MCAT Verbal Strategy Primer

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MCAT & Verbal

Many have told me that the MCAT is *the* most difficult standardized test one can take before graduate school. In addition to that, to some, the Verbal Reasoning section is presented as a mythical beast that seemingly requires divine intervention to overcome; like stories we learned of as children from Ancient Mythology texts. The MCAT reminds me of the dragon Smaug from *The Hobbit* – in order for the dwarves to acquire their lost treasure they must first defeat the immensely powerful dragon. So to is it true that in order for a student to be accepted into a medical school; they must score well on the MCAT. If the dragon's fire-breath strikes you, if one scores poorly on the MCAT, his or her hopes of treasure are lost.

Others argue that the VR section is impossible to study for if one is seeking a score greater than 10. They state that it is a game of luck! Someone close to me recently stated that the VR section is an aptitude test and to score a 13+ one needs to be a genius!

Perhaps there is some merit to those perspectives, and one should be prudent and take heed of them. However, I believe that all of you are aware of the arduous task that is the MCAT. There are many ways to reach the mountaintop, and this primer simply offers one of those perspectives.

A question I found myself asking repeatedly after reading TPR and EK's verbal textbooks was: but, how? They suggested figuring out the author's position on the topic, and how they have crafted their arguments. *But, how?*

This primer's primary focus is to ascertain precisely *how* to discern the author's position, and hold their arguments up to the highest possible scrutiny possible.

The Exam Kracker Approach

Their four tips: energy, focus, confidence, and timing.

All of which are important, yet I would add don't be arrogant (like EK suggests). Respect the MCAT. I would like to stress that this primer does not act as a substitute for EK – use it in harmony with their guide. Their four stipulations in their "EK Approach" are all equally important. It would be prudent to follow their instructions.

As for their "say NO to out-of-order strategies", I will discuss that later in this document with advice from TBRBioSadist.

The EK Approach

1) Read the passage – this should be a given for everyone.
2) Construct a main idea

One tactic that I vociferously disagree with is their "going-back method". After careful scrutiny of each and every single word in the passage you should not have to refer back to the passage when answering questions. You should also be developing the crux of the passage (and therefore, each paragraph) as you read through the passage. Section 2.2: is important, yet it lacks precision. We will discuss a finer technique – pinpointing logical fallacies committed by the author / questions posed to the reader.

Going forward, I will assume that you are familiar with the instructions provided by EK and TPR. This primer's intentions are to take their instructions/approaches to the next level (granted, with a few exceptions).

You have just read a passage, and you are ready to start answering questions. How should you start to deconstruct the passage's contents? The simple question that you need to ask yourself is: how do people think?

It seems like a convoluted question, but it's not. You know the answer. There are two main types of reasoning: inductive, and deductive reasoning.

Overview*: Deductive – Inductive Reasoning*

The discovery of **knowledge** can be broken down into two main approaches: inductive reasoning and deductive reasoning. A similar dichotomy, used by Aristotle, is analysis and synthesis. Analysis takes an object of study and examines its component parts. Synthesis considers how parts can be combined to form a whole.

While studying VR techniques, and after reading a passage you will engage in *BOTH analysis* ***and*** *synthesis.* It is not good enough to construct the "big picture"; you must also be able to understand the brush strokes that create the finished product.

- **Inductive reasoning** is the discovery of knowledge through observation (as in the scientific method) and **inferences are drawn from data**.
- **Deductive reasoning** is the discovery of knowledge done through **logic**. That is, deductive knowledge (if *a*, then *b*) is gained in an *a priori* (knowledge before experience) fashion that follows naturally from stated axioms.
  - If a statement is *a priori*, its truth can be established without external observations. For example, we can verify the Pythagorean Theorem without measuring triangles to "test" the claim. If a statement is *a posteriori*, "the sun emits heat," then sensory observation is necessary as logic alone cannot verify or refute it.
  - We use our experience to sift out the relevant from the irrelevant chains of thought; we do not use our experience to determine the validity of a particular chain of reasoning.

Example

Question: What can we DEDUCE from the concept of action?

What follows from our having a goal?

In the discussion above we found that:

- Ideas determine human action.
- To act, you must do something to get what you want.

- You use means to achieve ends.

- The cost of an action is the value placed on satisfaction that must be forgone in order to achieve the chosen end.

- Value resides not in objects but in the minds of actors who rank those objects as either directly desirable or as means to some other, more ultimate end.

Deduction: What must be true if there are ends and means?

- You act to achieve your goals, thinking to become better off.

