper, writer Daniel Golding notes the possibility that video games may not be considered "games" in the traditional sense. His definition involves how video games may not be classified as games such as chess because while the rules of the game are enforced by the player, not by the game itself, which is the case in video games. In a video game, the console will "usually dictate the limits of how a videogame is played"[10]. If Mr Golding's opinion was taken into account, then video games would not be games in the traditional sense, but something new altogether, perhaps a new genre of 'games' altogether, much like how it can constitute as a new form of art entirely.

Immersion
The idea of immersion is a key aspect that separates video games from art. Generally, video games often allow the player to actively engage in the story presented, to make choices that matter and have ramifications later on. The controller essentially acts as a medium in which the player can act and react with the world, that they have a place within the virtual environment. This sense of immersion is heightened as the player is able to have control of the movements and actions of characters. This engagement with imaginative immersion can also be seen in certain art forms however, in particular music and the playing of music pieces. The audience experiences the music directly through their sense of sound, and musicians have the added benefit of experiencing playing the music, which engages their sense of touch

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[9] "Andrew", April 2012, http://www.theandrewblog.net/2012/04/25/the-princess-is-in-another-castle-braid-roger-ebert-and-whether-video-games-can-be-art/ Accessed 11th June 2012

[10] Golding D, "Rules of the Games", Issue 225, Published by Next Magazine July 2012, Accessed 10th July 2012

and sight. Video games are arguably more successful in directly engaging a variety of senses, which results in greater immersion for the player. The combination of music, landscape and also the moving world causes the player to engage with the game with an effort unlike that which other forms of art can evoke.

However, this does not take into account the example of cinema. Widely recognised as a legitimate art form, is there a difference between cinema and video games? The development in technological capabilities necessary to the evolution of video games has also translated over into other forms of art. This can be seen in the recent surge in 3D movies, with the inception arguably being the release of Avatar (2009) in 3D. The inclusion of the 3D effect was there to draw the audience further into a new and alien environment. Movies can be described as giving the audience "the same experience from making everyone understand the same thing"[11]. However, like video games, the interpretation of a movie is dependent on the same factors as video games, the individual experience of each audience member. Numerous video games have been widely regarded as a cinematic experience, but this does not qualify them solely as belonging to the cinema genre. While a level of immersion can be achieved in a film, whether it be tension in a horror film, or empathy in a romance, the audience is still not directly responsible for the actions of those on the screen. This is where video games differ, in providing the ability to control the actions and paths that characters take, which enable a further level of immersion.

The difference between video games and other electronic media is indicated by the response of legislation, take the former South Australian attorney general, who believed that that video games should be not be allowed an R18+ rating, thus restricting the amount of violence allowed in a game for example, resulting in video games such as Manhunt not being released in Australia. This sets video games apart from other forms of art, as there are much less restrictions on what can be painted for example. This is often due to the argument that video games possess the capacity to desensitise children to "taboo" subjects. Children are able to participate in murdering pedestrians whether by car or with weaponry with series like Grand Theft Auto, or project themselves into a battlefield with realistic weaponry. Opposition to the R18+ rating is justified on the basis of the immersion factor, and this implicitly suggests that the level of immersion that video games have the capacity to bring differs from that of other forms of art. One of the leading forces in preventing Australia from attaining an R18+ and maintaining the MA15+ was the former South Australian Attorney General, Michael Atkinson who was of the belief that *"The interactive nature of electronic games means that they have a much greater influence than viewing a movie does[12]"*. He goes on to infer that this level of interactivity has a much more dramatic effect on children in particular, and it essentially gives them the opportunity of "*'acting-out' violence and criminal behaviour when they are playing a video game"*. His belief is that the nature of video games, and its implicit capacity to draw a player in by having a "challenge and response" system, is a defining feature that other artwork simply does not possess. He makes a particular comparison to the art form of "cinema", and makes the distinction that video games allow the player active participation in committing acts of violence and sex.

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[11] Kyle Bradford, May 2010 http://www.1up.com/do/blogEntry?bId=9032124 Accessed 17th May 2012

[12] Laura Parker, January 2007 http://au.gamespot.com/news/exclusive-michael-atkinson-talks-aussie-game-classification-6203703 Accessed 6th June 2012

However, to make this claim he would have to have evidence to suggest that video games do actually cause children to become or be more violent, and that other forms of art like cinema and music do not have such an effect. There have been cases throughout history where sociopathic people who committed crimes had their behaviour linked to their playing violent video games. For example, the case of the Colorado High School shootings in 1999 featured two students; Dylan Klebold and Eric Harris, opening fire and shooting 20 students, of who 13 were killed. They were noted for having played violent video games like "Doom", "Wolfenstein 3D" and "Mortal Kombat"[13]. The immersion that a player experiences in a video game came into investigation once again, as to whether video games possess the capacity to desensitise players to events in reality. In 2001, the U.S attorney general John Ashcroft cited the text game Dope Wars as influencing "the culture of violence" that may have contributed to a spate of recent deadly school shootings"[14] Within a game such as Call of Duty, there are numerous factors that serve to enhance the realism. There is the first-person viewpoint that the game uses, and also factors such as weapons that exist in real life. This can serve to desensitise the player if they are thrust into a battlefield where the circumstances are similar to the video game. It can be argued that other forms of art are not capable of producing the same level of immersion as video games. Science fiction author Jim Munroe believes that video games are alienated from other forms of art because they "represent a very new medium and that some critics find novelty alarming"[15]. However, it needs to be acknowledged that the cases where video games have been linked to public cases of homicide are generally rare, and also important to take the person that committed the murders into account. The Virginia Tech massacre is a prime example of this. The fact he played violent video games was taken advantage of by the media, and how his having played games such as Counter-Strike and his subsequent immersion into them allowed for him to become desensitised to the violence he later caused. However, before the incident he was diagnosed as having a severe anxiety disorder, and he was accused of stalking two female students in Virginia Tech.

This point is important in that it makes Mr Cho an individual. His characteristics, personality faults, played a much stronger part in his decision to massacre others than the fact he played violent video games. If anything, they merely accentuated homicidal or anti-social tendencies that he might have already possessed. This can be translated over to other forms of art. A picture depicting a murder would yield different reactions to each person. Someone with homicidal tendencies might have them emphasised by seeing this image. Dr Bandura and other psychologists have suggested through *social cognitive theory*; that viewers of media entertainment such as movies or video games are taught by the mediums "which actions are effective"[16] and lead to a suitable outcome, and whether the subsequent results are positive or negative. This provides further reason to believe that video games can impact emotionally in the same way that art can.

There is often a difference in terms of the audience on a general scale on their willingness to immerse themselves in an artwork. Video gamers on a general level, tend to be willing to

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[13] Julia Layton, *How Stuff Works*, Inc. http://electronics.howstuffworks.com/video-game-violence.htm Accessed 11th June 2012

[14] Ashcroft, J, Reuters News, April 4, 2001, Accessed 9th July 2012

[15] Jim Munroe, 2010 interview for *Spark* (Radio show) with Nora Young, Accessed 9th June 2012

[16]Max Nomad, *A Matter of Life, Art and Youth,* Published 2005, Max Nomad http://www.bgpublishing.com/bgp/a-matter-of-life-art-and-youth/ Accessed 9th June 2012

engage in "suspension of disbelief" and ignore the faults that might be present in a game, they can put up with "frustrating controls so long as the game has something else to offer".[17] Technological faults that can appeal strongly to the immersion that someone feels while playing a video game are not common in composing music or painting landscape. The problem with this is that people often rely on the lack of 'bugs' in a game to support the immersion they feel, the smoothness in a video game serves to emulate reality or allow for immersion that is not hindered by glitches in the game. It could be argued however that art can require an even greater suspension of disbelief than video games. While video games can deliver an immediate response to your senses, when observing art it is often necessary to pay more attention to what a painting or music piece offers to the senses.

