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Editor Mr Mark Foy

Assistant Editor Jason Wright

Printer Mr Alex Crawford

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Editorial

When I first began the IB diploma I was curious about the infamous subject of "TOK" and how this compulsory subject – similar to philosophy - would be beneficial to my learning. Moreover, having never studied philosophy before, I was bewildered when in my first lesson of 'Theory of Knowledge' we discussed how one actually knows that an apple is in fact red – or that it even exists. However, I soon became accustomed to this unusual way of thinking that is common in 'TOK' as we explored and analysed the various ways from which humans gather knowledge and information. Over the course of the next six months our class explored these 'ways of knowing' – including perception, language, science, mathematics and emotion – and the advantages and disadvantages of each. Currently entering my fourth term of Theory of Knowledge, I have become acutely aware of the many limitations that are present in all methods of obtaining knowledge and how these limitations ultimately corrupt the fundamental accuracy of all knowledge. However, Theory of Knowledge is not intended to dismiss all human knowledge as inaccurate and/or false, but rather to highlight to students the inherent restrictions of knowledge and how it is important to consider how knowledge is obtained and shared. Ultimately, Theory of Knowledge encourages students to become critical thinkers and to not merely accept knowledge as facts that are definitive and final. As a result, Theory of knowledge has vastly broadened my understanding of knowledge and education, as well as demonstrating the importance of understanding the 'ways of knowing' and their individual pros and cons. In this respect, I would highly encourage other students to study any sort of philosophy as it is not only deeply fascinating but also educates one on the fundamental issues of the world we live in.

Jason Wright.

Reid Amos

Year 12

Addiction and Responsibility: need we accept a Deterministic View of Addictive Behaviour?

Introduction

The issue of how and when people can be held responsible for their actions is becoming increasingly important in both social circumstances and cases of law; how people are to be held responsible impacts how other people and the law treats them. Understanding decision-making, and the various arguments of determinism and free will associated with it are critical to how responsibility is to be understood.

However, this is quite a broad subject to examine within 4000 words, therefore in answering "Addiction and responsibility: need we accept a deterministic view of addictive behaviour?", addiction will be used as a limit case with which the subject can be focused and examined with respect to.

Terminology

To understand this question, addiction must be understood. The term has connotations similar to having a desire; for example, if someone likes playing basketball they may be described as addicted to it, but this loose, informal use is not sufficient. Addicts experience compulsion rather than mere desire, and this need is significant because it cannot be satisfied. This distinction can be seen through the example of thirst. When one has gone without drinking they experience a powerful need to drink, rather than just a desire to play basketball as with the former example. The desire can be easily ignored, while an addiction is very difficult to abstain from. Furthermore when ignored, addictions can cause withdrawal symptoms; creating psychological and physiological distress. Addiction comes in many forms; e.g. substance addiction to certain drugs, alcohol, etc. even sexual addiction and addiction to social networking sites and video games. While not as obvious as substance abuse, these can still be sources of addiction. This essay uses addiction to substances as a paradigm situation to focus on the issue of free will.

We need also to consider what is meant by responsibility. It is sometimes used to mean having custodianship of: a parent is responsible for their child insofar as it is their task to care after the child's well being but this is not how it is to be used in this essay. The term is usually used in the context of attributing cause to something such that an occurrence can be said to happen because of whatever is responsible for it. This can be considered from two perspectives; physical responsibility and ethical responsibility. Physical responsibility occurs if someone or something physically causes something to happen. Ethical responsibility occurs if someone deliberately causes something; one is ethically responsible if they intended for something to happen. If a person does or does not do something, then regardless of the reason, they are physically responsible for it, i.e. they are the cause. If, however, an outcome is accidental and a person did not deliberately do something, then they are not ethically responsible - the intention is not there. This distinction can be seen through the following

analogy. In one circumstance, Jack is angry with Jill and deliberately throws a ball through her window with the intention of breaking it. In another circumstance, Jack throws his ball to Tom but misses and the ball accidentally goes through Jill's window. In the former situation, Jill would hold Jack physically responsible because the window's breaking was physically caused by Jack's throwing the ball, and she would hold him ethically responsible because he intended to break her window. In the second situation Jack is still physically responsible because his throwing the ball is the physical cause for the window breaking, but he is not ethically responsible because he did not intend to break it; it was an accident. This ethical responsibility is apparent if we choose an action. Essentially, responsibility means accountability for; and relating this back to addiction, for an addict to be ethically responsible they must not only have physically done something (i.e. physically ingested a substance) but must have intentionally chosen it; i.e. made the intentional decision. Therefore, if an addict is ethically responsible for their actions, they are answerable for them and the blame or praise belongs to them.

Determinism

Intent and decisions are therefore important aspects of responsibility, and this draws attention to the determinism vs. free will debate. Determinism relies upon the theory of causality: that everything in the universe is caused by previous events; that something happened, causing something else to happen, causing something else to happen, in a chain stretching back to the beginning of time. An example of causality is a log hitting the ground. The log does not 'just' hit the ground, it does so because previously it was falling; it was previously falling because it was dropped; it was dropped because the fingers holding it extended; and the chain of causes continues. This is an example of how physical occurrences are affected by causality; that there is a clear, logical chain of causes, which are responsible for the most recent event (i.e. the log hitting the ground in the above case). It is important to note that an event will likely not be the result of only one cause, rather that there are a range of other events/circumstances which influence and combine to cause a particular event (e.g. the motion of a water molecule in the ocean cannot be described as caused by a single current, rather by the combination of various currents which in turn are caused by movements of animals, tectonic plates, heating of areas of water, etc.). This appears sound; it makes sense that an event is caused by other events, but it does rely on underlying assumptions. It assumes that the universe operates by means of logical, ordered laws. This also appears like a sound assumption as there is evidence for this in every day experiences: the motion of a billiard ball can be predicted using Newton's laws.

However, a modern scientific theory in quantum physics called 'Quantum Indeterminacy' proposes that the universe is essentially chaotic, and that on very small scales, things can be uncaused (Martin, 2006, p. 214). This does not mean unpredictable; many things can be the result of systems too complex to understand such that they seem unpredictable and random, but if they are the result of something then they are not random; there is order there. An example of quantum indeterminacy is radioactive decay. This involves radioactive material such as Carbon-10, decaying into other elements. The half-life of an element is the amount of time taken for half of the atoms to decay. Carbon-10 has a half- life of approximately 20 seconds (Earwaker, 1962), which means if you have 100 atoms of Carbon-10, in 20 seconds you will have 50; 20 seconds after that you will have 25,etc. According to this theory, even if these 100 atoms were identical and exposed to identical conditions, after 20 seconds half of them will have decayed and the other half will not. One particular atom may persist for hours while another for only 1 second and there is no reason why. If this understanding is correct, it

is not that we do not know the reason, rather that there is no reason; the behaviour of these atoms is uncaused or random. This is an example of causality not governing the physical realm. Furthermore, quantum indeterminacy states that on the quantum scale all particles are effected by randomness: when two particles collide, the direction that they are deflected is random; one particle may come to a complete stop, or bounce back the way it came, or even continue straight through the other, and whichever result occurs is random. If this is true then does causality apply? Similar to the issue of radioactive decay, it is not that the reasons for the particle's movement are unknown, rather that there aren't any reasons; and if there is no reason for its movement, its movement was uncaused. If this theory is correct (as is widely accepted among physicists (Martin, 2006, p. 215), it provides two cases where causality does not apply to the physical universe; hence challenging the theory of comprehensive causality.

Nevertheless, determinism applies this theory to people. It argues that if other physical events are merely the result of a chain of causes then why not the actions of individuals? For determinism to work, a materialistic ontology (understanding of reality) must be accepted; i.e. the physical world composed of matter is all there is. If this belief is accepted, then a person is also purely physical, only their physical body. If this is so, then people are just biological machines, composed of inputs and outputs whose decisions are merely the results of processes caused by physical conditions affecting the body. Therefore, an ontologically monistic perception of a person is one of a biological machine, bereft of a non-physical mind. If, however, a decision implies choice: that in a given physical circumstance an individual could act in multiple possible ways, then determinism is a denial of free will. However, there are other more ontologically plural understandings of existence that do account for a mind. One such is that each person is composed of their physical self, including a brain, but also has a non-physical mind and/or soul. This idea is believed in many religions such as Christianity (The Holy Bible (R.S.V), 1946) and Islam (Radice, 1981), to name a few. The non-physical mind cannot be perceived through any empirical means, but is apparent through introspection; that is, by looking into oneself. It appears as common sense to many individuals that they themselves have a mind; a consciousness of understanding, of thought as they perceive it, but this is not a physical thing that can be seen and touched, rather is perceived nonetheless in a non-physical way. Even if causality is accepted to some extent, if we have a mind that is not of the physical universe, then it follows that it may not be ordered by the laws of the physical universe and therefore, causality may not apply to it in the form of determinism. Determinism is opposed to this idea of the mind, taking a monist perception of a person; that there is only one aspect to a person which is their physical being. This is supported by the Occam's Razor principle which proposes that the simplest explanation is usually the preferable one. Determinism therefore concludes that if the simple explanation of causality governing a person's actions works, then why complicate the theory by adding in the aspect of a mind? However, this reasoning may be seen as reductive: trying to view everything in respect of one thing when that is not sufficient to fully account for it.

Medical Understanding of Addiction

Medical science applies this to people, therefore taking a deterministic approach. Modern medical science treats the body as a purely physical entity - as a machine even. It looks at actions and finds causes for them (e.g. the cause of moving an arm is the twitching of muscles due to electrical impulses sent by nerves originating in the brain) and it goes so far as to look into the brain to find causes for a person's actions. The medical model of the brain is that of a network of nerve cells that communicate via electrical impulses. The brain is immersed in a bath of chemicals and hormones which affect how it works (Mount Nittany Medical Centre, 2011). Activity of nerve cells in particular parts of the brain send electric

impulses to the rest of the body to make it do things. Furthermore, evidence suggests that activity in certain areas of the brain correlate with different emotions and processes of thought (Mount Nittany Medical Centre, 2011). The simplest explanation is that this activity is the thought or emotion, and due to the principle of Occam's razor, this is believed to be true from a materialistic point of view. Psychiatry is the science of mind and behaviour. It treats the mind as identical to the brain. The basis of psychiatry is that when certain physical conditions are found within the brain, a person will display certain characteristics or feel certain emotions, have memories, etc. An example of a piece of evidence supporting this idea is the research of brain surgeon Wilder Penfield in the 1950s (Vaughanbell, 2008). He found that by placing probes in particular areas of the brain and administering a tiny electric shock, the patient recalled memories. In this case, the memory (something associated with the mind), was caused by stimulus in the brain. Psychiatry also operates with the idea that administering drugs to people can make them feel different emotions, the basis being that emotions are the consequence of the balance of chemicals in the brain. Therefore, if this balance is changed, a person's emotions are changed. If the medical understanding of the brain is accepted and emotions and thoughts are caused due to physical conditions, then this impacts how an addict can be held responsible.