To recap: Logic is often divided into two parts, inductive reasoning and deductive reasoning. Inductive reasoning draws general conclusions from specific examples, while deductive reasoning draws logical conclusions from definitions and axioms. The following table provides a comparison of the two methods.

Alright, once we've established whether the author is engaged in deductive or inductive reasoning – how does one process that information?

Information Processing: Information wants to be compressed. The more random information is, the greater the dimensionality, and thus the more difficult to summarize. The more you summarize, the more order you put in, the less randomness. Think of the world around you, laden with trillions of details. Try to describe it and you will find yourself tempted to weave a thread into what you are saying. A novel, a story, a myth, or a tale, all perform the same function. Myths impart order to the disorder of human perception and the perceived "chaos of human experience": you develop a coherent narrative.

The same applies to scientific pursuit—it is just that the purpose of science is to get to the truth, not to give you a feeling of organization or make you feel better. In addition to that, almost every MCAT VR passage engages in condensation of information, as authors are able to convey the ideas in fewer than six paragraphs).

The central problems identified in the probability and information theory are:

- Information is costly to obtain;
- Information is costly to store; and
- Information is costly to manipulate and retrieve.

Compression is vital to the performance of conscious work. We try to get impeccable facts, but use ES to weave them into a narrative in such a way to convey the impressions of causality (and knowledge). The more information you give someone, the more hypotheses they will formulate along the way. We are explanation-seeking

beings who tend to think that everything has an identifiable cause and grab the most apparent one the explanation (provided by ES). Yet there may not be a visible "because." Frequently there is no cause identifiable, not even a spectrum of possible explanations and the silent evidence may mask this fact. We pull memories along causative lines, revising them involuntarily and unconsciously (thanks to ES).

We have far too many ways to interpret past events. Does this mean there are possible families of explanations and that each of these can be equally perfect and sound? Certainly not. One may have a million ways to explain things, but the true explanation is unique, whether or not it is within our reach. This does not mean we cannot talk about causes; there are ways to escape the narrative fallacy. **How? By making conjectures and running experiment, or by making testable predictions.**

So, how does one go about testing conjectures, experiments, or predictions?

Knowledge: Concepts in Logic

All rational knowledge is either material or formal:

- ***Material knowledge***/philosophy deals with determinate objects and the laws to which they are subject. There are twofold laws:
    - laws of nature: the science of the material laws is physics (natural philosophy); and
    - laws of freedom: the science of freedom is **ethics** (moral philosophy).
        - *Natural philosophy* has its **empirical** part, since it has to determine the laws of nature as an object of experience, laws according to which everything **does** happen.
        - *Moral philosophy* also has its **empirical** part, the ***laws of the human will***, so far as it is affected by nature, and studies laws according to which everything **ought** to happen. Ethics, however, must also consider the conditions under which what ought to happen frequently does not.
- ***Formal knowledge*** is concerned only with the form of the understanding and of the reason itself, and with the universal laws of thought in general without distinction of its objects. Formal philosophy is called **logic**.
    - Logic is a canon for the reason or the understanding, valid for all thought, and capable of demonstration.

        - Logic cannot have any empirical part; that is, a part in which the universal and necessary laws of thought should rest on grounds taken from experience.

- If logic is restricted to definite objects of the understanding, it is metaphysic, and has two categories: a metaphysic of nature and a metaphysic of morals.

    - **Physics** will thus have an empirical and also a rational part.

    - The empirical part in **ethics** goes by name of practical anthropology (the knowledge of man himself), while the rational part is called **morality**.

Logic is the study of arguments: "the science of reasoning, proof, thinking, or inference." Logic is a tool for distinguishing between the true and the false. Logic examines general forms which arguments may take, which forms are valid, and which are fallacies. It is one kind of critical thinking. You can communicate using logic, but also through discussion and debate.

Logic will let you analyze an argument or a piece of reasoning, and work out whether it is likely to be correct or not. In philosophy, the study of logic figures in most major areas of focus: epistemology, ethics, metaphysics. In mathematics, it is the study of valid inferences within some formal language.

Note that logical reasoning is not an absolute law which governs the universe, and logic is not a set of rules which govern human behaviour. Humans may have logically conflicting goals.

Epistemology (theory of knowledge) usually discusses knowledge that is propositional knowledge, also known as "**knowledge that**". The epistemological relevance of **knowledge how** and knowledge that: consider the example of the act of balance involved in riding a bicycle. The theoretical knowledge of the physics involved in maintaining a state of balance cannot be a substitute for the practical knowledge of how to ride. It is important to understand how both are established and grounded.