Conclusion

The objective of this investigation is to suggest how the common differences that are drawn between video games and other forms of art are not so much defining features that are exclusive to video games. The common belief is that the immersion experienced by players in the virtual reality projected by a video game surpasses that of any other artwork from other mediums. The primary reason behind this is due to the player having direct influence over their actions, as video games give the audience the capacity to make an action and see the response. However, it could be argued that art requires an even greater willingness to 'suspend disbelief' to immerse oneself in an artwork. However, what is unique about video games in particular is that they often that offer choices to the player help broaden the scope of experience felt by the audience. Video games also draw many similarities to art when examining the intention behind a game and the inclusion of many forms of art when creating a video game to justify a different conclusion. Overall, instead of arguing whether or not it is art compared to existing forms of art, what should be examined more closely is the possibility that given the unique aspects of video games, it presents itself as a new genre of art entirely.

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James Keeves

Year 12

Is the ultimate protection against research error and bias is supposed to come from the way scientists constantly re-test each other's results?

The philosopher Karl Popper once said, "Science is perhaps the only human activity in which errors are systematically criticized and, in time, corrected."[1] His words address a process that is fundamental in science – the way scientists "systematically criticize" their discoveries in order to protect against research "error" and bias. Although science aims to be an entirely objective undertaking, it is a "human activity", and is therefore affected by certain biases and variables that result in inaccuracies – labelled as research error. Arguably, science gains its objectivity from the systematic application of reason to empirical enquiry, and in order to protect against such error, scientists incorporate a number of measures that utilise reason in the experimental process. One such measure is the re-testing of each other's results, although by no means an ultimate protection. The scientific community's critical treatment of peer-experimentation through peer-review is another protection, albeit with a number of associated issues. Another protection that utilises reason is the isolation and the control of variables in the experimental procedure. In order to evaluate and compare the efficacy of these protections, it is necessary for them to be considered in both the natural and human sciences.

The nature of science is such that research error and bias can always arise as an issue in experimentation, resulting in the need for protections. Science could be defined as a seeking of knowledge, involving a systematic study of the physical and natural world through observation and experiment.[2] Although any definition of science may lead to knowledge issues in terms of language, it is conventionally accepted that scientific experimentation is how this knowledge is attained, involving observation, measurement, and experiment, and the formulation, testing and modification of hypotheses.[3] However, protections are required with this method to reduce errors, although perhaps without total elimination.

The re-testing of results is a significant process in the protection against research error. A requirement of a scientific experiment is that for a theory to be valid, it must be predictive and its results must be repeatable, to survive falsifying tests.[4] Therefore, if an experiment cannot be repeated to produce the same results, it could imply the original results could be erroneous. To evaluate the effectiveness of this re-testing, one must consider the types of error that are found in experiments. In the natural sciences, by definition, there are two types of research error: systematic error and random error. Random errors occur randomly and are

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1 Science and Pseudoscience, "Quotes Related to Science", http://www.srmhp.org/archives/quotes-science.html, Last Viewed 28th July 2012

[2] Experiment Resources.com, "Definition of Science", http://www.experiment-resources.com/definition-of-science.html, Last Viewed 28th July 2012

[3] Oxford Dictionaries, "Definition of Scientific", http://oxforddictionaries.com/definition/english/scientific, Last Viewed 28th July 2012

[4] Experiment Resources.com, "Reproducibility",
http://www.experiment-resources.com/reproducibility.html, Last Viewed 28th July 2012

just as likely to be positive as negative. Thus, taking a large number of observations, and repeating the experiment can reduce their effect.[5] Here, repeating the experiment is an extension of the re-testing process, which is able to reduce random error, and is part of the need for results to be repeatable. Systematic errors have the same effect on each measurement, so repeating the experiment in identical conditions cannot reduce their effect, because the error is due to a fault in the system, for example an inaccuracy in a measuring instrument.[6] Re-testing in different conditions can identify systematic error, however, if other scientists overlook the same factors as the initial scientist did, it is possible that the process of re-testing can in fact perpetuate rather than correct or reduce the error. Hence, replicating the experiment in different conditions is not necessarily a completely effective method of minimising systematic error. Therefore, it is evident that in the natural sciences, total elimination of research error is not possible, and this renders re-testing as never being a completely effective means of protection.

In the human sciences, similar problems in terms of research error exist, but are further contributed to by increased subjectivity due to human presence in the experimental process. The observer effect can affect this process, where subjects alter their behaviour because they are aware of being observed, and this cannot be fully avoided by re-testing. Furthermore, the re-testing process itself is subject to certain limitations in the human sciences. If an experiment, such as an interview, is repeated identically, then it is possible that research error will result, due to different experiences and attitudes that the subjects have encountered since the first interview. If the experiment is repeated with different subjects, then it is likely that opinions and actions will be expressed differently, affecting the results, and suggesting that re-testing can never fully avoid research error. From this, it is evident that repetition and therefore re-testing, in the human sciences, is effective in reducing research error, but more intrinsically problematic, due to the nature of the human sciences.

The scientific community's critical treatment of peer-experimentation through peer-review is another protection, involving re-testing. In more recent times, scientific discoveries that give rise to new knowledge are confirmed after having been accepted by the scientific community. While this may be viewed as an extension of the re-testing process, confirmation requires a further undertaking, where 'experts' from scientific organisations evaluate experimental processes and results and provide anonymous opinions and supposedly unbiased criticism. This may be viewed as the culmination of other protections, all of which utilise systematic reasoning, which may suggest that such a process is highly effective in reducing research error and bias. However, despite the suggested efficacy of such a process, there are a number of contributing issues. Firstly, the role of the so-called 'experts' suggests an appeal to authority, where they may be viewed as possessing unfair power in their definitive decisions. Furthermore, issues of paradigm investment can affect the effectiveness of all protections. A paradigm could be described as an 'overarching theory shared by a community of scientists,'[7] for example, Newtonian mechanics in physics. However, it is possible for any given paradigm to be incorrect, as Thomas Kuhn drew attention to, where scientists carry out their

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[5]Physics Courses, "Random vs. Systematic Error"
http://www.physics.umd.edu/courses/Phys276/Hill/Information/Notes/ErrorAnalysis.html, Last Viewed 28th July 2012
[6]ibid
[7] van de Lagemaat, R, Theory of Knowledge for the IB Diploma, Cambridge University Press 2005, Last Viewed 28th July 2012

work within a paradigm, without constantly questioning the paradigm.[8] As a result, hidden sources of error could be present in the experimental process, which are simply perpetuated by the scientific community's fixation on the given paradigm. Furthermore, several issues affect the peer-review process, due to the fact that science is a social undertaking. Despite the methodological rigour and empirical precision of science, the knowledge that is attained and accepted is still vulnerable to the influence of social dynamics and human motivations. Status within the scientific community is one such issue, where independent researchers are regarded less highly than those scientists who are part of specific scientific institutions. Although, in principle, scientists should be judged based on the calibre of their contributions and publications, they can often be judged purely on their standing.[9] This could potentially result in an improperly justified or biased rejection or acceptance of a theory after being subjected to the peer-review process, depending on the scientist's status. Ultimately, this suggests that although the peer-review process is viewed as a highly important protection, several issues can significantly reduce its efficacy.