In the brain, the limbic system is a reward system. It links various brain structures which control and regulate one's ability to feel pleasure (NIDA, 2011). Feeling pleasure when performing an action motivates one to repeat that behaviour. This is useful as it motivates us to perform beneficial actions such as eating. However, the limbic system is also activated by addictive drugs, providing motivation to continue taking them. If one accepts the medical understanding of the brain and mind: that they are identical, then that is a monistic, materialistic, deterministic view and as such it follows that all of an addict's actions are caused. The addict does not choose to take an addictive drug, rather their taking of the drug is caused by other physical circumstances. These circumstances, according to medical science, include biological, genetic and environmental factors. The significance of this perspective is that if the addict does not choose to take a drug, but instead do so because of a range of physical factors, then how can they be held ethically responsible for their actions? This is the view of many determinists; that not only the actions of addicts, but of everyone are caused and therefore no accountability can be placed upon said person; i.e. they cannot be held ethically responsible for their actions because they were physically caused by factors that the person cannot control and not chosen by them. Therefore, they are only physically responsible. An alternative way to hold addicts responsible while accepting determinism is to acknowledge that no one has free will, yet still hold them accountable for their actions for the purposes of punishment. This view, sometimes called 'soft determinism' takes the approach that both punishment and threat of punishment can itself be a contributing cause to a person's behaviour which, if implemented, can influence us as biological machines to deter unwanted behaviour such as addiction (Addiction & Behavioral Health, n.d.). This does not hold an addict ethically responsible, but instead addresses the physical causes of the person's actions, attempting to influence them such that alternate behaviour occurs.

An Alternative View of Addiction

The crucial assumption of both determinism and soft determinism however, is that the brain is identical to the mind. But this is open to question. It is firstly based on the theories of causality and determinism which have already been demonstrated to be questionable. Secondly, it relies on a materialistic, monistic belief about the mind. This is not, however, the only understanding of mind. Another understanding is that the mind is correlated with the

brain. The meaning of correlation here is that two things go together but are not identical, e.g. when we have certain micro-organisms present in grape juice we have fermentation, but the two aren't identical; i.e. when we have one we have the other but they're not the same thing. This is one way of viewing the mind and the brain: as correlated but distinct. If so, then physical circumstances in the brain are correlated with states of mind e.g. Penfield showed that certain brain activity was correlated to a patient having a memory, not that the event in the brain (the electrical impulse) was the memory (Martin, 2006). A plausible understanding is that of the mind being correlated to the physical body but not of it, and therefore not subject to the physical laws that govern it. This allows for free will in a way that determinism does not. If there is no mind external to our physical body then we are only biological machines that operate either by cause and effect, or apparent cause and effect built upon fundamental randomness and probability. While the latter is not determinism, neither is it free will because a random event is an occurrence, not a choice. This external mind must be capable of making decisions; i.e. when there are multiple different actions possible, the mind chooses which to make, without cause, and not due to random probability. This paper suggests that the mind can be better understood in terms of an analogy, which will here be designated the 'King model'. In this model, there is a non-physical mind that has free will. But its decisions are influenced by the physical circumstances of the brain and body. The analogy is that of a king ruling a country. The king is the seat of ultimate power; what he decides, is what the country does. But the king is not alone, he is accompanied by a multitude of advisors; some of whom only give him reports on the state of his kingdom (e.g. how much food they have stored) while others advise him on what actions to take. Though the reports and advice he receives influence him, the reporter does not make an action, nor can the advisors make the rest of the kingdom do as they desire; the king has the final say and while his decision is influenced by these things, it is not caused by them (the king may choose to take an alternative form of action to that which some of his advisors recommend). This relationship of king and advisors is like the relationship of an external mind and physical body: the body influences the mind with sensory inputs, chemical levels, brain activity, etc. being like advisors, while the mind itself has the final say. The mind therefore has choice - it may be influenced by physical factors but has the ability to ignore them, therefore breaking the causal chain.

It may seem that science demonstrates that this idea of the external mind is wrong; it has provided no evidence for the existence of a mind and supports a much simpler alternative through determinism, but this is a fallacy. Science cannot show this idea to be false, nor can it confirm it. Its empirical approach is such that it has difficulty assessing non-physical claims of this kind. In this context, science is akin to the proverbial 'blind man'. A man that is born blind and has no contact with others has no way of collecting any evidence for the existence of other senses; and would live his life in contentment that he is not lacking in any sensory means. He cannot know of the existence of sight because he has no means of detecting it. Science is like the blind man; it has access only to the physical realm as he has access only to certain senses. It therefore is not well suited to examining the non-physical due to its focus on the empirical, similar to how the blind man is not well suited to examining the sense of sight. This idea of the mind as a non-physical dimension of reality is also found in many enduring philosophical and religious traditions, including those of St. Augustine (Mendelson, 2010), Descartes (Smith, 2010) and Vedanta (Sadananda, 2008). These traditions are not only enduring but were isolated by time and place, some of whom were and are remote, and unlikely to have influenced one another. Many people also have an intuitive understanding that they have a mind, which is observable not empirically, but through introspection. This

experience of the mind is not physical, so it stands to reason that science has not empirically observed it. These arguments do not justify the notion of a mind, but do either support the notion of a mind or neutralise science's tendency to dismiss it. It is by no means a conclusive argument for the existence of an external mind, but our minds are such that, arguably, we cannot conclusively determine their nature. The eye cannot see itself; it can receive some evidence as to its nature (i.e. can look at other people's eyes or into a mirror), but this does not show it itself. This is much the same as how the mind cannot know itself; through introspection it may be able to have some idea of itself but this must be subjective, and has a similar problem to that of the eye.

If this idea of an external mind is accepted then an individual is more than a biological machine; they are capable of making decisions and as such, have the ability to be held ethically responsible. Relating this back to an addict; that an addict may persist in abstinence of their addictive behaviour for a period of time despite intense cravings and even give up their addiction, may demonstrate the mind acting as the 'king' over the 'advice' of the addiction. However it is not so simple to say that everyone has free will and so an addict is just as accountable for their actions as everyone else. Using this model of the mind, decisions are made under a range of influences; the brain is correlated to the mind and its conditions affect the decisions of the mind. It is therefore more difficult for an addict to resist their addictive behaviour than for someone who is not under this influence as it is more difficult for a king to resist the advice of many advisors. If it is more difficult for an addict to abstain from a particular behaviour, then perhaps this should mitigate some of their responsibility? However, most addicts are well aware of the risks of ingesting addictive substances, and at the time when they first take an addictive substance, are not under its affect. The actions while under an addiction are foreseeable when not under the addiction and yet the addict chooses to perform the addictive behaviour regardless. If the addiction is a result of their performing the addictive behaviour in the first place, and when they first perform the addictive behaviour they were under no mitigating circumstances (i.e. addiction) then they are ethically responsible for that first action and therefore, the addiction. They themselves therefore, are ethically responsible for the subsequent circumstances that make it difficult to abstain from the addictive behaviour, so using their addiction as an excuse to mitigate their responsibility is not a persuasive argument. Even if it were, due to the advisory effect of the addiction, it cannot make the addict perform any action. It is like an advisor that shouts over the others, demanding attention, but ultimately the addict still makes the decision to perform their actions, as is demonstrated by their ability to abstain for a given period of time or completely quit. This implies that if people have free will as is allowed by a model of the mind such as the 'King model', then ultimately an addict is has ethical responsibility.

Conclusion

In examining the question "Addiction and responsibility: need we accept a deterministic view of addictive behaviour?" the implications of a deterministic view on responsibility and addiction were examined. This essay found that accepting a deterministic view, addicts either cannot be held responsible for their actions because they, and the addiction itself, were not chosen by the addict, but were determined by external causes, or they can be held accountable such that the threat of punishment may itself be a contributing cause to creating more desired behaviour. However, this understanding was shown to be questionable and an alternative was proposed: the idea of an external mind which was not subject to the laws of causality. Specifically the 'King model' of the mind was presented which allowed for free will and responsibility for addiction. While this understanding is not conclusive it is a plausible alternative to determinism which allows for ethical responsibility.

Reid Amos

Year 12

'Through different methods of justification, we can reach conclusions in ethics that are as well-supported as those provided in mathematics.'

Every day, people make ethical decisions. When deciding what to do in many situations we apply ethical principles to reach a conclusion as to how to behave. But how well supported are these ethical decisions? What is the similarity between ethical and mathematical conclusions and how certain are any of them?

Firstly, consider the nature of ethics. The term comes from the ancient Greek word for 'good character' such that an ethical person is one of good character. It is the study of conduct, of how we should behave. When confronted with choice in a situation, it is ethical reasoning that is used to decide on the course of action. Ethical reasoning operates in the following manner: a person has a range of ethical principles that they believe in, (e.g. 'it is good to defend yourself') which they apply to a given situation to decide how to behave. Using the above ethical premise as an example, in a situation where a man is attacking us, then we should defend ourselves from the attacker. This reasoning appears rather straightforward, a person has a set of ethical principles which define good things to do, and these principles can be applied to a situation to determine what they should do. This is a form of deductive logic: "if this is true (ethical premise), then this follows (ethical decision)" where the ethical principle is accepted as truth, and its implications followed through to determine the appropriate course of action, hence using reason as a way of knowing.

This reasoning is also used in other disciplines of knowledge, such as mathematics. Mathematics works through the accepting of axioms, and changing of representation of these axioms to make evident what they imply. This can be demonstrated by the following example:

Axiom 1: An even number is "$2n$" (where n is a whole number)

Axiom 2: An odd number is "$2m + 1$" (where m is a whole number)

Theorem: An odd number (o) and an even number (e) can be summed to give an odd number

Proof:

$e + o = 2n + 2m + 1$

$e + o = 2(n + m) + 1$

$\therefore e + o = 2p + 1$ (where p is a whole number)

but this is of the form $2m + 1$ and therefore an odd number plus an even number is an odd number.

This uses reason as a way of knowing effectively, where the outcome is certain given the premises, showing it to operate in a similar manner to ethics. But is it the same? A possible distinction between the operation of ethics and mathematics is the nature of the premises.