When a passage asks us, the test-taker, whether the author believes that X is true or whether the author would agree with Y – it is essentially asking us to discover the truth. *What is truth?*

Truths

Belief is a subjective personal basis for individual behavior, while truth is an objective state independent of the individual, i.e., a fact.

Intuition is an assumed truth with an unknown, or unexamined, source. It is a judgment without rational examination of the facts.

How do we determine whether the author believes in X, or holds X to be true? They *must* justify their premises/assertions.

Justification is the reason why someone holds the belief, and is the explanation as to why the belief is a true one, or an account of how one knows what one knows. If *A* makes a claim, and *B* then casts doubt on it, *A*'s next move would normally be to provide justification. Empiricism (the evidence of the senses), authoritative testimony (the appeal to criteria and authority), logical deduction, induction, pragmatism, probability theory, scientific methods and Occam's razor (preference for simple theories) are often involved in justification. Justification based theories of knowledge can be divided into:

- irrationalism, which appeals to irrational criteria and authorities (feelings, faith); and
- **rationalism**, which appeals to rational criteria and authorities (observation, intellectual intuition).

Some truths (very few) are self-evident. Self evident truths are immediately obvious and are inherently accepted in the investigation of knowledge and truth, such as the **three primary truths**:

- **the first fact** (the fact of our existence);
- **the first principle** (the principle of non-contradiction) ; and
- **the first condition** (the ability of the mind to know truth).

The primary truths cannot be validated with positive proof, as they are an inherent in every analysis. As a demonstration of their a priori nature, a person objecting to these essential truths cannot set a standard of proof without implicitly accepting the premises.

Truth can only be attributed to judgments, which are expressed as propositions that note the degree, or lack, of agreement between two or more ideas. Truth is the agreement of a premise or judgment with reality.

Statements of existence assert the existence of some particular thing of the form: There exists an x such that x is a swan, and x is white.

To get to truths, logical systems are set up that often can have the following important properties:

- **Consistency**, which means that no theorem of the system contradicts another.
- **Validity**, which means that the system's rules of proof will never allow a false inference from true premises. A logical system has the property of soundness when the logical system has the property of validity and only uses premises that prove true (or, in the case of axioms, are true by definition).
- **Completeness**, which means that if a theorem is true, it can be proven.
- **Soundness**, which means that the premises are true and the argument is valid.

It is ***imperative*** that you test EACH and EVERY argument made in a passage to see whether they are (a) valid (b) sound (c) consistent with other arguments being made in the passage (d) and finally if they are complete. If the majority of the author's arguments make sense to his/her general idea; then their arguments are complete. This makes it much easier to identify the crux of the passage, or the main theme.

What is an argument, and how does one go about identifying an argument? What makes an argument valid or invalid? And, how does one validate an argument?

An **argument** consists of one or more premises and one conclusion.

> A **premise** is a core assumption upon which the argument is built. Premises are statements (a sentence that is either true or false) that is offered in support of the claim being made, which is the conclusion (which is also a sentence that is either true or false). Premises are the reasons for accepting the argument. You should always state the premises of the argument explicitly. Words such as Assume, Since, Obviously and Because introduce the premises of an argument.
>
> A **proposition** is a statement which is either true or false. The proposition is the meaning of the statement, not the precise arrangement of words used to convey that meaning.

There are two main types of arguments: deductive and inductive (remember those?)

- **A deductive argument** is an argument such that the premises provide (or appear to provide) complete support for the conclusion. Deductive arguments have three stages:

  - premises
  - inference
  - conclusion

  In **inference**, you start with one or more propositions which have been accepted; you then use those propositions to arrive at a new proposition. If the inference is valid, that proposition should also be accepted. You can use the new proposition for inference later on.

  > So initially, you can only infer things from the premises of the argument. But as the argument proceeds, the number of statements available for inference increases. Inference steps are often identified by phrases like "therefore ..." or "... implies that ..."

  The **conclusion** is the result of the final step of inference. Hopefully you will arrive at a proposition which is the conclusion of the argument - the result you are trying to prove. It's only a conclusion in the context of a particular argument; it could be a premise or assumption in another argument. The conclusion is said to be affirmed on the basis of the premises, and the inference from them.

- **An inductive argument** is an argument such that the premises provide (or appear to provide) some degree of support (but less than complete support) for the conclusion.

If the premises actually provide the required degree of support for the conclusion, then the argument is a good argument.