The scientific method is comprised of a number of processes that act as protections to research error and bias. The isolation of variables is a fundamental aspect of the scientific experimentation process, involving the application of reason to determine causal relationships. In its simplest form, a scientific experiment in the natural sciences involves selecting an independent variable that will have a predicted and desired effect on a selected dependent variable, where other important variables are deliberately controlled. The controlling of variables is a highly important part of reducing research error and bias. For example, when investigating the effect of light on the rate of photosynthesis, there are other factors that affect photosynthesis, such as temperature.[10] In order to effectively observe and record the effect of changing the light intensity and the consequent change in photosynthesis rate, the other factors must be controlled. This could be achieved by measuring the temperature at each light intensity, and ensuring it remains constant. However, as with any experiment, there are other variables that cannot be fully controlled and may affect the experiment. In most cases, these variables have a minimal effect, and the control of more significant variables is usually a more effective means of minimising research error. Nonetheless, this renders the isolation of variables in the natural sciences as not entirely effective, although a highly important protection. In the human sciences, the large number of variables in human activity raises difficulties in deciding on which variables to isolate and control, and additionally, how to effectively do so. As a result, the presence of confounding variables, those variables that are not controlled and that can affect the validity of an experiment, is greater.[11] This means that the relationship between the independent and dependent variable may not be accurately portrayed leading to claims that because there is a correlation there is causation, which is a logical fallacy – post hoc ergo propter hoc. This demonstrates that the isolation and control of variables in the human sciences, although an important protection, can be potentially problematic and less effective in the human sciences than in the natural sciences.

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[8] ibid

[9] Collins, Harry and Steven Yearly, *Epistemological Chicken* in Science as Practice and Culture, A Picking, Chicago: The University of Chicago Press, pg 301-326, Last Viewed 28th July 2012

[10] Photosynthesis Info, "Factors Affecting Photosynthesis", http://www.photosynthesisinfo.com/factors-affecting-photosynthesis-2/, Last Viewed 28th July 2012

In conclusion, it is evident that although research error and bias are significant problems that arise in scientific experimentation, there is by no means an ultimate protection against such a problem. It should be appreciated that utilising a combination of protections is more effective in different areas of science, such as the natural or human sciences. Ultimately, it should be realised that currently in modern science, research error and bias may always be a problem in scientific experimentation that is without a fully effective method of elimination. Therefore, as Karl Popper suggests, we should be forever questioning the assumptions we make in science, with the knowledge that with any new discovery comes the possibility of associated errors and biases.

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Tenglong Chen

Year 12

An analysis of Einstein's claim: *"Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."*

The idea that either imagination or knowledge is more important than the other is a bold claim to make. An argument for either case is rendered problematic due to numerous knowledge issues that arise when considering what is asked of us as knowers, which make it difficult to agree or disagree with Mr Einstein's claim. Perhaps most prominently are issues pertaining to the use of language, the idea of 'importance', as well as the implications of scope.

The matter of language is a crucial issue as it perhaps misleadingly implies that imagination and knowledge are necessarily and unambiguously distinct and therefore able to be judged independently. Generally, imagination can be regarded as the ability of the mind to create thoughts and scenarios, sometimes seemingly independent of experience and reality. Upon first examination, it may be suggested that it is separate from knowledge, often seen as the store of information and facts in the mind gained through interaction with the physical world. However, it is important to recognise that imagination and knowledge are both abstract concepts which, when no longer referred to in terms of their linguistic definitions, are not necessarily completely discrete. Indeed, in many cases, knowledge cannot operate successfully without imagination, and vice versa. For example, chefs use their knowledge of ingredients and cooking as well as their imagination to devise new dishes and menus. Acquiring knowledge requires imagination to conceptualise and contextualise information, without which pure facts would have very little meaning. Reading a novel or a DIY manual demands imagination to make sense of the knowledge that appears on the page. Likewise, it can be suggested that imagination cannot really exist without knowledge, since without it there is no foundation for ideas and innovation. Conversely, imagination itself can be seen as a source of knowledge, since so often imagination is the inspiration for new theorems, hypotheses and so forth. For example, in Physics class when I first learned about the Bohr model of the atom, I needed to use imagination in order to attain such knowledge; and I imagine Dr Bohr most likely used imagination to conceive of such a model since he could not have gained such knowledge through macroscopic observations. However, if we consider the counter perspective, it is clear that there are situations where knowledge and imagination do operate independently, or at least where there is little interference from either party. For instance, the tying of shoelaces involves very little imagination and instead relies mostly on knowledge. Although, in these cases, often the use of one capability has only been because of previous interaction with the other. That is: the method of tying shoelaces was probably first imagined and then changed into knowledge. Thus, it is difficult to usefully compare imagination and knowledge when, despite the distinctions implied by language, imagination and knowledge are mostly mutually dependent and sometimes even equivalent.

 The notion of 'importance' to the discussion is also an issue both central as well as problematic. In regards to many qualitative knowledge claims, such as Mr Einstein's of one thing being more 'important' than another, it is difficult to make general assertions that have

wide implications that are valid and accurate. This is perhaps mostly due to the intrinsically qualitative nature of the claim, whereby the value of 'importance' changes according to the context of what is being referred to. For example, a theoretical physicist such as Einstein who is performing advanced quantum mechanics may value imagination more so than knowledge for it may serve a greater purpose in their work, such as in trying to discover a Grand Unified Theory. Conversely, the primary objective of an accountant may be to use knowledge so that sums are balanced and finances kept in order. Furthermore, there is also the problem of subjectivity in that by virtue of the diversity and complexity of human thoughts, their foundations and influences, every individual's perception of 'importance' is different. Indeed, whenever the 'importance' of a subject is in question, the thinking demanded is often based upon values and opinions that are idiosyncratic and do not necessarily reflect superior verities. If we consider the alternative arguments, however, then we must examine if 'importance' can be generalised across many different contexts and can satisfy many different paradigms. Although it perhaps may be true in certain fields, such as art and literature, it does not necessarily stand in the majority of areas. For the most part it seems, in many every day applications such as mental arithmetic or driving a car, knowledge is as prominent if not more so than imagination. As for the existence of a prevalent paradigm in regards to the claim, it does not inevitably mean that what is believed is true. This may be a result of a shared subjectivity or lack of awareness. To use my Year 7 class as a microcosm, our teacher out of good humour convinced us for a while that bananas naturally grew straight and needed to be bent into shape for aesthetic, commercial purposes. Therefore, in order for the knowledge claim to have greater truth and application, perhaps more precise explicitness is required since it seems that its implications are too broad and only accurate for specific cases.

Another prominent issue in regards to the knowledge claim is that of scope. In his argument, Mr Einstein seems to suggest that both can be seen quantitatively; that knowledge is limited whilst imagination is somewhat boundless. This is, however, problematic since neither imagination nor knowledge are accurately quantifiable entities and cannot be effectively compared in terms of their size. The reasoning employed seems to indicate that knowledge can be regarded as an entity that is circumscribed whereas imagination by comparison is boundless and infinite. Perhaps it could be argued that knowledge is limited because of what we don't know, and is constrained to what we do know. As in: we do not know how to cure cancer or we do not know the ancient *Eteocypriot* language.[1] Yet, it does not automatically follow that imagination is infinite since it is so abstract and amorphous. Indeed, it is problematic to determine the scope and limits of imagination: like ideas, it seems to spring into the mind without any physical origin, and then either lingers or withers or recedes. For example, sometimes our imagined thoughts seem so surreal that we wonder from where could such sights have arisen. Nevertheless, vaguely defined boundaries are not the same as having no bounds. Let us, however, consider the view that imagination were not limited and encompassed all knowledge. This may be valid for some circumstances, yet, it seems that our imagination has been demonstrably shaped by presently available knowledge, thus implying imagination is in some way finite. Through new scientific discoveries, for instance, authors and screenwriters have been inspired through knowledge to imagine new apocalyptic scenarios. This is also evident in the world of music. For example, when I learnt the blues scale on the piano, I could improvise new songs using that knowledge. Hence, it seems that imagination can be spurred on by knowledge, and vice versa, which suggests that both are limited and imagination does not completely contain all knowledge.