The use of reason here as a way of knowing is quite reliable, deductive logic such as this operates by the principle that 'if this is true then this follows' such that 'this has to follow' meaning that the conclusions are certain given the accepted premises. However, a knowledge issue associated with this way of knowing is the validity of the premises. In mathematics they are called axioms. The defining point of mathematical axioms is that they cannot be proven (it is required for something to be known as true originally to use it to prove something else) but instead appear as self evident and so are accepted as truth, behaving as the starting point for deducing other theorems. The previous example " $e = 2n$" cannot be proven, instead it is a statement which is so obvious that it is accepted as truth and used to prove other things. The premises in ethics however, are not considered axioms because they are not so self evident as mathematical premises. While the use of reason as a way of knowing for ethical conclusions might be as sound as that of mathematical conclusions, the knowledge issue associated with the validity of premises may be more significant in ethics. Ethical premises have diverse sources (different cultures that have no contact with each other develop ethical premises from different sources) and a problem with the validity of these premises is their variation. If one culture operates under one set of ethical principles and another culture under a different set, then this questions the reliability of either's: can multiple different or contradictory ethos be true? Furthermore, not only different cultures, but individual people can accept ethical principles that are contradictory. If this is so it demonstrates uncertainty in ethical premises. An example is shown through the following premises: 'it is wrong to kill' and 'it is good to defend yourself'. If we subscribed to both of these ethical principles, then in a situation where in order to defend ourselves we must kill, our ethical premises would conflict with each other. Both of these variations suggest that ethical premises are not as definitive as those of mathematics and therefore, while one may reason with ethics as well as mathematics, the conclusions are not as well supported.

However, although mathematical axioms seem certain, how different are they actually from ethical premises? Are mathematical axioms actually so obviously true or is our judgment of them significant? The knowledge issue of the validity of mathematical premises may be more significant than is commonly thought. Mathematics is certain given the axioms, but it is only true insofar as the axioms are true. These axioms cannot be proven, however there is much evidence which affirms them, e.g. we are able to use mathematics successfully to accomplish a whole range of tasks, and it is frequently demonstrated to work. Furthermore, mathematical axioms' apparent self evidence to so many people means that there is little cause to question them, however, this raises the issue of the 'appeal to authority fallacy,' and does not mean they cannot be questioned. If we were to take some mathematical axioms and change them, what would happen? One expectation is that it wouldn't work; that the theorems created would be nonsensical or not work mathematically, however this is not the case. The classical mathematical axioms of Euclidean geometry have been challenged, yielding interesting results. The mathematician Lobachevsky substituted a different axiom into Euclidean geometry and found that this new mathematical system worked. Lobachevsky’s geometry can be regarded as describing the inside of a sphere in two dimensions, and is useful in such circumstances. Another similar example is Riemann geometry which again changed some axioms and is used to successfully describe the outside of a sphere in two dimensions. These examples are of instances where particular axioms of mathematics have been challenged and substituted, to yield a system that still works and is useful. This demonstrates that although mathematical premises may appear self evident, it is plausible that they are more similar to ethical premises in that they too may be only conventions, rather than universal truths.

Moreover, although there is variation in ethical sources, this does not necessarily mean that there is not the possibility of 'universal' ethical premises. Among the variation in different religions and philosophies on how to live, some ideas are recurring. Premises such as "happiness is good" form the basis of many cultural beliefs, though views on what causes happiness may differ. Emotion as a way of knowing is used by many different people and cultures to come to similar conclusions, where people's intuitive beliefs create similar ethical premises. Indeed "it is good to be loved" is a widespread ethos which appears as self evident to many, and so a principle of this kind could be said to resemble a mathematical axiom. Many enduring religious traditions endorse a belief of this kind, that the universe is morally ordered and is subject to ethical principles which may or may not be defined by a deity. If this is true then some ethical premises could be regarded as definitively true and could even be considered axiomatic. This demonstrates further similarities between ethics and mathematics: that both mathematical premises and ethical premises may be universally true, means that ethical conclusions are supported in a similar manner to mathematical ones. If an ethical argument is based not only on conventional premises, but premises that represent the actual moral order of the universe, and the reasoning is sound then the conclusion would be extremely well supported, just as much so as if the same were done with a mathematical conclusion.

However, an associated knowledge issue is that this depends upon the acceptance that certain ethical principles are axiomatic. But we might consider that we inherit them from culture or group agreements, and they are merely conventional. We may reason that because our ethics are as they are only because someone else says so, to insist on them is an 'appeal to authority fallacy' and they need not be followed. However, it benefits society to have a set of ethical principles with which its members use. If they were disregarded, our social structure would suffer and it has already been proposed that universal ethical premises are plausible.

The mechanism of ethics and mathematics operate in a fundamentally similar way: the use of emotion to establish premises and use of reason to reach conclusions. Therefore, the largest potential for difference is how well supported their premises are. Mathematical premises are thought to be axiomatic and self-evidently true, but they cannot be proven and it has been demonstrated that they may not be necessarily universally true, and so may be more similar to ethical premises. Conversely, ethical premises are thought to be conventional, but it is plausible that there are ethical premises that are universally true, or axiomatic. Due to these similarities, it is concluded that ethical conclusions are supported to a similar degree as mathematical ones.

Drew Clements

Year 12

'Through different methods of justification, we can reach conclusions in ethics that are as well-supported as those provided in mathematics.'

If science can be thought of as a religion in modern society, then mathematics would be the gospel on which it is built. The thought that ethical conclusions could be as safe as mathematical principles would strike believers as heresy, despite the fact that this could be so. The word conclusion, especially in a mathematical sense, means the end of an argument, so it implies that it was derived through the use of reason. This could limit the possible justifications to different methods of reasoning; deductive, inductive and evidentiary, provided that justification is necessarily related to reason. A well-supported conclusion then is one where the premises and logic that make up the argument are both sound, or the evidence strongly suggests a certain conclusion. In the formal system of mathematics logic is always sound, it is only the logical premises, called axioms, that may be disputed. If ethics were to be considered a formal system, that is logically sound, then it would have the same strengths as mathematics. This cannot be replicated however, since the study of ethics is far more concerned with the applications that it can provide, namely, how to act properly, rather than taking the formal approach used by mathematical thought. Though other forms of justification do exist, such as revelation and intuition, these are not considered rigorous enough to justify a mathematical conclusion. This means it would be difficult to compare ethical conclusions that can be justified using these methods, with mathematical conclusions that do not. This difficulty puts these methods of justification beyond the scope of this essay. These ways of knowing may, however, be used to find Ethical principle, which are the most basic of ethical beliefs.

One form of reasoning is deductive reasoning, which forms a part of the principle of mathematics and can arguably be used in ethics. Mathematics as a body of knowledge is established on axioms, which are principles that are unprovable but self-evident, so are assumed to be true. Mathematics then uses formal deductive logic to establish conclusions from the axioms. Deductive logic is the logical process that shows a conclusion *necessarily* follows from the premises of the argument, in this case the axioms. This means that the conclusions formed are not disputable, assuming the axioms are correct. This implies that the conclusions then are strong, but they rely heavily on the accuracy of the axioms. It follows that if the axioms are not true then any conclusions deduced from them are also not necessarily true, though they may be provable from other axioms. The axioms that form the basis of mathematical knowledge are, by nature, very simple and appear to be true but there is a possibility that they are not. However slight this possibility is, it still casts some doubt to the validity of the conclusions. Now consider some self evident ethical principles, like the United Nations' Declaration of Human Rights. These principles are widely seen to be acceptable beliefs, although there is an inherent inability for them to be proven as such, making them seemingly axiomatic in nature. Two shortened articles, article 23 and article 24, from there are "Everyone has the right to work" and "Everyone has the right to rest and leisure" (The United Nations, N.D.). From this it can be logically concluded that no-one

should be employed to work too long be able to enjoy leisure. Since this conclusion was established through the use of deductive logic from axiom-like principles, it could be said that it is as sound as any mathematical conclusion. It is arguable that laws are made this way, though the logic is not explicitly or formally stated. Law makers could use these principles to create laws. Since we place so much trust into the laws of our society, as much as the trust we have in the mathematics behind the construction of a bridge we are standing on, these conclusions must be well justified. If either were to be wrong it would be a severe misfortune. It should be noted that although the ethical principles were said to be self-evident, the vast number of different cultures that live by different ethical principles would suggest that they are not, although the relativism of morals is a large debate (problem), and so this claim cannot be resolved definitively either way. Furthermore, ethics and law are separate areas, limiting the usefulness of this comparison somewhat, although it is still relevant.

There are some reasons why the laws based on ethical principles are not as justified as the laws of mathematics. Firstly it is unlikely that an ethical principle can be as certain as a mathematical axiom, due to the relativity of most ethical principles, and the diversity of ethical principles that are found. It is hard to find an ethical principle more widely accepted or self-evident than that which says that killing is wrong, but some cultures do not show such an aversion to killing. Contrastingly mathematical theorems aren't considered proven until the theorem is shown to be true for the general case, which means every case. There is also a concern that ethical logic cannot be as precise as mathematical logic. Plato believed that all knowledge was as precise as mathematical knowledge, and he treated ethical problems in the same way he would a maths problem, but Aristotle considered that the imperfection of humans would lead to imperfection in identifying the correct way for them to act (Gier, 2005). Mathematics has developed its own language of symbols to remove the ambiguity inherent in language, but no such situation exists for logical ethical thought because, as Aristotle identified, there is no real way to represent an actual ethical situation as an abstract idea, as is possible in mathematics. Consider the logic that, since a=b and b=c, a=c. It is indisputable. If we now consider the logical argument that since not killing someone is right and keeping someone alive on life support is not killing someone, then it is right to keep someone alive on life support. The problem in this argument lies in the way that the phrase 'not killing someone' is used in two different ways. In the first case it is the opposite of killing someone, whereas in the second it is used to describe the act of keeping someone on life support. Although the difference is subtle, it is important, and is called the fallacy of equivocation (Kemerling, 2002). This illustrates the way difference, that 'a' represents a definite, abstract value or object, whereas the phrases used in the second argument aren't so well limited in their possible meaning.

An important point to consider is that mathematical conclusions are considered by society, at least western societies, to be far more valid and justified. This stems from the objective nature of mathematical conclusions, such that, they are not disprovable within the mathematical paradigm, as they are built by sound logic. The success of these principles in the real world suggests that the paradigm is, at the least, a very good approximation of the world. This leads to the trust that people show to their bridges and buildings, products of mathematical knowledge. It must be remembered here that the ability for mathematical knowledge to be useful in the real world is just another aspect of justification, not the whole justification. Pure mathematics is indeed unconcerned with the real world applications of its conclusions and would not accept it as any justification. Contrastingly it is seemingly human nature to question the propriety of one's actions. This means that even when evidence

suggests someone has taken the right course of action, he may continue to question them. This may give the appearance that the action done, based on an ethically reasoned conclusion, was not the best action. Other well reasoned conclusions could be made in the same situation, which are well justified, again due to the diversity in ethical beliefs. In mathematics there is just one sound conclusion in any situation, so that when the conclusion is found, people may be very confident in the fact that it is the best conclusion. It would actually be considered to be proven. There is no corresponding state for an ethical conclusion, where there is such small doubt in the validity of the conclusion. Different ethical disciplines often would reach very different well-supported conclusion given the same set of circumstances. An example of this is a situation where a man gave a girl with a severe allergy to nuts a nut sundae. An intentionalist, who believes that actions should be judged on the intentions of the one performing the action, would conclude that the action is good because the man intended to make the girl happy. A consequentionalist, who believes that actions should be judged on their consequences, would say this was not a good action because the girl would have suffered an allergic reaction. Both positions can be well supported, but neither has the certainty of a mathematical conclusion.