- **A good deductive argument** is known as a valid argument and is such that if all its premises are true, then its conclusion must be true. Deductive arguments are generally viewed as the most precise and the most persuasive; they provide conclusive proof of their conclusion. If all the argument is valid and actually has all true premises, then it is known as a sound argument. If it is invalid or has one or more false premises, it will be unsound.

- **A good inductive argument** is known as a strong (or "cogent") inductive argument. It is such that if the premises are true, the conclusion is likely to be true.

In summary, arguments are made up of propositions, which are declarative statements and are known as the premises, and other declarative proposition know as the conclusion.

- Arguments are never "true" or "false." The propositions making up the argument may be "true" or "false," but not the argument itself. An argument is either "valid" or "invalid."
- Every deductive argument is either valid or invalid. The conclusion may be true but invalid, but it is also possible for a conclusion to be false but valid.

Validity is the adherence to rules of logic in the relationship between premises and conclusions. Only propositions are true or false, while deductive arguments are valid or invalid. Inductive arguments are neither valid nor invalid, but rather judged as having a certain probability.

A ***valid argument*** transmits truth from the premises to the conclusion. A***ll*** the premises must be true for the truth to be transmitted.

- The proof of a conclusion depends on both the truth of the premises and the validity of the argument.

(note – a full list of logical fallacies will be provided in Appendix ____).

A fallacy is, very generally, an error in reasoning. In contrast, a factual error is simply being wrong about the facts. A fallacy is an "argument" in which the premises given for the conclusion do not provide the needed degree of support.

Confusing cause and effect is a **fallacy** that has the following general form:

- **A** and **B** regularly occur together.
- Therefore **A** is the cause of **B**.

This fallacy requires that there is not, in fact, a common cause that actually causes both **A** and **B**. When **B** is undesirable, this pattern is often extended in reverse: Avoiding **A** will prevent **B**. In the case of the **Fallacy of Ignoring a Common Cause *A*** is taken to be the cause of ***B*** when there is, in fact, a third factor that is the cause of both **A** and **B**.

Showing that the fallacy has been committed will typically involve determining the actual cause and the actual effect. One way to avoid the fallacy is to pay careful attention to the temporal sequence of events: Generally, if **A** occurs after **B**, then **A** cannot be the cause of **B**.

A deductive fallacy is a deductive argument that is invalid (it is such that it could have all true premises and still have a false conclusion).

1. Deductive Fallacy

   Premise 1: If Vancouver is the capital of British Columbia, then it is in B.C.
   Premise 2: Vancouver is in B.C.
   Conclusion: Vancouver is the capital of B.C.
   (Vancouver is in B.C., but Victoria is the capital. Vancouver is the largest city in B.C., though.)

An inductive fallacy is less formal than a deductive fallacy. They are simply "arguments" which appear to be inductive arguments, but the premises do not provided enough support for the conclusion. In such cases, even if the premises were true, the conclusion would not be more likely to be true.

2. Inductive Argument

   Premise 1: Most cats in Canada are domestic house cats.
   Premise 2: Bill is a cat in Canada.
   Conclusion: Bill is domestic house cat.

3. Inductive Fallacy

   Premise 1: Having just arrived in Ontario, I saw a white squirrel.
   Conclusion: All Squirrels in Ontario are white.
   (While there are many, many squirrels in Ontario, the white ones are very rare).

A **Post Hoc fallacy** is the error that a person accepts that **A** is the cause of **B** simply because **A** occurs before **B**. It is also sometimes referred to as false cause, coincidental correlation, or correlation not causation. For example, a person buys a good luck charm, does well on his exam, and then concludes that the good luck charm caused him to do well. This person would have fallen victim to the Post Hoc fallacy (and superstition). The key to the Post Hoc fallacy is not that there is no causal connection between **A** and **B**. It is that adequate evidence has not been provided for a claim that **A** causes **B**.

A **logical fallacy** is a flaw in the structure of a deductive argument which renders the argument invalid. Fallacy of chasing a red herring introduces

irrelevant facts or arguments to distract from the question at hand, which results in a misconception caused by incorrect reasoning. For example, suppose person **A** and person **B** are debating whether spaghetti tastes better than lasagna, and person **B** brings up the point that spaghetti is better because it isn't as fattening. This would be a red herring, because which dish is most fattening was not the issue at hand. If person **A** isn't careful, he may get sucked into an entirely different debate.

Fallacy of Composition: "From Each to All", i.e. arguing from some property of constituent parts, to the conclusion that the composite item has that property. Examples: "You like eggs, ice-cream, pizza, cake, fish, jello, chicken, taco sauce, soda, oranges, milk, egg rolls, and yogurt so you must like this yummy dish made out of all of them." “Atoms are colorless. Cats are made of atoms, so cats are colorless.”