Indeed, a question that presents itself is whether or not scope is a reasonable criterion for superiority. Perhaps in many everyday situations, it may seem that a greater number of

something is better in contrast to something lesser, such as more features in a car or more money in the bank. However, it seems that in a situation where we are considering such abstract capabilities rather than material items, there are more suitable measures. Indeed, it would seem reasonable to suggest that often value and meaning can be attributed to something because of its ability to provide quality, depth or substance. For example, at university, a doctorate is usually undertaken not in a broad area of research but rather a very specific region of knowledge in great detail. Even if imagination were larger than knowledge, it doesn't immediately confirm that it is of greater importance.

In conclusion, it is very difficult to agree or disagree with Mr Einstein's opinion insofar as there are inherent knowledge issues that arise as a matter of course when considering his proposition. This is in part due to the difficulty of separating imagination and knowledge so as to assess them individually, the problem of context and subjectivity in regards to 'importance', as well as the indefinable realms that imagination and knowledge operate within. Furthermore, in cases of progress and development, often it has only been a consequence of both sound knowledge and inspired imagination — and not only because of the latter, that success has been achieved. It seems that any tendencies for society to celebrate imagination more so than knowledge stems perhaps from the sense that it is the true instigator of growth, yet a more apt approach may be to acknowledge that one without the other is not particularly beneficial and both are required for advancement and innovation.
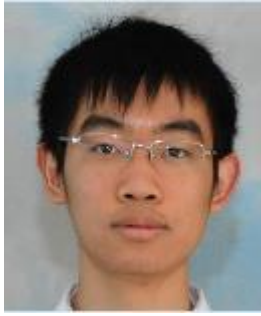
Dao-Shi Guo

Year 12

Is the ultimate protection against research error and bias is supposed to come from the way scientists constantly re-test each other's results?

For much of the scientific community, the process by which scientists repeatedly test the validity of established theories is deemed to be an extremely effective form of protection against research error and bias. The scientific community's trust in the re-testing process predominantly arises from its success in identifying bias and error throughout the development of science. Many important theories, such as Fleischmann and Pons's Cold Fusion, have benefited from the re-testing process and were found to be prone to bias and error (Andrews, E 2010). Hence, it might be claimed that the most important, accurate and reliable – and therefore 'ultimate' method of protection against research error and bias is the way in which scientists constantly re-test each other's results. However, there are numerous issues pertaining to the re-testing process; and with such a conclusive claim comes the need to examine and evaluate its validity in terms of both the re-testing process itself and other means of protection.

Before the re-testing process can be compared to other tools of protection, the meaning of research error and bias must first be defined. There are numerous types of research error, including those that exist in the 'elimination of variables', 'experimentation' and 'observation' stage of the scientific process; and thus it would be difficult to put forward a universally accepted definition of scientific error. However, it is conventionally viewed that errors in science fall into the categories of random and systematic errors. If the topic's claim is true, then depending on the type of error, the effectiveness of the re-testing process, as a form of protection, may also alter. For instance, errors caused by irregular changes of heat loss of a current-conducting wire to the environment (a random error) are relatively easier to be identified, when compared to errors that arise from the inability to completely isolate effects of alpha-radiation on the formation of cancer (a systematic error). The distinction is mainly a result of that as scientists are unaware of the existence of a variable that has contributed to the result, they may consequently attribute the cause of the outcome to a wrong factor. Scientists who then re-test the proposed theory may also not be aware of the variable, due to limitations in apparatus, and so would perpetuate the error; whereas the effect of random errors will be averaged out and identified after a number of re-tests. It is the difference in the type of scientific error that determines the degree of effectiveness of the re-testing process as a form of protection. Likewise, there are various groups of bias, including confirmation and sampling bias. The re-testing process is better at ascertaining certain forms of bias than others. Sampling bias, such as excluding data that may disadvantage the theory is easier to be recognised in the re-testing process than confirmation bias. This is because the re-testing scientists cannot know exactly how the author of the re-tested theory thinks, whereas the re-testers are able to investigate tangible data. In this sense, the topic's claim is ambiguous as it does not identify which type of research error and bias it is referring to.

However, whichever form of research bias and error the topic is mentioning, we must also consider whether the re-testing of results by other scientists is indeed, as the topic assumes and implies, the best approach for protecting against scientific error and bias.

There are several intrinsic advantages, as well as limitations associated with the re-testing process. The re-testing by other scientists may improve the quality of published papers, as it acts as a filter, detecting bias and error, such as over-looked experimental results and inaccurately divided control-groups. Conversely, no matter how many times scientists test each other's results, they can never be certain that the theory is free from research error in its 'observation' stage, one of the fundamental steps of the scientific method. Science has inductive nature (the reasoning from the particular to general), i.e. they rely on empirical evidence, a form of testimony that can never be conclusive. Scientists seek to re-test suggested theories as many times as possible in order to identify the error and bias involved, nevertheless the number of cases examined is still minimal in comparison with the instances that are yet to be testified.

Another issue with the re-testing process is that in some areas of research other scientists may not have sufficient expertise to competently re-test. If the topic's claim is true, should we then discard those theories that have not, for want of relevant expertise, been intensively re-tested? On a historical basis, it can be argued that this would not be justified. As a physics and chemistry student, I am especially aware of good theories which were produced when the re-testing of scientific theories was not yet common. For example, during the 17th century, there were fewer opportunities to re-test results as scientists were scarce. Nevertheless, many great theories, such as the Newton's Laws of Motion were established during the time (Newton, I 1846, p. 72). Although it can be argued that such theories, which were proposed when there was minimal opportunity for it being re-tested, are 'likely' to contain research error and bias, there have been studies which demonstrate the probability that the re-testing of scientific results may sometimes be ineffective in identifying bias and error. For example, when a medical research team deliberately included eight errors in a research paper, an average of two were identified after the peer-review process (which is a form of re-test) (Godlee, F, Gale, CR, and Martyn, CN 1998, pp. 237-240). If good theories can do without extensive re-testing, and if re-testing is sometimes ineffective, then it cannot be the 'ultimate' protection.

Furthermore, when scientists re-test each other's theories, they cannot be completely free from confirmation bias. Intellectual, professional and personal investments in upholding a given paradigm are primary sources of such bias. For example, in some instances, scientists may interpret results in favour of their careers, in order to gain funding or simply to stay employed. Paradigm specific presuppositions scientists have towards a certain issue may hinder the accuracy of the re-testing process. Some may argue that confirmation bias can be avoided by the double-blinded re-testing process, whereby both the authors and the testers are prevented from knowing the names of the other party. Although most scientists have integrity, this is no guarantee that they are not affected by pressures such as paradigm investment and the social dimension of science: concerns of statue, funding, advancement and the like, which can be influential.

Due to the limitations of the re-testing process, it may be argued that other forms of protection may be better. When the re-testing process is compared to mathematics, the topic's claim is, to some extent, dubious. Mathematics is a systematic description of our experiences founded upon a set of axioms, and elaborated by means of deductive logic. Unlike empirical

knowledge, which can never be conclusive, mathematics utilises deductive logic and gives rise to permanent statements. Once a scientific theory is re-tested and justified with the use of mathematics, it is considered to be permanently true as long as the axioms are not disproven. For example, by verifying students at my school prefer to take the route via the front building on their way to the assembly hall, due to its shortest distance with the use of mathematics,

this theory is always valid as long as the axiom that the shortest distance between two points is a straight line is true. An alternative view is that there remains the possibility that axioms are not necessarily permanent. However, since the axioms are irreducible and in being themselves resistant to proof, they cannot be proven wrong and hence are everlasting. However, a demerit of using mathematics in protecting against error and bias in science is that it does not rely on empirical evidence, since it is solely the sciences' quantitative focus that relates it to mathematics. As 'observation' is a non-dismissible component of the scientific method, mathematics cannot eliminate all error and bias involved in scientific research. Nevertheless, it can be seen that in comparison with the re-testing process, the use of mathematics is a more certain tool of protection against research bias and error in certain aspects of scientific research.