Since western society in general has a favourable view towards knowledge gained in the areas of science and mathematics, mathematical conclusions are often considered to be as well-supported as they are, whereas ethical conclusions can unfairly be considered weak. This is due to the apparent effectiveness of and method of reasoning to find mathematical conclusions in real-world applications. The logic involved in ethical reasoning can also not be as rigorous, so logical conclusions cannot be ‘proven’ as mathematical theorems can. Although the problems inherent in justifying ethical conclusions should be considered, they can in fact be well-supported as mathematical conclusions, just not as certain perhaps.

Albert Wu

Year 12

What is it about theories in the human sciences and natural sciences that makes them convincing?

Theories in the human sciences and natural sciences are proposed explanations of empirical phenomena that are considered to be satisfactorily tested. The above question assumes theories in these areas of knowledge are convincing and this is indeed the case for much of society. In general, background assumptions that support science together with sufficient evidence are required to make scientific theories convincing. Sufficient evidence required to make scientific theories convincing may be different for different individuals. The primary merit of scientific theories is their appeal to a systematic combination of the ways of knowing of perception and reason. Scientific theories appeal to perception as they generally correspond to empirical evidence and are often effective in application. In addition, their use of scientific methods appeals to reason. Furthermore, erroneous scientific theories are likely to be corrected by other scientists and through the peer review system. The strength of evidence often determines the extent to which different theories in the human sciences and natural sciences are convincing.

Background assumptions that support science are generally required for scientific theories to be convincing. They are often derived from education, the news media, culture and religion. These can make scientific theories more or less convincing. Sometimes, they can be sufficient to convince people of scientific theories because of the widespread confidence in science. This confidence can be largely attributed to the widespread education in the scientific paradigm. However, this paradigm may not be completely adequate as it is a theory used to make sense of some aspect of reality. In 2008, my school accepted two Indigenous students who had undertaken minimal schooling. They initially experienced difficulty in accepting many scientific theories but eventually overcame this difficulty to some extent after some education in the scientific paradigm. This demonstrates the importance of background assumptions in convincing people of scientific theories. Furthermore, as a Chinese Australian, I am especially aware of the scepticism with which many non-Chinese people view Traditional Chinese Medicine. In 2007, a Chinese medical team used a drug derived from a Chinese herbal remedy on the 40,000 residents of a Comoros island. 60 days later, less than 2% of the population were carrying malaria parasites compared to 23% the previous year. Despite this, the World Health Organisation was reluctant to accept the value of the project probably because of its Western preconceptions of science (Wijesinha, 2009). In addition, scientific theories can remain convincing despite conflicting evidence because of the underlying belief in scientific theories. This is evident in school science experiments where data that conflicts with a scientific theory is sometimes rejected as an outlier. Thus, for scientific theories to be and remain convincing, background assumptions that support science are often necessary.

For many people, scientific theories are convincing because they appeal to perception. This is because scientific theories generally correspond to empirical evidence and are often effective in practice. In the natural sciences, technology can often be used to collect further evidence to

support scientific theories. However, evidence not directly observable can be considered less certain. In a school physics experiment, a Geiger counter was used to detect nuclear radiation emitted from some radioactive items and this indirectly confirmed the presence of radiation. The effectiveness of scientific theories in practice also makes them convincing. During a school chemistry excursion to a brewery, we learned about the application of theories from chemistry in the manipulation of components in alcoholic beverages. In the human sciences, appeal to perception also makes theories convincing. This year, the student leaders of my school were taught some theories in managerial psychology such as the quadrant of active-passive and overt-covert dimensions. The model was generally convincing because our experiences confirmed it. However, categorising individuals in particular quadrants is sometimes difficult and management often requires flexibility. This shows theories in the human sciences can be ambiguous and may be more difficult to implement in practice. In addition, it suggests theories in the human sciences are sometimes less convincing than those in the natural sciences. However, theories in the human sciences can be very effective in practice. For example, understanding of economic theories allowed the Australian government to implement the Economic Stimulus Plan which probably reduced the impact of the Global Financial Crisis on Australia (Commonwealth of Australia, 2010). Both human and natural scientific theories are convincing for many people because they correspond to empirical evidence and many bring practical benefits.

The appeal to reason of scientific theories makes them convincing for many people. Scientific theories are often developed and tested using scientific methods which are intended to be logical and systematic. In the natural sciences, inductive logic is used extensively. Some theories in the natural sciences are general laws such as the laws of thermodynamics and some others are more localised theories such as photosynthesis. Laws seek to explain all empirical phenomena throughout space and time. They generally use inductive logic more extensively than other more localised theories. Inductive logic is intrinsically extrapolative. Its effective use in more localised situations encourages its use more broadly when this is logical and supported by sufficient evidence. As inductive logic repeatedly demonstrates a predictive reliability, testing of every possible circumstance is considered unnecessary. However, the problem of induction is that instances of an empirical phenomenon are not tested exhaustively before a scientific theory is considered to be satisfactorily tested. Based on limited observations and experiments, scientific theories generalise for all instances of empirical phenomena which include unobserved cases. These could potentially undermine the theories. Thus, the acceptance of scientific theories is always conditional. However, in addition, scientific theories are convincing because of the widespread belief in the order and comprehensibility of nature. For example, each time an object is pushed in the same conditions, the same effect is caused. Nature seems to adhere to reason and is not random. Mathematics is an area of knowledge which appeals strongly to reason and is used extensively in many scientific theories. These theories are thus made convincing because they reflect the apparent reason in nature. In the human sciences, the behaviour of individuals can be quite unpredictable but large group behaviour can often be predicted accurately. A probable explanation is that in a large population, random variations tend to cancel each other out. The use of probability in making predictions and theories appeals to reason. This is evident in a recent study which suggests greater happiness and unhappiness result from experiential purchases compared to material ones. In each experiment of the study, hundreds of participants were involved. Furthermore, respondents rated their happiness and opinions on scales (Nicolao, Irwin, & Goodman, 2009). However, emotions and opinions are difficult to measure accurately. This makes some theories in the human sciences less convincing than

those in the natural sciences. The use of probability in predicting large group behaviour is further evident when predicting the effect of a change in interest rates on an economy. While many individuals may not significantly change their behaviour, the aggregate effect on the economy is often quite substantial and often confirms economic theories. The appeal to reason of scientific theories convinces many people of them.

Scientific theories are convincing for many people as erroneous theories are likely to eventually be corrected by other scientists and through peer review. The peer review system differentiates scientific knowledge from speculation and opinion. However, a scientific theory which convinces some scientists may not necessarily convince others. This may be due to subjective motivations or divergent views on what constitutes rigorous science. The checking of scientific theories by other scientists may have a limited effect on making scientific theories convincing, for example, for people who are not convinced by science. In general, the checking of a scientific theory by other scientists makes people, who agree with the evidence for this theory and have background assumptions that support science, more convinced about the theory.

Theories in the human sciences and natural sciences can be considered to be convincing to different extents. Choosing between competing theories in the human sciences is sometimes difficult as the human sciences often seek to explain complex situations in which controlling variables is difficult. This means these theories can be considered to be ambiguous. For example in economics, Keynesian and neoclassical theories are both prominent theories but they conflict with each other (Blink & Dorton, 2007, p.181). Theories in the human sciences can be considered to be more ambiguous than those in the natural sciences and thus more difficult to undermine. As theories in the natural sciences have more potential to be undermined and generally withstand this pressure, they can be considered more convincing. However, theories in the natural sciences are often more extrapolative because many generalise in relation to all matter whereas the study of humans is confined to Earth. This may make theories in the human sciences more convincing. However, the use of inductive logic in the natural sciences is often justified. Thus, theories in the natural sciences are actually considered by much of society to be more convincing than those in the human sciences.

Scientific theories often require background assumptions that support science and sufficient evidence to be convincing. They mainly convince through appeal to perception and reason. In addition, the checking of scientific theories by other scientists makes people, who are already convinced, more convinced about scientific theories. Although much of society is convinced by scientific theories, different people are convinced to different extents. Furthermore, theories in the natural sciences are generally more convincing than those in the human sciences. In general, the factors aggregate to convince much of society about scientific theories.

Fabian Ivancic

Year 12

What is it about theories in the human sciences and natural sciences that makes them convincing?

What is it about theories in the human and natural sciences that makes them convincing? Firstly, this question assumes that theories in the human and natural sciences are convincing, but this is not always self-evident. If we accept the premise that they are convincing, then what makes a theory more convincing than another? Are theories from the natural sciences equally as convincing as those from the human sciences? Why are some people convinced by a scientific theory and some are not? Science presents us with theories, which are intelligent postulates based on available information to try to explain certain phenomena. Scientific theories have been wrong in the past, explaining why we find them convincing allows us to think more critically about them and help us form a better, more informed opinion.

A theory is a description and/or an explanation about a phenomenon which has been observed repeatedly but cannot be proven conclusively. It should be pointed out that there is a significant difference between theories from the natural and human sciences; the way in which the theories are formed and tested reflects this major difference. In some cases, if just one observation is inconsistent with a theory, then that theory's validity can be significantly undermined if the inconsistency cannot be explained and further observations show that the inconsistency is not simply an outlier. Therefore, it is likely that at least some scientific theories are convincing, as they have stood the test of time – no observation that could not be accounted for has disagreed with the theory since it has been postulated. The amount of empirical and theoretical evidence supporting a theory is also a factor in deciding whether or not a theory is convincing. However, the way in which the evidence is interpreted is problematic, since the interpretation of evidence is open to individual variation, people are convinced by scientific theories to varying degrees.

Let us assume that some scientific theories are convincing, why are they convincing? It can be argued that theories are convincing because they are supported by empirical evidence and that the more empirical evidence supporting a theory, the more convincing it is. This is because since theories cannot be truly proven, the best that can be offered is observable, tangible evidence that points in the direction of the theory being correct, thus, the more evidence supporting a theory, the more it is convincing. For example, the

theory of global warming, first hypothesised by Svante Arhenius in1896,[1] now convinces the vast majority of the scientific community,[2] because of the sheer amount of evidence that has accumulated over time supporting the theory. However, is the amount empirical evidence the only discriminator in determining how convincing a scientific theory is? Consider again the theory of global warming, it not only has a considerable amount of empirical evidence, it has also ties with other disciplines of science. For example, from the perspective of physics and chemistry, when radiation from the sun re-radiates from Earth, its wavelength is lengthened, the carbon dioxide in the atmosphere traps this longer-wavelength radiation (but not the incoming radiation) and keeps in this radiation as heat.[3] The mechanism of global warming is much more complicated of course, however, if the amount of empirical evidence is insufficiently convincing, a theory can be convincing because of the ties it has with well-developed theory of other disciplines of science. In other words, it can be argued that consistency throughout the different disciplines in science contributes to making a particular theory convincing.