Another form of protection is the use of method. This is achieved by altering the 'experiment' element of the scientific method in order to confirm the initial hypothesis. A novel approach of testing a theory is sometimes better to prevent research error and bias than the re-testing process. For example, by releasing a feather and a rock from the inner side of a vacuum tower, Galileo developed a method to demonstrate that the two objects fall at the same speed (VIAS 2009). Hence, he identified error in the theory that the two objects with different masses fall at different velocities. Although it may be disputed that the alteration in method cannot completely eradicate error and that the obtained data will necessarily encompass random errors, since some degree of deviance to the 'true value' is inevitable due to limitations in the accuracy of apparatus, in comparison with the re-testing process, the use of method is a better way of protecting against systematic errors.

To conclude, whilst scientists' constant re-testing of each other's results has some advantages in detecting scientific error and bias, there are also problems with the process. When it is compared with mathematics and the use of method, there are areas of the scientific method in which the re-testing process cannot be regarded as 'the best tool of protection' against bias and error. It can hence be concluded that the topic's claim is partially true, but the use of the term 'ultimate' is problematic.

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Francis Kette

Year 12

Is it *"a capital mistake to theorise before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts"* (**Arthur Conan Doyle**)?

Effectively Arthur Conan Doyle suggests that formulating theories then searching for facts or data which verify the theory is a "capital mistake", and theories are better formulated as the result of data analysis. Doyle discourages the method of theorising then searching for facts, as "insensibly" data could be manipulated to fit a set theory. This is important in that theorising before acquiring data lends itself to prior assumptions and attempts to validate these assumptions, which could have an impact upon the resultant data, as an attempt is made to look for data which supports a theory. That is subjectivity. The relationship between theory and data is reciprocal, regardless of the order in which they are obtained. To theorise is dependent upon the frame of reference as this constrains the theory. Hence, can we ever encounter data free of prior theoretical presupposition? There must have been a reason for its collection. In effect, one must have data to theorise regardless of its nature. Hence, it is evident that a theory can never be evidence free; however, it can be developed before the explicit action of providing data to support or test it. Hence, there is reciprocity in the relationship between data and theory and the order in which they originate. The order of their relationship need not be prescribed to that which Doyle asserts. Additionally, the process of theorising as outlined in the question is subject to the area of knowledge explored, as a process may be applicable to one, for example, scientific method to the sciences, whilst this process may not be useful in another area, for example, in history.

To analyse Doyle's claim it is first necessary to understand and define the terms and how they relate to the question. How we understand theory is dependent upon which area of knowledge it relates to, and hence, cannot be conclusively defined. In general, a theory is a coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a phenomenon[58]. Whether the theory is derived after the encounter with data, as Doyle recommends, or prior to seeking data is irrelevant, the theory will eventually be tested by evaluation of data and its value determined by its ability to explain or predict. Hence the method of theorising cannot be regarded as a capital mistake. Data is factual information (measurements or statistics) used as a basis for reasoning, discussion, or calculation[59]. In relation to this topic the term data is used to provide information to evaluate a conjecture and is central in the procedure of developing a theory. Data is only accumulated as a result of some investigative process. This process is the result of a question driven by a theoretical presupposition. Hence, what is problematic about Doyle's view is that since we encounter data only in the context of some investigative undertaking, all our investigations necessarily involve theoretical presuppositions. So we can see that Doyle's claim does not account for the relationship of data to previous theory. One cannot have a theory free of data, or for that matter, a theory free of theories, knowledge, data or paradigms. Karl Popper asserts "(scientists) necessarily develop their ideas within a

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[58] http://www.nap.edu/openbook.php?record_id=6024&page=2
[59] http://www.merriam-webster.com/medical/data

definite theoretical framework". Something is true in so far as an idea is consistent with other reliable ideas and an idea is true in so far as it guides us in the solution of practical problems or in the understanding of other ideas. Additionally, what we know is dependent upon what we believe. In turn, the framework of our beliefs shapes a particular view of truth. So that truth becomes dependent upon perspective.

Theory is central to how we interpret the world and we continually test our theories about day to day events on the basis of the information we interpret. Theories without data are fantasies. The closer to reality, the better the data fits the theory. In two areas of knowledge, history and natural sciences, we utilise different assessment tools, primary among these is testability in the sciences, and comparative evaluation in History. Doyle's claim leads to the question: can we have a theory free openness to data? Popper would say no. We are always predisposed towards evidence by current theoretical commitments, and are always selective of data. Separating oneself from the process of data collection is difficult, as inherently, we utilise our current paradigm to base our perception of reality in the exploration of data, and do much the same when we seek to obtain data. In historical research, separating the development of a theory from a paradigm is difficult. This paradigm, through social, cultural factors, or the school of history adhered to, provides the theoretical framework through which data or evidence is analysed. Historical theories are also subject to the inability to validate or to test the theory, and hence are never definitive. In general, historical research cannot be independent of theory, in that, it is dependent upon theoretical presuppositions that shape the collection and interpretation of data. As historical data cannot be retested, it inherently relies upon the incomplete "picture of reality" of someone else. In the Sciences, a theory can never be proven, only disproven. Theories are experimentally tested, utilising the null hypothesis, the purpose of which is to disprove the theory. In the Natural Sciences, it would seem possible to have data free of theories. This is evident in Penicillin's discovery, inadvertently discovered whilst Alexander Fleming was searching for a cure for Gram-negative bacterial infections. It seems accidental or coincidental data indicate theory free data. However, the collation of data relies on a set of pre-existing theories. Penicillin's discovery was only possible because a framework of inquiry had been established within which the accidental occurrence of mould became data. A set of data is meaningless unless interpreted. Hence, the process of interpretation relies upon pre-existing theories or paradigms. In this, it is not possible to have data free of theories.

The question is it possible to have data free theories arises from Doyle's claim. If so, can data free theories be classified as a theory? According to the discussion above, data cannot, as a data free theory would not be based upon the collation of evidence. Conversely, it would seem possible to conceive of a theory free of data, in that a theory could be developed without concern for data, for example, the nature of God. Indirectly, this theory will have been the consequence of previous encounters with data. To this extent, a theory without data seems impossible to achieve due to human nature, and the process through which data is analysed. Although a theory cannot be free of data, it is valid to contemplate the implications of a data free theory to evaluate an area of knowledge. In history, a theory can be developed, prior to the acquisition of data, and is no less "true" than another theory based on evidence, due to the nature of historical knowledge. Historical knowledge due to its nature is not testable in the way scientific theory is, evident in different schools of history, and different interpretations of the same event, indicating that subjectivity or a previous theory influences the stance taken for that data. Contrastingly, however, a theory is also dependent upon the pre-existence of data to influence an opinion. One cannot theorise before there is knowledge about the subject. In some areas, such as historical knowledge, our information is limited to

already pre-written events, and records, and at best it can be an approximation, as a photograph is to a moment in time. Historical knowledge is limited by our current social matrix, linguistics, culture and heritage. Hence, especially in history, the interpretation of an event or event's is the principal of historical theories so that it becomes impossible to theorise upon an aspect of history without some data for one to be aware of the issue. In the natural sciences, to theorise before acquiring data, as Doyle suggests, creates a desire to twist facts to suit a theory. However, the nature of the natural sciences, in that they are testable through acquiring further data, provides a method to eliminate confirmation bias.