Whether or not a theory is convincing, be it of the human or natural sciences, does not depend only on the evidence that is available, it depends also on one's own interpretation of the theory, along with one's own background; i.e. what convinces people, varies. People from different backgrounds inherently form different epistemological preferences, this variation of preferences is one of the reasons why different people are convinced by different theories. For example, there is a much better chance of an atheist scientist being convinced by the theory of evolution than a fundamentalist Christian, who has been taught from birth that the chapter 'Genesis' in the bible, is fact. Similarly, a physicist who has a strong mathematically orientated background is more likely to be convinced by ideas in string theory than a physicist who has a strong experimentally orientated background. The epistemological preferences of the person are not the only factors in determining whether or the person is convinced by a theory; the person's age, education and life experiences are also factors. For example, a politician's opinion may differ to that of a scientist's in regards to a scientific theory because of their fundamentally different agendas, a scientists is concerned with scientific criteria whereas a politician must be concerned with economical, ideological and communal criteria.

The difference between the human and the natural sciences is significant, the natural sciences seek to examine how and why the environment and non-living objects behave

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1) V M Ponce, 'The science of global warming: good, bad, or ugly?' in *Prof. Voctor Miguel Ponce's website* (n.d.), viewed on 13 August 2011, <http://warming.sdsu.edu/>.

2) 'Is there a scientific consensus on global warming?' in *Skeptical Science*, August 2010, viewed on 13 August 2011, <http://www.skepticalscience.com/global-warming-scientific-consensus.htm>.

3) S Damji & J Green, *Chemistry*, 3rd edition, IBID Press, Victoria, 2008, pp. 447.

and interact with each other, whilst the human sciences seek to examine how and why we humans behave and interact with each other. This difference in the nature of the disciplines implies that what makes them convincing is inherently different.

The main reasons why some natural science theories are convincing are that they have great predictive power, ease in isolating variables and ease of reproducibility of results. If a theory is shown to work over and over again, over an adequately long period of time, it is almost human nature to be convinced by the theory. Since the objects under investigation in regards to natural scientific theories do not have free will, that is, they cannot choose how to behave, it is much easier to isolate variables and discover with considerable confidence what effect variable X has on variable Y. Having such confidence in the relationship between variable X and variable Y means that the probability of the result being affected by random factors is considerably reduced, hence, making natural scientific theories convincing. Moreover, as the objects do not have free will, they can be used in experiments repeatedly without being able to change their nature (as they wish) to affect the results.

Since human scientific theories do not have the same foundations on which the natural scientific theories are formed, human scientific theories have some disadvantages when compared to those in the natural sciences. It can be argued that these disadvantages make human scientific theories less convincing than their natural scientific counterparts. Since there is the issue of free will amongst humans, theories in the human sciences cannot be tested in the same ways as theories in the natural sciences are. Isolation of variables is therefore much more difficult to achieve, hence, it is far more difficult to be convinced that variable X changes because of variable Y. This is partly because humans behave differently whilst being observed. Furthermore, in the natural sciences, the investigator, for the most part, can be completely independent and neutral of the environment. However, when trying to study ourselves, it is impossible to remove ourselves entirely from the environment and be completely objective. For these reasons, some theories in the human sciences make sense in theory, however, they do not always work as well as those in the natural sciences. Take the theory of supply and demand for example, it makes sense initially, that a decrease in price implies greater sales (and vice versa) and that an increase in price implies fewer sales (and vice versa). However, this is not always the case. In some cases, it is likely that more people would prefer the more expensive option over the cheaper option, having the preconception that the expensive option is better; cars, doctors and airline tickets are such examples. This illustrates how, in some instances, theories in the human sciences have far less predictive power than those in the natural sciences.

Since the relationship between theory and practice in the human sciences theories can have unanticipated results (due to the difficulties in isolating variables), people's willingness to be convinced by human scientific theories may vary more so than by theories in the natural sciences. It can therefore be argued that the amount of empirical evidence supporting a human scientific theory, as with a natural scientific theory, affects

how convincing it is. This is mainly because it is difficult to appreciate fully, the effect that all the hidden variables have on the theory itself, without having empirical evidence (such as statistical evidence on the theory of supply and demand). However, a significant amount of empirical evidence is not always available to obtain in the human sciences, as the human sciences necessarily involve so many psychological variables affecting both researcher and subject. In the case where empirical evidence is not enough for a theory to be convincing, or if it is impossible to obtain directly, theoretical ties and indirect evidence from other disciplines of science may be needed to make the theory convincing, as with theories from the natural sciences.

To conclude, there are many factors affecting the degree to which theories in the human and natural sciences are convincing, along with many factors affecting the willingness of an individual to be convinced by these theories. In both the natural and human sciences, the amount of empirical and theoretical evidence supporting a scientific theory affects how convincing it is. Additionally, the epistemological preferences and life experiences of a person also affect whether or not a particular scientific theory is convincing to a particular person.

Carson Seagle

Year 12

'Through different methods of justification, we can reach conclusions in ethics that are as well-supported as those provided in mathematics.'

The argument that ethical and mathematical justifications, although very different, are equally valid is of great significance as decisions often come down to them. Be it something as simple as donations, to situations as important as deciding a person's fate, we often eventually ask: what is the logical basis for our decision, and what is the choice which we believe is ethically correct? Addressing the claim itself, the validity of a conclusion relates to how disputable its premises are, and, how logically the premises are applied. Therefore, the claim that the Ethics and Mathematics are equally 'well supported' not only argues that they draw equally valid conclusions but also, that both apply premises which are equally difficult to dispute and are equally well drawn. As such, this essay shall examine the foundations of both areas of knowledge, and how conclusions are drawn from them.

Ethics is arguably focused on studying how we should live and treat situations we face. It is developed from ethical principles: concepts of goodness or righteousness, which allow us to determine whether an action is ethically proper. However, the origins of these principles are multiple and sometime uncertain; they stem from foundations like reason, religion, and social convention. Although, the foundations being applied are often dependent upon the individual: for instance, some would not apply religion. Each of these foundations provides their own sets of principles by which an individual should abide; ethical principles are a combination of these principles. For example, often societal convention and religion oppose murder; therefore, we might principally oppose murder, and as such feel that murder is ethically wrong.

Mathematics stems purely from a set of axioms: mathematical statements which are argued to be 'self-evident' by common consent and are as such considered coherent truths. One might argue that because of their origins Mathematical statements are more valid then Ethical ones. This is because Mathematics utilizes a single and apparently unquestionable set of axioms whilst Ethics derives from multiple sources, not all of which are clearly defined or arguably well established. This is because there seems not only to be significant diversity in the principles of each of these foundations but also in the principles of each foundation dependent upon the individual applying it, like with societal convention. For example, society's expectations may offer very different principles to Religion. In such diversity we can find principles in direct contradiction. For instance, the way of the Samurai advocates suicide (hara-kiri) for the sake of honor[1] while Buddhism arguably opposes it.[2] From a single often considered a great insult.[3] Because of these contradictions we might question the foundation there can also be conflict. With respect to social conventions, in Japan it can be considered rude to look into the eyes of another, whilst in Australia a lack of eye contact is

1) N.a, 'Seppuku – Ritual Suicide', N.a, N.d.
2) Damien Keown, 'Buddhism and Assisted Suicide', Patheos, June 8 2009
3) Lacy & Nyman, 'Japanese Communication Style', Doing Business in Japan, May 26 2004

validity of any of Ethics' foundations or founding principles by highlighting their contradictions.

However, we might question whether Mathematics works upon a single foundation: axioms. This presents a concern; the concept of axioms is that they are formulas which are self-evident but that also cannot be proven by other equations. However, if they cannot be proven how can they be strongly stated as certain? One might question why they are self-evident? One may conclude that the axioms are "ghosts"; human concepts that might be considered 'made' truths rather than 'discovered' ones. If this was the case, why could it not be argued that the axioms are wrong, because, another set of axioms gives 1+1 = 3? How does one dispute this 'ghost' without relying upon the very axioms which it questions or without creating another set of axioms which could then be questioned by yet another set of axioms? It could be argued that the axioms validate themselves through the pragmatic theory because they can be applied in the perceptive world. For instance, calculating how many apples a crate can fit inside it and then using perception to see how many apples are present. This validation becomes reliant on other ways of knowledge such as perception. However, this presents another issue as these other ways of knowing may also be questioned, for example perception is susceptible to the 'brain in a jar' argument. Furthermore in order to determine how many apples are in the crate mathematics is still applied in order to tally the number of apples which means that the proofs are still relying on the axioms. It appears that the axioms must be accepted and one might consider that this point brings some concern over the reliability of any mathematical justification.

Another aspect that might be examined is the way that Mathematical or Ethical Statements develop. Both appear to work through logical deduction. For example mathematically: 1+1+1 = 3x1, 3x1= 3 therefore 1+1+1 = 3. An ethical example could be: the Bible says animals have no souls; my family says eating soulless creatures is fine, and therefore eating animals is fine. As both seem to be using logical deductions one might argue that the areas of knowledge are similarly well deduced and as such well supported. However, whilst both are using logical deduction, mathematics appears to draw only from the axioms whilst ethics relies upon multiple sources that can be personal, cultural, or social. Whilst both Mathematics' and Ethics' foundations can be debated to some extent, one might argue that as Ethical conclusions develop the question of their validity continues to grow. This is because each source that Ethical conclusions draw from can be debated for individual and often personal reasons. Using the same example, what if, as in Hinduism, my Bible stated animals had souls?[4] What if my family was vegetarian? And, what if I was vegan; and sick at the thought of eating creatures? This would mean that as Ethics develops the risk of it becoming inaccurate process to be compromised. Furthermore what if as mentioned some of the foundations applied are in contradiction? How is one placed above the other? It could be proposed that this is dependent on the individual - for example, a priest might invest more in religion whilst a scientist would be more reliant on reason and scientific knowledge.