Doyle's assertion implies that a theory is more likely to have value, and theories of value are likely to be more efficiently produced, if based on data. The more data one has in its formulation, the more likely that a valuable theory will emerge, rather than if one has a theory and tries to find data to support it. It has been argued that there is reciprocity between theory and data, and therefore, any theory is based on data, no matter how meagre. Hence there is a spectrum dependent on the apparent amount of data utilised. Nevertheless, the ultimate value of a theory is independent of the method of obtaining the theory. Doyle provides an ideal framework for the dissociation of confirmation bias to improve the basis of theorising. This framework, however, is not definitive in that it does not apply to all areas of knowledge. Freedom from the constraints of data and perhaps reality, lends itself towards selectiveness of data that suits the theory and rejection of that which does not. In history, data can be omitted, it's possible significance ignored or downplayed if it does not fit the theory. The nature of historical data means it is impossible to test a theory. The inherent ambiguity of historical theories is not suited to Doyle's assertion. Theorising in science would, however, seem far more suited to Doyle's thesis, yet the "Capital mistake" may still be productive.

Thomas Russell

Year 12

An analysis of Einstein's claim: *"Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."*

The quote from Albert Einstein invokes a comparison of the two concepts of imagination and knowledge. Einstein establishes the limitations and some of the qualities of the two concepts to justify his claim regarding the comparative importance of each. Its significance comes from the way in which both imagination and knowledge are utilised in the search for understanding. The quotation asserts how each concept should be regarded, indicating that imagination is greater which has implications on how information is gathered and taught as well as other facets of human life. In order to assess this view, its assumptions will be examined with reference to situations relevant to it as well as aspects of the situation that are not directly discussed in the quote but might have an effect on the conclusion.

The analysis of both imagination and knowledge first requires a clear understanding of what both concepts involve and the boundaries of each concept. Imagination can for the most part be considered as the ability to create thoughts, ideas or gain an understanding of a scenario. This process is seemingly independent of experience. However it is difficult to define imagination holistically since it is so various. Knowledge on the other hand can be defined as an understanding gained through experience. Knowledge is in a greater sense related to verification and application compared to imagination. By these definitions, imagination and knowledge could be viewed as independent and clearly distinguishable concepts. The two concepts may however be so interdependent that they cannot be distinguished sufficiently for the purposes of Einstein's comparison. One problem that arises when comparing the importance of both imagination and knowledge is the presence of interdependencies between the two concepts.

To analyse the question further it is important to identify and investigate the assumptions made in the question. One of these is that imagination is limitless and has the ability to embrace everything regardless of variables such as time and space as mentioned in the quote. However the lack of a dependency on time could be argued against. This is due to the point made before that imagination has a dependency on knowledge but more specifically, the knowledge that is currently held. What this entails is a dependency on time because the knowledge that is currently held is something that is affected by time. An example of this could be seen in modern day science. The Large Hadron Collider was built to investigate sub-atomic particles. However historical science did not detail the existence of such particles and it was only when the early versions of the modern day model of the atom were derived that subatomic particles, and the complex technology needed to investigate them, could be imagined. This example shows how imagination is dependent upon time. This suggests that imagination is not necessarily as limitless as Einstein implies. So, if imagination doesn't have a limitless scope, its scope can still be considered larger than that of knowledge. This is because knowledge, which can only occur in the context of verification and application is therefore limited to experience and hence time and space in a greater sense. While

imagination is dependent on knowledge, its independence from the senses mitigates its reliance on location.

One of the interdependencies between imagination and knowledge talked about above is related to the acquisition of knowledge. This is relevant to two situations, one in which a person is being taught knowledge, and one where a person is acquiring this knowledge prior to any others. Imagination plays a large role in the process of learning as it allows the development of generalised ideas rather than those specific to situations. Imagination allows the extrapolation of ideas to multiple situations as to allow this knowledge to be applicable and useful in other situations. For example, if one were to gain an understanding that adding one apple to another yields two apples, this knowledge would not be very relevant unless it can be imaginatively extrapolated to the abstract concept of numerical integers. This would allow this knowledge to be applied to other situations in which apples are not involved but addition is necessary. However it may be possible to separate the imaginative component of the learning process and learning could take place through purely non-imaginative experience. It would be improbable however, that an imaginative contribution would not be necessary in contextualising and hence truly understanding a new piece of information. Thus imagination is important to knowledge, but this does not necessarily indicate that it is more important than it.

Interdependencies are also prevalent when knowledge is acquired independent of the learning process. This occurs in such fields as science and mathematics as well as other research fields. While these research fields involve the acquisition of knowledge through the conventional ways of knowing such as reason and the senses, they also require imagination. This is because imagination is required to identify new topics and possibilities. While imagination is not actually necessary for the retrieval of the information, without imagination the same perspective would be perpetuated. This is evident in the advances made in the model of the atom. While scientific experiments, such as the Rutherford gold foil experiment[1], enabled us to arrive at the current model of the atom, without imaginative capabilities the motivation for these experiments would not have existed because the structure of the atom is not apprehensible by our senses. It is because of this reason that much of scientific advance has occurred through imaginative leaps. It could however be argued that all advances in research such as the model of the atom were logically derived from current knowledge and hence imagination and knowledge are in fact independent. This conclusion is based upon the assumption that there is a plausible logical link which could lead someone from existing concepts to a new concept. For clarification, it is important to remember that these concepts are those derived from observation. However as derived, any concept is only possible within the realms of imagination. The argument for a logical process the possibility of new pieces of knowledge which are contrary to all current knowledge. As it is contrary to all existing knowledge, a logical development from that knowledge would be impossible and hence an imaginative leap would be required. Such advances were evident in the creation of the current model of the atom as paradigm shifts occurred as new experiments and new ideas arose.

Another interdependency is in relation to the argument that while imagination can create knowledge that would not have otherwise existed, the imaginative process is dependent on existing knowledge. Hence while imagination can often be viewed as independent of

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[1] Michael W. Davidson, June 15 2006, *The Rutherford Experiment*, Florida State University, Available: http://micro.magnet.fsu.edu/electromag/java/rutherford/ [Viewed July 25 2012]

experiences directly, it is dependent on knowledge itself. To understand this, it must be acknowledged that the acquisition of knowledge heralds the opportunity to acquire further knowledge based upon the currently held knowledge. If it is then accepted that this relationship is applicable to the process of imagination, then the sensible conclusion that imagination is dependent upon knowledge is arrived at. An example of this is a composer who creates knowledge in the form of a new piece of music. This knowledge is seemingly unique in its own right however its existence is dependent upon the plethora of knowledge regarding musical constructs that the composer would already have. Therefore imagination can seem to be reciprocally dependent on knowledge and this suggests neither is more important than the other.

One of the problems that arises from responding to Einstein's assertion is that it is a prediction and hence it has problems of verification. That is, it is hard to justify the prediction with evidence as it entails the future. Furthermore he is making an assumption based on the imaginative capabilities of humans which is also hard to verify. Conversely a counter argument would be that the evidence upon which Einstein bases his prediction is in fact historical. However, historical generalisations are highly unreliable due to the development of new influencing factors and hence would justify the statement no more than if it was a prediction. Due to these two factors the question can only be agreed with to a certain extent.

Another implication of Einstein's remark is that knowledge is fixed as it is reliant on current understanding and time. This is not necessarily the case. Knowledge is often much more mobile than Einstein suggests. While it can be argued that knowledge is indeed limited to *"all we now know and understand"*, when comparing it to imagination and evaluating its importance it is important to note the variety and ambiguity of the use of understanding. An understanding can be diverse and mobile in the sense that it has a wide variety of applications. This is evident when considering art as a method of communication from the artist to the viewer. A piece of knowledge may be evident in the art and the viewer can obtain this from experiencing the art. This knowledge can then be generalised and applied to other scenarios. In this sense the knowledge is mobile and hence contradictory to the image created by Einstein.

Ultimately it is hard to completely agree with the statement due to the problems discussed. Complications such as interdependencies make it difficult to evaluate the importance of each concept separately. The existence of cases where imagination is dependent on knowledge and vice versa implies that no priority can be taken from such dependencies. The assumptions upon which Einstein makes his assertion are also open to question. While imagination arguably has a greater scope than knowledge, the evaluation of which is more important is less clearly evident.

Isaac Taylor

Year 12

Is it *"a capital mistake to theorise before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts"* (**Arthur Conan Doyle**).

The idea of avoiding the formation of theories prior to collating data is to be addressed within this essay. Arthur Conan Doyle suggests that any theory is ostensibly flawed if one does as such. In order to address the knowledge issues inherent in this statement, the key terms of 'data' and 'theory' will need defining. Data refers to evidence of any kind which relates to a study or area of knowledge. It is not just any particular occurrence in the natural world, and should not be regarded as anything more until used for specific purposes. Theories though are more encompassing. They are ideas formed to explain happenings in existence, and have their basis in data. As such the data must show the theory to be correct for most circumstances. However a definitive proof is unattainable for a theory, as future occurrences may render the theory irrelevant. Within the areas of knowledge of Natural Science and History, this essay will consider the knowledge issues of whether data can exist prior to theories, the effect of the language filter on collecting data and the problem of contrasting yet accurate data.

The idea of collecting data prior to any sort of theory is the key idea behind Doyle's quote. It is questionable though whether data is able to be encountered without any prior theory. The first reason for this is that theorizing is inherently human. It occurs in all activities undertaken by people, often subconsciously. Assumptions are made daily just in order to live our day-to-day lives. Without the belief that roads can be safely crossed, it is unlikely one would ever cross a road. To cross a road, theories are made about all other people upon it, without any data to support them. As such, managing to record any level of data without first making a single theoretical presumption seems almost impossible. Indeed were we to follow Doyle's advice in our daily lives, we would most likely be crippled with inaction. It is easy to argue though, that none of these assumptions are the ones the Doyle is arguing about. It is unlikely he meant that one should not cross roads before theorizing. However the same principle still applies to the quote, and to the data that Doyle suggests to collect. Almost all actions involve some level of theory. The collection of data then will almost assuredly have theories involved in its creation. Not only will this make it a product of theorisation, but it will likely affect how, and in what manner data is encountered. Small yet potentially important aspects would be addressed nonchalantly if they are factors which are taken for granted. This drastically affects theories made in history, as they are almost entirely based on evidence collected previously. First hand collection of primary data is impossible for historians. It relies on the records of the people at that time. Individual assumptions will have affected the people who collected this data. The creation of a theory in history is therefore unlikely to be done based on just pure data. The limitations of others though, do not as largely affect the collection of data within the natural sciences. If precise to the required level, it would seem possible to create a theory based entirely on data. Hence, there would seem possible scenarios where data can exist without theory. The example of Alexander Fleming and his discovery penicillin reflects this possibility. The growing of the mould instead of microbes on his petri dishes was new data that Fleming had not subjected to his own hypothesis. On closer inspection though,

this example also reveals why this counter-scenario is flawed. Although the growth of mould was not predicted, it only occurred because of Fleming's earlier theories. Despite the theories being incorrect, the mould would not have grown if Fleming had not attempted the experiment. He theorized before beginning the experiment that microbes should grow. Theories were still involved in the creation of the data. Indeed, any such phenomena that occurs without a theoretical process is unlikely to qualify as data to a scientist and instead just remain as an unexplained event. The key principle of science of being a collective process of building upon past knowledge is key to this. It also means that the former theories of science will be incorporated in all new processes, undermining any precise planning of scientists to create theory free data. The nature of Scientific, and arguably all, data will always involve theories in its formation.

The preconceptions of language and all it encompasses is an important issue associated with Doyle's statement. Language affects the manner in which the world is viewed. Occurrences in life, whether emotional or physical, are often hard to define until a name is put to them. They are impossible to express unless all parties involved comprehend the same language. As individuals will almost all have slightly varied linguistic interpretations of the world, language can be said to have a certain level of non-neutrality. Language based conceptions of the world will not be identical, affecting the collection of data. Doyle's claim that data should be collected prior to theorisation to ensure a 'pure' theory, assumes that data itself is 'clean.' That if data is collected first, then the following theory will be free of misconception. However the language filter discussed makes this largely not the case. There are preconceptions inherent within data which will carry over to theories formed. In the study of history, these implications of language are quite significant. The meanings of certain specific words will alter the theories of historians, as their perceptions of them will vary. For instance the term 'mateship,' in regards to Australian military efforts, will more than likely provoke a response in a patriotic Australian historian different to one from another nation with no experience of Australian culture. However the natural Sciences give rise to a possible counter scenario to language affecting data. It is an acknowledged phenomenon for a scientist to have a sudden epiphany and come to a theory. As such, the language filter over data would not compromise the theory. Sir Isaac Newton's famous encounter with an apple causing his realisation of gravity and the subsequent paradigm shift of scientific thought is such an example. Newton's linguistic experiences of an apple are unlikely to have affected his theories on gravity. However such epiphanies are essentially theorizing prior to data; being based largely on the individuals thoughts. Therefore in order to fulfil Doyle's requirement of acquiring data first, language will almost inevitably affect the process. Language's filter upon the collection of data and subsequent effect on theory impacts the possibility of Doyle's claim.

A further key issue within Doyle's claim is his statement that only by collecting data can you form a correct theory; this assumes that the data itself will be accurate. Indeed anyone who theorises within Science and History assumes they have collected accurate data. However what happens when two completely contrasting pieces of evidence both arise relating to the exact same topic? Data itself does not have its own point to make. The above definition of data as anything specifically directed at a topic of research means that contrasting data is not only entirely possible, but in fact quite likely. As theories rely on data to be accurate, then by extrapolation the contrasting points of evidence must also be accurate. This however, seems illogical. In order to take into account both conflicting pieces of evidence, a theory could take shape somewhere between the two. It stands to reason that, if there are two points of contrasting evidence then the middle area between the two would be most correct. It would also be assumed that there would be data to support this middle stance. But by assuming as

such, one is theorizing that there will be data prior to any data actually being there, which is exactly what Doyle suggests to avoid. The debate over anthropogenic global warming reflects this problem, both on a historical and a scientific level. Historical data extending back thousands of years indicates that the current rise in temperature has happened several times before, and is in fact fairly overdue. Global warming scientists on the other hand claim that the current rise is caused by humans, and have their own data to support this claim. A theory which finds the middle ground between these two contrasting arguments would then seem the most accurate. Again however, this would assume that data is there to support this. Furthermore such a theory would mean combining the two conflicting points, which seems unlikely to work. Conflicting evidence is a scenario of considerable impact to the legitimacy of Doyle's statement. Conflicting yet accurate data relating to the same theory is a significant complication to Doyle's apparently simple suggestion.