However, one might argue that these issues are irrelevant as the person making the deduction should be able to properly determine the premise's validity and rank how important each premise is. But, this presents the issue of subjective and objective knowledge: whilst this ethical conclusion may be well supported for that specific person it would not necessarily be in general. This is because it is not utilizing pure/objective logic, it instead continually draws on concepts that are specific to the individual. Therefore, the risk of the premises and, as

4) Sarah Dowdey, 'Reincarnation in Hinduism', How Stuff Works, n.d.

such, the conclusion, being invalid for others increases the more the individual draws on subjective knowledge only relevant to them. This raises a question with the topic statement: it does not specify how the conclusions are being utilized - is the individual applying these conclusions also the one who developed them? Mathematics does not encounter this issue because it attempts to utilize pure and objective logic. This is because it only seems to continually draw from a single, generic, questionable, concept that seemingly all mathematicians utilize. The axioms are the only acceptable and valid axioms. So whilst Mathematics develops, the only obvious questions that can be asked are if the deductions are logical and whether the axioms of Mathematics are accurate. However, Mathematics' exclusive reliance on logic may mean it excludes other pieces of knowledge that are themselves not reliant on pure logic. For example mathematic predictions for the share-market can be incredibly inaccurate because they cannot predict the responses of certain groups or individuals to events.[5]

In conclusion there seems to be three possible responses to the question. The first response is that ethical conclusions in general are to nowhere near the same extent as well supported as mathematical conclusions, because, the foundations upon which they rely are often personal and their application of logical deduction seem to be more subjective then objective. The second response could be that both types of conclusion are equally unsupported as the axioms upon which mathematics relies appear to be 'ghosts' and that they are not as self-evident as many may believe. The final response is that Ethical conclusions that are developed for a specific circumstance may be more supported then mathematical conclusions as they can apply knowledge that mathematics cannot.

5) Bill Bonner, 'Goldman Sachs Fund Loses 30%, Wall Street Math Fails to Predict Future', The Daily Reckoning Australia, August 16th 2007

Jason Wright

Year 11

Are some ways of knowing more likely than others to lead to truth?

Perception, emotion, reason and language are the four fundamental 'ways of knowing' that have been used by humans as means to perceive reality, communicate and deduce information. Every way of knowing has unique and individual characteristics that allow it convey knowledge in a certain manner that the other ways of knowing cannot emulate – for this reason, the different ways of knowing each have specific purposes and functions in way humans ascertain knowledge. However, when it comes to using the ways of knowing in order to obtain 'truth', the ability to do so can be debated. Throughout history humans have disagreed on which way of knowing is most accurate and whether it is, in fact, possible to obtain absolute truth. For some, using emotion and language to express and interpret their religious beliefs is truth. For others, reason and perception are the only means by which they believe truth can be obtained. The actual existence of truth is also a debated topic that does not have a definitive answer – with the implication of the existence of truth central to the idea of ways of knowing and their ability to provide humans with knowledge.

The idea of truth is a topic that is very much based upon the specific beliefs of a person and therefore, does not have a universally accepted definition. However, in order to determine which way of knowing is more likely to lead to truth, a premise must be formed to base arguments upon. For the purposes of this essay, one will assume the premise that truth is '*the* universally correct interpretation of information – the accurate representation of reality' (knowledge that is truthful is knowledge that is accurate in accordance with reality). Although, this premise is too based upon other assumptions, most importantly, that there is in fact a reality that is universal, absolute and composed of definite facts (a realist view). The above definition of truth is similar to that of the 'correspondence theory of truth' as it defines truth as the accurate representation of reality and is the most widely accepted theory[4] on truth. However, realistically, it cannot be assumed that reality is definite and that truth is merely an accurate representation of this. It is easy to point out that each individual perceives reality independently and therefore, it cannot be concluded that reality is the same for everyone. Moreover, it is also clear that human's perception of the reality is limited predominantly by our senses – which can be improved and expanded with technology, but still do not allow one to perceive reality from 'outside' of our senses. Thus, human's interpretation of reality through their sense cannot be considered accurate due to the inability to verify reality between individuals. Therefore, there is an inherent fault in the idea that reality is based on definite facts, as these facts can only be proven definite within the limits of our senses. However as stated before, in order to analyse each of the ways of knowing individually, it will be assumed that the truth is what represents reality most accurately.

1) http://philpapers.org/surveys/results.pl?affil=All+respondents&areas0=0&areas_max=1&grain=medium

Emotion is arguably the most inconsistent of the four principal ways of knowing – as it is not based on any observable rules or logic and appears to be to some degree random and unpredictable. For these reasons, emotion is often dismissed as being a reliable way of knowing. However, for deeply spiritual people (such as psychics) emotion might be considered the most accurate way of knowing and the most likely to lead to the truth. Likewise, some religious individuals believe that the ultimate truth is based upon their respective God/religion – with emotion sometimes being considered a means by which their God can communicate with them. In these ways, it is clear that an individual's beliefs and understanding of truth and emotion can have a profound impact of what they believe is the truth. In addition, language is another way of knowing that does not seem implicitly logical or predictable in its structure and application and yet is still an important facet of many cultures and societies. Language serves as an integral part of many tribal culture's traditions, with stories and tales passed down through generations. It is through these stories that valuable information and teachings are communicated to future generations – often with these tales lasting for hundreds of years and becoming integrated into the society's culture and tradition. Because of this, these tales often serve as a form of indisputable knowledge to the tribal people and, in their eyes, absolute truth. However, there are numerous issues surrounding the use of emotion and language to reach truth. Whilst emotion may be quite well-adapted to interpreting the unquantifiable – namely the emotion of others – it is often erratic and sometimes misleading. Whilst language is essential for the communication of humans, it possesses inherent instability and varies according to personal understanding and, of course, which language is being used. For these reasons, it would seem that language and emotion are not inclined to consistently lead one to 'truth' according to the aforementioned definition – however, they do possess certain characteristics that can lead one to knowledge that cannot be obtained through any other means.

In modern society it is often believed that through reason the fundamental laws of the universe can be discovered and thus, the truth of reality. The movement towards this view in recent history has been led by the advances in science and mathematics, which have – through the implementation of reason – discovered and predicted more about the universe than at any time previously in human history. The industrial revolution and later the technological revolution can be attributed to these studies of reason and thus, in modern society, reason and its applications are commonly accepted to be the most likely ways of knowing to lead one to truth. More specifically, mathematics and its inherent structure of pure logic is considered by many to be the only source of certainty in the seemingly chaotic universe. Whilst science is still considered a reputable source of knowledge, its use of inductive reasoning does lead to incorrect theories and statements and consequently is not considered to be of the same clarity of maths. However, mathematics and its carefully constructed logical frame does have limitations in its ability to reach truth. First of all, the entirety of mathematical logic is based on several irreducible axioms. These axioms form premises that are unprovable, yet essential to the operation of maths. In addition, mathematician Kurt Gödel's proof of his theory of incompleteness demonstrates that any sufficient strong logic system cannot be both complete and consistent. With 'complete' referring the ability of a system to prove all statements originating from the system and 'consistent' referring to a logic system existing *without* any contradiction present within it. This idea can be seen simplistically in the existence of the human logic system – with humans attempting to prove their logic system *using* their logic system. This contradiction stems from the fact that humans cannot 'step-back' from their logic and assess it through other means – they can only use logic to assess the same logic. Thus, this demonstrates that the human logic

system (and all other logic systems) is inherently incomplete and inconsistent. Therefore, modern society's belief in reason to lead to truth may not be completely justified, as this truth cannot be proven to be truth through any means available to man – it will only lead to truth according to human logic, which itself is an incomplete system.

Perception is the final way of knowing that humans use on a regular basis to observe reality and obtain information. The use of perception is considered by many to be the most accurate manner by which to observe reality, and thus, the most likely to lead to 'truth'. The evidence of this belief is evident in various idioms of the English language that demonstrate man's belief in perception – namely sight – as the primary source of knowledge and truth (for example, "seeing is believing"). The tendency for humans to rely on perception is well justified as historically, the development of mathematics and science was not substantial enough for their validity to be evident to the general populous. Furthermore, the fact that perceiving reality is a primary experience – one perceives an event first-hand. Therefore, people often have greater faith in the information they obtain from their senses compared to science, where receiving information is often distinct from the occurrence of the event. However, human perception has fundamental limits and inconsistencies that may prevent one from considering it an infallible tool for determining truth. Firstly, as human senses are ultimately extensions of the human body, they are prone to the inaccuracies that are generally associated with organisms (human error) and can be easily confused and deceived. Secondly, when compared with other species on Earth, human sight is the only sense that could be realistically considered accurate – as human hearing, small and taste considerably worse than other animal species. Apart from the obvious inaccuracies of human senses, they are also extremely limited in their application to 'reality'. For instance, if one considers the electromagnetic spectrum the human eye can only detect waves that have wavelengths within the 'visible light' section. Theoretically, the electromagnetic spectrum is infinite, with no minimum or maximum wavelengths – and thus, humans can only perceive an infinitely small percentage of 'reality'. If one considers the electromagnetic spectrum in the commonly accepted range of wavelengths (1 pico-metre to 100 mega-metres) then visible light (from approximately 390 nanometres to 750 nanometres) is merely 3.6×10^{-15} percent of the electromagnetic spectrum – the type of electromagnetic radiation that humans can detect is one *quadrillionth* the size of the (limited) electromagnetic spectrum[5]. This information demonstrates how little of 'reality' humans can actually interpret through perception, and hence, how it cannot be said that the perception of an event is necessarily the 'truth' of reality.

In conclusion, the idea of any of the 'ways of knowing' leading towards truth is entirely dependent on what one defines as 'truth'. With truth considered as the perfectly accurate interpretation of reality, it does appear that some ways of knowing are more likely to lead towards it than others. With emotion and language dismissed due to their sometimes illogical and unpredictable nature, one is left with reason and perception. Whilst perception, as a primary source of information, seems more intuitively truthful than reason alone, it is also shown to be considerably flawed in its representation of reality due to its confining limits and lack of definiteness. Therefore, it could almost be said that reason and its logical structures provide humans with the most definite and accurate representation of reality, and therefore, is more likely to lead one to 'truth'. However, this notion entirely depends on one's beliefs and

2) http://en.wikipedia.org/wiki/Em_spectrum

understanding of reality – with the true nature of reality currently undefined. Thus, the idea of any particular way of knowing leading to truth is ultimately impossible as long as reality remains indefinite and subjective to the observer.

Alex Mansell

Year 11

Does language play roles of equal importance in different areas of knowledge?

It is immediately clear, upon examination of all the areas of knowledge, that language plays an important role in each of these . This does not, however, imply that the role of language is of equal importance throughout them, and it can certainly be argued that the importance of language differs considerably between the areas. In mathematics, for example, a type of language, or at least specific mathematical notation, is necessary to convey ideas to others. In the arts, however, the role of language appears to be less pronounced, wherein language is used more to analyse ideas, rather than to convey them on a basic level. Furthermore, in social sciences, language appears to play an immediately obvious role, where limited aspects can be expressed without language.