The idea proposed by Doyle that theorizing prior to encountering data is to be avoided to ensure the theory is accurate seems a relatively straight-forward statement. However, several knowledge issues render his belief almost unachievable, at least within the Natural Sciences and History. Achieving data prior to theory, crucial to Doyle's suggestion, is a challenge in itself. The preconceptions involved in language incur some degree of assumption, as too do the theories necessary for daily existence. Indeed it is arguable that it is impossible to act without theory. As such, data itself will almost inevitably be a product of theory. However, even if data has been encountered prior to theory, a further issue arises with the possibility of conflicting data. This in turn creates non-supported theories, again undermining Doyle's suggestion. I would argue that, whilst Doyle's claim seems hypothetically the correct manner to undergo theorisation, several knowledge issues make fulfilling it unlikely.

Theo Squires

Year 11

The Dilemma of the Modern Polis.

In the West, there are several assumptions inherent in our political system: the will of the majority is paramount; democracy is the pinnacle of political philosophy, and all previous systems were progressing toward it. However, these assertions are neither entirely true nor, even if they were true, beneficial: often such assertions are used as justifications for undemocratic policies, or as the cassus belli for wars – the US government, among others, being guilty of both in the past decade. The modern polis is grossly different from the ancient Greek or Roman polis about which classical philosophers wrote; likewise, the conditions of the Enlightenment differ from contemporary conditions. There exist different challenges in the 21st Century, including: a lack of meaningful engagement in politics; stagnation of liberties; the bloated state.

Of the many things taken for granted in the world, political structure and political philosophy are two of the most important. Most people are largely unaware of the thousands of years of thought and the changing conditions from which our current systems were born; unaware of the origins of political order and thus apathetic, unconscious and controllable, malleable for propagandists and politicians. If the extent of an individual's knowledge of political systems extends as far as democracy versus extremism, then the former would indeed appear as the preferable system. Lessons from the 20th Century, where populations did not, or could not, engage in politics, show that a conscious and active polis is a defence from tyranny. An effective polis relies, therefore, on not only awareness of history and philosophy, but also interest and the continual involvement of all of society's members in the civic world. The Weimar Republic was a democracy, in which millions of generally intelligent Germans did vote, but from this system arose the Nazis: able to contravene the democratic system without consequence, the Nazis used street thugs and manipulated the system to gain dictatorial power. Likewise, in 2001 the "Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act" (USA PATRIOT Act) was passed in the USA, drastically increasing state-power to violate individual freedoms, under the guise of anti-terrorism law. The PATRIOT Act, still in force, is in many ways similar to the Reichstag Fire Decree; in a democracy, people will vote away their freedoms – in a tyranny, they have none to begin with. Perhaps, then, a voting population is not enough to safeguard liberty.

The counter-argument that more liberties are enjoyed in democracies than in non-democratic states may be empirically evident, but is not inherently true. While there may be greater political liberties in a democracy, in voting for example, a democracy will not necessarily have greater personal liberties. Prior to universal or even majority male suffrage, there had been large increases in personal liberty. Even in the absolute monarchies of the 18th Century, there had been trends toward greater liberty. In modern-day China, there have been great increases in personal freedoms without the associated increases in political freedom – it remains as the world's largest single-party state. Given that increases in personal freedom do

not necessitate, nor necessarily arise from increases in political freedom, it is possible that many of the freedoms experienced in a modern Western democracy would be possible in a constitutional monarchy or alternate system without universal suffrage.

If the ability to elect one's rulers is insufficient, and given a state's natural tendency to try to increase its powers, what mitigating mechanisms can be used? A constitution is one possibility. The United States Constitution, and Bill of Rights, was written for the sole purpose of protecting people from the government, by limiting the government's power to act against the liberties of its people. Consistently, however, constitutions are ignored or directly violated. The New Deal, found unconstitutional in 1933, was found constitutional upon appeal when the US government requested another judge. At most, the constitution delayed the expansion of the state's power by six months. Within Australia, the original constitution explicitly states that trade within the Commonwealth be "absolutely free". Despite this, there were still tariffs in place on interstate trade during the 20th Century. While constitutions can serve to safeguard liberties, there are too many examples of where they have failed to do so to be considered an entirely effective measure. Despite their repeated failings, however, it can be argued that constitutions have still served to safeguard liberty. To what extent may be determined by how separated the legislative and executive is from the judicial; if the judicial can be influenced by the government, the constitution is undermined.

One of the most important differences between the ancient and modern polis is size. Aristotle suggested that the maximum size for a polis should be 100,000 people. The number, perhaps, is unimportant, but the idea is relevant: at what point does a democracy become too big? In a population of five to ten million, as in several European countries, nearly every view and interest will exist. Consensus is therefore impossible, so there is reliance on majorities. However, the decision of the majority will never serve the interests of an entire population. In a larger population of 300 million, for example the USA, the 'minority' interests which are not served by a majority vote may be over 150 million people. The effects of this can be exacerbated by widespread ignorance of political issues and the facts, compounded by propaganda media and low levels of education. With these conditions, a democracy is mob rule: the will of the majority, which can be swayed through the media or bought by politicians, will rarely serve even the majority. The truism that people always vote in their own interests is false: people rarely know what is in their interests. For example, socialism was a popular system in the 20th Century: of the many socialist states that existed in the 20th Century, none were successful, and many were authoritarian – for example, Nazi Germany, USSR, East Germany, Albania etc. Significantly, many of these regimes had popular support, at least in their origins: majorities can act against their interests.

Two of the most famous and successful democracies in history made use of slavery: the Roman Republic and Athens. Further, only a portion of the population could vote. Thus, consensus and larger majorities were easier to achieve, as the interests of the well-educated patricians and freemen were often compatible – burghers, for example, do not want government intervention in their markets so a majority can be attained in voting against such regulations. Majority rule could serve the interests of almost all the *voting* population in these smaller nations.

Thus it can be reasoned that for a successful democracy to exist, there must be a small, well-educated and politically-involved population with less varied interests, lest the system devolve to mob rule.

Theo Squires

Year 11

What is language?

Language can be viewed in several different ways. Different definitions of language focus on one aspect of its use - each provides insight on one facet of the crystal that is language, but none incorporate all. Using the metaphor of the crystal, language can be seen as a way that the sensory input of the world is refracted and shone onto our mind; language splits the one light into different colours, making the world interpretable. Another view is that language is that language is the embodiment of thought, and different languages provide different mediums to formulate and express thoughts, giving rise to cultural differences due to the difference in language. The latter is called linguistic determinism.

However language is viewed, it has a very large role in our lives. Language is both the crux of our existence and the seat of our power, for without language there is no comprehension of the world; language is both a facilitating and limiting force in this regard - the limits of our understanding of the world, and ourselves, are defined by our language.

While thinking of how one would live in a world without language, one faces an unavoidable issue: they are using language in these researches. However, intuitively, viewing the world without language would be incredibly disorientating. Objects, colours, shapes, smells, sounds : all have words to describe them, without which they would most likely be an indistinguishable mess - though this hypothesis is nearly impossible to test for the stated reason.

While language is integral to human existence, is it necessary for life and the existence of the world itself? Beyond the semantic sense that there would be no 'world' if there was no word to describe it, this is an interesting question as even basic animals, which have no recognisable language, must be able to make sense of the world they occupy, at least to some extent. While consciousness and language are inextricably linked for humans, the same may not be true for all animals that have consciousness. Or, perhaps, their consciousness is so different from ours that while it shares the same noun, it is completely beyond human comprehension.

The above questions highlight one of the main limitations of language: it is nigh impossible to move beyond language when thinking, making studies of the metaphysical difficult and unsatisfactory. That language is also prone to misinterpretation, confusion and distortion is problematic, particularly to logical pursuit. In this case, the crystal is an apt metaphor: crystals can distort, clarify, refract, and dazzle, just like language.