Mathematics is a complex area of knowledge, characterised by a great reliance on logic. In different aspects of mathematics, either normal written or spoken language is used or alternatively, specific mathematical notation is used. These are both ultimately forms of language, as what can be expressed through mathematical notation is always possible to explain in standard language. Thus language is completely necessary in expressing the vast majority of maths, and without language, it seems that it would be impossible to convey mathematics. Indeed, mathematics can be thought of, to a great extent, as a language itself. A great deal of mathematics consists of logic, and logically derived theorems applied to real-world and theoretical problems, where all aspects of this can be expressed in the mathematical language. A powerful example of this is seen in the following Euclidian theorem, compared to its expression in mathematical notation. Euclid states that "if a straight line be cut at random, the square on the whole is equal to the squares on the segments and twice the rectangle contained by the segments."[6] In maths, this is expressed simply as "$(a + b)^2 = a^2 + b^2 + 2ab$". Thus maths, when thought of as a language, is perhaps more concise, and more exactly constructed than conventional languages such as English and German. If this is taken to be true, then language plays an enormous part in mathematics as an area of knowledge, because it is itself a language. But really, mathematics can just as easily be seen as not being a language, and as being "the study of quantity, structure, space, and change."[7] As a study, mathematics is based on ideas, and thought. With this in mind, mathematics can clearly be developed, and studied mentally, and without use of notation. Mathematicians such as Georg Cantor are seen to use notation throughout, however his discoveries and developments occurred not through notation, but through ideas and thought. This position is supported by Plato's idea of realism, wherein a separate and shared 'world of ideas' exists, as mathematics concepts are ever-present, and can be accessed by any person, as they exist separate from humanity. Language then, is not necessary for

[6] Euler, L (translator Hewlett, J) 1822, *Elements of Algebra*, University of Birmingham, Tarquin Publications, viewed 3/9/2011, http://web.mat.bham.ac.uk/C.J.Sangwin/euler/ElementsAlgebra.html

[7] Engineers Edge 2010, *Mathematics Encyclopaedia*, viewed 3/9/2011, http://www.engineersedge.com/encyclopedia/math/mathematics.htm

maths by any means, nor necessary for its development by individual persons, however it is imperative for conveying mathematical ideas between people. Overall, this second argument appears sounder, relying on ideas over notation as a basis for mathematics.

The arts are often seen as one of the more effective means of communication without language, however it is possible that language still plays a major role in the different aspects within it. A subset of 'the arts', sculpture for example, bears no reliance on language. Meaning and emotion, then, can be conveyed through form, rather than language. But despite this, language is surely necessary for humans to understand these meanings and emotions. 'La Nuit', a depiction of a crying woman is displayed publically in Paris, and certainly an emotive piece of art, however beyond an abstract idea of sadness, language seems necessary to further understand the sculpture. Music is another branch of 'the arts', and to a great extent does not use language to express its ideas. Of course, lyric-based music places a greater importance on language, whereas classical symphonies are said to 'tell a story' through the instruments alone. Emotions can be expressed, and to an extent manipulated, by the sounds expressed through this music. But once again, language can be seen as necessary to understand these emotions, and convey the emotions beyond a basic feeling. In this way, language is necessary in art, because the words stemming from language are necessary to properly convey the message, even if this does extend from feeling. If it were assumed that complex emotion exists without language, however, then it could be argued that the arts require no language whatsoever. Through studies of animals, for example, it is found that they appear not to demonstrate complex emotions, only simple ones. It can, of course, be argued that this is due to their lack of language. Insofar, it can be seen that language plays separate, although perhaps inter-related roles in both the arts, and mathematics.

Social science describes the area of scientific study that focuses on society and its machinations, such as archaeology, economics, and political science. Knowledge from this area is often subjective, and based on fundamentally unprovable theories. This subjectivity is often attributed to the essential uncertainty of human life and action, and as such is not a precise science. One prime example of social science is education, the act of teaching and learning different skills. The role of language in education is mixed, depending on the skills being taught. Institutional school education, a type of formal education, relies extremely heavily on language. History can scarcely be taught effectively without the use of language, for example. Despite this, practical education, in fixing a broken object, for example, can be taught without any language, purely through repetition and observation. Despite this, the great majority of education does require language to be conveyed effectively. Psychology is another example of social science that relies heavily on language. Although patterns in behaviour can be observed without language, the understanding of these appears to rely heavily on language. Cognitive psychology, for example, examines the mental processes examining how people think, perceive, and learn. This being a thoroughly experimental science, the knowledge gained requires experiments; experiments which can scarcely be performed without the use of language. Thus social science relies quite heavily on language, in all aspects of the knowledge acquired through it.

It does appear that language plays a more vital role in the area of social science, than in mathematics and the arts. Whereas they require language for acquiring knowledge to a small degree, and require language for expressing this knowledge to a great degree, social science can be seen to require knowledge in essentially all areas of its acquisition and expression. Alternatively, it could be said that knowledge is scarcely useful without the ability to convey and comprehend it, and if this view is taken, the areas explored above can be seen to be of essentially the same value. It seems more logical; however, to use the first analysis above, as knowledge, regardless of its ability to be shared, is still existent and pertinent.

James Keeves

Year 11

Are some Ways of Knowing more likely than others to lead to truth?

The four Ways of Knowing – language, perception, reason and emotion – allow us to attain knowledge from the world. Linked closely with the Areas of Knowledge, all four ways of knowing play an important role in helping us to construct a workable map of reality; however they can limit our ability to know the truth. It is difficult to assign a clear definition to truth, but knowledge and belief are connected with truth in such a way that our Ways of Knowing allow us to attain knowledge, create a particular belief and shape a particular perspective of truth. The fact that our Ways of Knowing play such an important part in finding truth can lead to possible problems in determining the difference between knowledge that is mislead and knowledge that is believed to be true.

Language is one of the key methods of acquiring and communicating knowledge about the world. As a way of knowing, it has both benefits and limitations in conveying truth. Language can deepen and broaden your understanding of something, and allow you to make better judgments as to the truth of this something. For example, if you were to believe baking a cake was particularly difficult, and you then read a cook-book or recipe, you would find that it is much easier to do. In general, the use of a text or anything that uses language to communicate its content can help your understanding and is essential in attaining knowledge. However language frequently leads to problems of understanding and meaning. Because so much of our knowledge comes from language, it is important to be clear about the meanings of words so that we can correctly interpret and understand the information that is being communicated. For example, ambiguity can prevent language and its portrayal of truth – the statement 'flying planes can be dangerous' could refer to the claim that the process of flying a plane is dangerous, or it could mean that planes in flight are dangerous. The problem is the possibility of misunderstanding the statement can mislead people's belief and their view of the truth. The same could be said for the use of irony in language – if someone was to say to you on a particularly rainy day, 'nice weather!' you could recognise that they were being sarcastic. However, to take it at face-value, you will most likely be bemused as to why they have said something that is so clearly and utterly incorrect. This highlights the fact that there are many problems with language that warp or give the wrong impression of the truth.

Perception is the use of our five main senses – sight, touch, smell, taste and hearing – and the way in which we process this information we gain from the world. The way we perceive the world is effectively what makes it real – it is easy to raise issues about the whether it is true we are living in a dream – but what we view, to us, is real. Hence, if we perceive something, we generally believe it to be true. For example, if you can touch an apple, can see its features and taste it, you will conclude that it is real. If you smell a flower, you conclude that it is true that you can associate that smell with that flower. However, problems can arise when our senses are misled, and this can distort our view of the world. For example, if I was to wear pink glasses, I would view the world as pink, even though I know that the world is made up

of many different colours. If we change our perception, we change our view of reality, and this can sometimes influence our view of truth. When a stick is placed in water, and is viewed, it appears to be bent. We know it is true that the stick is not bent – we can verify this by taking it out of the water. But our senses deceive us by picking up and processing the light that travels the shortest distance when reflecting off the stick and through the water. It is very easy to be deceived by our senses, which can give a distorted view of reality and acts as an obstacle to finding truth.

Reason is traditionally seen as a way of knowing that is closely linked to providing truth. Reason allows us to acquire new knowledge about the world through its process, and seems to give us certainty in the conclusions that we make. The suggestion that reason leads to truth, and that it is an important source of knowledge, links to the concept of Rationalism. Rationalism states that we can discover important truths about reality through the use of reason alone – and effectively opposes that view that knowledge gained from perception, because our senses can mislead us so easily. For example, if someone claims to have seen a shark in a lake, you can use reason to conclude that because the lake is fresh-water, and because sharks can only live in salt-water, it is impossible for any sharks to be there. This demonstrates the power of logic and the potential problems of perception, and suggests that reason is very useful tool in finding truth. Reason is heavily involved with arguments and drawing conclusions, and in doing this, validity and truth must be considered. Statements can be true and arguments can be valid – and 'the validity of an argument is independent of the truth or falsity of the premises it contains.' Therefore it is possible to have a false but valid argument. This can be potentially confusing and may lead to problems in relation to truth. It is common for someone to make an argument that sounds right and comes to a valid conclusion, but that is actually completely false. It is also possible to have arguments or conclusions that seem true but are deceptively invalid in their reasoning, commonly known as fallacies. For example, if I was to say 'There is no proof that God exists. Therefore, God doesn't exist', this would be committing the *Ad Ignorantiam* fallacy, which involves claiming something is true because it cannot be proved to be false. The argument is invalid because God might exist even though there is no way empirically to prove it, although it may appear untrue. The fallacy of *False Dilemma* would be committed if I was to say, 'you don't agree with me, therefore you're against me.' This is logically invalid – you may be simply 'sitting on the fence', be unsure or not immediately committed to one side. This demonstrates the potential difficulties, although limited, in using reason to discover truth.

Emotions are traditionally seen as more of an obstacle to knowledge than a source. While reason is seen as a clear and formal way of thinking – emotions are perceived as being problematic, and your emotions will typically effect your logic and reasoning in a certain way. For example, if a person is angry or frightened, they are unlikely to see clearly or reason well, while a happy or confident person may be more willing to make an important decision. This suggests that emotions can influence the way we see and think about the world – and that our emotions are constantly manipulating our lives. It is clear that emotion has a strong link to reason, but strong emotions can also affect the other three ways of knowing. In terms of perception, for example, if you are crazily in love with someone you will concentrate on their physical attributes, while if you loathe someone you will see only their physical faults. For language, people's emotions very often influence how they use language – they will use emotive and slanted words. For example, politicians use certain words to gain votes, while they may not be telling the truth. This

shows the potential that emotions, despite being such an integral part of human life can give an altered view of the truth.

In conclusion, it would appear that some Ways of Knowing are more likely than others to lead to truth. Although language can communicate a wide range of knowledge and truths, problems of meaning and ambiguity can sometimes distort the portrayal of knowledge and give a wrong impression of the truth. Perception gives a basic view of reality and it is generally believed that what we perceive is true – however our senses can just as easily mislead us and give a distorted view of reality and of truth. Emotion can influence and manipulate our entire experience of the world – how we perceive it, how we learn and communicate, and how we process the information we have and draw conclusion – to sometimes create bias or act as an obstacle to knowledge and therefore truth. It would appear that reason would be the Way of Knowing that most often leads to truth – being so clear, straightforward and formal, it is difficult to run into problems when drawing conclusions and attaining knowledge. It saying this, one thing is evident in the search for truth – it is relative. What is true when perceiving the world is completely different to what is true when you logically and validly draw a conclusion based on assumption. This demonstrates the difficulty humans have in defining truth and highlights the fact that no single way of knowing, despite benefits and weaknesses, is completely able to always give a clear and accurate view of the truth.

Dao-Shi Guo

Year 11

Are some ways of knowing more likely than others to lead to truth?

The four Ways of Knowing includes Perception, Emotion, Language and Reason. Although they can all to some extent lead to truth, it can be argued that some of the Ways of Knowing are more likely than others to lead to truth.

In the title of this essay, "truth" by dictionary definition, simply means the true facts about something, rather than the things that have been invented or guessed. However, this explanation of truth is vague and imprecise and since truth has different meanings in different contexts, it can be a difficult thing to define. For example, truth can be used as "1+1=2" is the truth. It can also be used in the context of "tell the truth." In the previous example, reason is likely to lead to the first truth while emotion is likely to lead to the second truth. There are three common theories of truth. The first theory is the Correspondence Theory and it states that "our representatives, in words, numbers, images etc., are true in so far as they copy reality." Truth can also be interpreted using the Coherence Theory and that "in so far as an idea is consistent with other reliable ideas, it is true." The last theory is the Pragmatic Theory and it suggests that "an idea is true so far as it guides us in the solution of practical problems or in the understanding of other ideas." Thus, we can see that there are many ways of explaining the word "truth."

If "truth" is difficult to identify, then it would be hard to evaluate whether some Ways of Knowing are more likely than others to lead it in. It might even be that truth is a convenient fiction" as Friedrich Nietzsche once said. In this sense, the title "are some ways of knowing more likely than others to lead to truth?" is ambiguous as there are many different ways of perceiving truth and it did not constraint of which view to undertake. In addition, since truth is such a difficult term to define and that it might even not exist, do we know that there are in fact some Ways of Knowing that do indeed lead to truth? In addition, this would cause problems with the use of the phase "more likely". How do we evaluate the extent to which different Ways of Knowing may lead to the truth if we cannot even define it?

However, if truth does exist, then there are different ways of approaching different kinds of truth.

Perception can be defined as the awareness of things through our five senses, including sight, sound, touch, taste and smell. Many areas of knowledge uses the knowledge gained from perception as the truth. For example, scientists use the knowledge gained from perception, which is called empirical knowledge. They often take the system of knowledge, established by many other scientists before them as the basis of their research and would acquiesce to the fact that it is the "truth." However, it can be seem in the past centuries that scientific theories have been continuously proven wrong along with the discovery of new evidence and that it is highly likely the scientific theories used by modern day scientists would be considered to be mistaken in the years to come. This is because science uses inductive logic, and once an incident which contradicts with the proposed theory appears, the scientific theory would be at

risk. Moreover, the information that our senses give us are sometimes contradictory. For example, perceptual illusions can very well illustrate that there are occasional disagreements between our senses. Hence, it can be seen that when compared to emotion, language and reason, perception is not a Way of Knowing that is likely to lead to "truth."

Emotion usually consists of various internal feelings and external forms of behaviour, and it can vary intensity from, say, mild irritation to blind anger. There are many strengths of emotion as a Way of Knowing, such as it is subtle, sensitive and is not limited to physical information. For emotion is like water and there is no clear boundaries between different feelings. However, emotion is unlikely to lead to the "truth." Emotion can give people a form of knowledge called intuition, which is the knowledge build into people's minds. Many cultures take intuition as one of their most important ways of perceiving the world and believe that it is message sent from the god. They often take intuition and dreams as the "truth". However, there is a very obvious problem with intuition because it has no evidence to proof it and you do not know where it comes from. The lack of boundary and clarity, the difficulty to measure and verify and the fact that emotion is influenced by personal and cultural attachments all demonstrates that emotion is highly unlikely, as a Way of Knowing, to leading to the truth.

Language is a form of communication which is rule-governed, intended, creative and open-ended. Language enables people to have a better understanding beyond themselves. However, despite its importance, language is not the perfect medium of communication as people rarely say exactly what they mean. Language can be vague, ambiguous and there are often secondary meanings attached to a same word. People also use language metaphorically and would often say one thing in order to mean the opposite. For example, if the weather forecast predicted good weather and it was running heavily, you might say: "good weather, hey." In this case, you do not literally mean that it is good weather, but that you are using irony and saying the opposite in order to convey your message. Even a theory which could be used to distinguish meaningful words to meaningless ones could not be agreed upon. Hence, due to its many uncertainties, language is not likely, compared with the other Ways of Knowing, to lead to "truth."

Reason is the relating of cause and effect. There are primarily two kinds of reasoning, including deductive logic and inductive logic. Many area of knowledge also use the knowledge gained from reason as the truth. For example, mathematics use deductive logic and is based on a set of seemingly self-evident assumptions called axioms. The "truth" in mathematics is the proof of the derived theorems using the established axioms. However, Mathematics is merely a formal system and does not relate to evidence. Reimann's Geometry has shown that Mathematics can be based on a different set of axioms and that axioms are not self-evident. Cantor's Infinites challenges people's view of Mathematics as a logically complete set of knowledge without contradictories. Even though there are problems with reason leading to the "truth," its consistency, regularity and capacity to link together and organise makes it a more certain Way of Knowing when compared to others. Therefore, reason is a Way of Knowing which is more likely than others to lead to the truth.

Therefore, although "truth" is a difficult term to define, and that the extent to which different Ways of Knowing may lead to truth is hard to measure. When approaching different kinds of "truth" and comparing between the different Ways of Knowing, it is evident that reason is more probable than perception, emotion and language to lead to the "truth." All in all, it can be argued that some Ways of Knowing are more likely than others to lead to the truth.

Francis Kette

Year 11

Are some Ways of knowing more likely than others to lead to truth?

To analyse this claim, it is first necessary to understand all terms and how it may relate to the question. From this, the question of what is truth arises. However, this poses a problem, as the definition of truth varies and there are also many ways to understand truth. Friedrich Nietzsche describes it as a "convenient fiction". To this end, it may be seen as a human creation, something that provides us with stability in our lives, although deceiving in nature. In common usage, it's referred to as "constancy or sincerity in action or character". However, the varying nature of the definitions of the term and how it is interwoven into other aspects such as knowledge and beliefs reflects how difficult it is to accurately describe it clearly and accurately. The term to some refers to a "picture of reality" Wittgenstein, whilst to others it is "the word of God". Additionally, it is often perceived to be "whatever can be verified by our senses". All these definitions have their inherent flaws, however, there is a thread of "truth" that runs throughout. This derives the Correspondence theory, coherence theory and the pragmatic theory. These three theories state that truth is a representation of reality, using words, images; numbers are true so far as they copy reality. Additionally, something is true in so far as an idea is consistent with other reliable ideas it is true 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 shape a particular view of truth. So that truth becomes dependent upon perspective. In addition, truth is influenced by emotion, reason and language.

Next the question of how a way of knowing may lead to truth arises. To answer this it is necessary to look at each way of knowing independently and how it leads to truth, then to look at, to what extent it leads to truth over another. Perception or Empiricism knowledge is one of the fundamental ways of Knowing. It is knowledge drawn from and verified by sensory experience. To this end, it seems to fit to a certain extent all three of the common theories of truth. Our perception is individual, and so it is a representation of words, images and numbers in our mind and is a copy of reality. Additionally, our perception can be used to solve practical problems, although has some quite obvious restrictions. Furthermore, it is consistent with other reliable ideas. However, our perception of reality is evidently flawed. When one looks through a kaleidoscope, they see a picture of reality, a picture which is not necessarily false, the antonym of truth. Perception can be misleading, it has specific limits to each sense, different senses give contrasting information and it can be restrictive of imagination. Additionally, it does not work in all circumstances. However, is it most likely to lead to truth? In some circumstances it will although this is not universal. It is the easiest of all the ways of knowing to interpret and analyse. In addition, if truth is taken to be "what ever can be verified by our senses" then perception would be the most obvious and simplest form of truth. However, its truths complexities and its relation to many other ways of knowing result in perception being only a simple way to lead to truth, whilst insufficient. Thus, it provides a platform through which other ways of knowing can be explored.

Emotion, another way of knowing, is partly based upon perception in the fact that how individuals perceive information and then relate it to emotion. Emotion, as a way of knowing, is associated with dimensions of our awareness that are difficult to explain such as, feeling, imagination, intuition and so on. This way of knowing, has its benefits, it not limited to physical information, it provides an awareness of self and others along with empathy. However, in terms of leading to truth it is very restricted as it is only concerned with what is in the mind. If the definition of truth was taken to be "whatever holds accurate for an individual" then emotion could lead to truth. However, truth can also be described as "the consensus of a given community". Emotion fits in part the three common theories of truth. For an individual it is very coherent, and it is pragmatic, although it does not correspond into visual representation, or a copy of reality very well, as if reality is what extends beyond the mind, emotion is limited to only the mind. Thus, it is just as likely to lead to truth as another way of knowing.

Reason as a way of knowing is for one to make sense of things, to establish and verify facts, and to "change or justify practices, institutions and beliefs". It is also using logical inferences to establish systematic causal relationships. Logic can be divided into deductive and inductive logic. Deductive logic is reasoning from the general to the specific, whilst inductive is the reasoning from the specific to the general. Using logic and reason to establish truths has its strengths and weaknesses. Reason can lead to regularity, consistency, the capacity to link together and organise and be verified. However, using reason primarily has its problems. It can depend upon information from other ways of knowledge, attached to structure and systems and it can ignore specifics and emotional awareness. Additionally the two forms of logic, inductive and deductive, can lead to different answers. As a result, it can be established that this way of knowing may lead to truths in a different manner, whilst not being more likely than others.

Language, as a way of knowing, enables us to acquire knowledge from other people and events which we have not directly experienced. This ability to communicate ideas and apparent "truths" enables knowledge to be transported and ultimately over time transformed. The use of a language to acquire truths is both beneficial and problematic. Primarily, it can be used to acquire knowledge and information, through the communication between people. Additionally, it provides a median through which to voice ideas, and have them criticised. To this extent it satisfies the idea that a truth is "a general consensus". However, a problem with language is it is trying to convey thoughts and mental images through the form of sounds and images. Furthermore, it is trying to convey specific and complicated ideas through something which can mean a lot of different things.

Overall, all of the ways of knowing, in their own way, lead to certain truths that are either specific to each or are generally related. Not one single way of knowing is more likely to lead to truths than another. It is the culmination of different ways of knowing combining to find a truth.