Truth is not usually self-apparent and must be **proven** through the medium of **rational analysis**. For example, the boiling point of water must be discovered and tested.

Clearly you can build a valid argument from true premises, and arrive at a true conclusion. You can also build a valid argument from false premises, and arrive at a false conclusion.

We can summarize these results as a "truth table" for implication. The symbol "=>" denotes implication; "A" is the premise, "B" the conclusion. "T" and "F" represent true and false respectively.

Truth Table for Implication

Premise	Conclusion	Inference
A	**B**	**A => B**
false	false	true
false	true	true
true	false	false
true	true	true

- If the premises are false and the inference valid, the conclusion can be true or false. (Lines 1 and 2.)
- If the premises are true and the conclusion false, the inference must be invalid. (Line 3.)
- If the premises are true and the inference valid, the conclusion must be true. (Line 4.)

So *the fact that an argument is valid doesn't necessarily mean that its conclusion holds*--it may have started from false premises.

If an argument is valid, and in addition it started from true premises, then it is called a *sound* argument. A sound argument must arrive at a true conclusion.

Tests of "truth": Consider two tests: correspondence and coherence.

> **Coherence** refers to a consistent and overarching explanation for all facts. To be coherent, all pertinent facts must be arranged in a consistent and cohesive fashion as an integrated whole. The theory which most effectively reconciles all facts in this fashion may be considered most likely to be true.
>
> **Correspondence** is quite simply when a claim corresponds with its object. An additional test beyond this "definition" is required to determine the precise degree of similarity between what is posited and what exists in objective reality.

Example argument

Here's an example of an argument which is valid, and which may or may not be sound:

1. Premise: Every event has a cause
2. Premise: The universe has a beginning
3. Premise: All beginnings involve an event
4. Inference: This implies that the beginning of the universe involved an event
5. Inference: Therefore the beginning of the universe had a cause
6. Conclusion: The universe had a cause

The proposition in line 4 is inferred from lines 2 and 3. Line 1 is then used, with the proposition derived in line 4, to infer a new proposition in line 5. The result of the inference in line 5 is then restated (in slightly simplified form) as the conclusion.

Spotting arguments

Spotting an argument is harder than spotting premises or a conclusion. Lots of people shower their writing with assertions, without ever producing anything you might reasonably call an argument.

Sometimes arguments don't follow the pattern described above. For example, people may state their conclusions first, and then justify them afterwards. This is valid, but it can be a little confusing.

To make the situation worse, some statements look like arguments but aren't. For example:

> "If the Bible is accurate, Jesus must either have been insane, a liar, or the Son of God."

That's not an argument; it's a conditional statement. It doesn't state the premises necessary to support its conclusion, and even if you add those assertions it suffers from a number of other flaws.

An argument is also not the same as an explanation. Suppose that you are trying to argue that Albert Einstein believed in God, and say:

> "Einstein made his famous statement 'God does not play dice' because of his belief in God."

That may look like a relevant argument, but it's not; it's an explanation of Einstein's statement. To see this, remember that a statement of the form "X because Y" can be rephrased as an equivalent statement, of the form "Y therefore X." Doing so gives us:

> "Einstein believed in God, therefore he made his famous statement 'God does not play dice.'"

Now it's clear that the statement, which looked like an argument, is actually assuming the result which it is supposed to be proving, in order to explain the Einstein quote.

The authority of scientists who performed such an experiment is usually accepted, but if they are doubted, the experiment can be recreated and the evidence of truth confirmed. To be of rational value, **evidence** must be **objective**, such as the evidence of the senses (inductive), and the evidence of rational thought (deductive).

- A **theorem** is a deductively proven result.
- Or, inductively, a group of falsifiable hypotheses/scientific statements is derived.

Consider first the deductive analytical method and then the inductive method in economics.

Okay, but happens when one can no longer employ rational reasoning – the rational system (RS)? What happens when *reason* itself breaks down (if you would like further reading on this topic read Immanuel Kant's *A Critique of Pure Reason*). The answer is: intuition. You **intuit** the answer.

Intuitive Apprehension

Consider three explanations to account for the tendency to overlook the presence of intuition in discursive reasoning.

- First, intuition presupposes a rational knowledge of facts. The insight does not arise if we are not familiar with the facts of the case. The successful practice of intuition requires previous study and assimilation of a multitude of facts and laws. We may take it that great intuitions arise out of a matrix of rationality.
- Second, the intuitive element is often obscured in discursive reasoning because facts known prior to the intuition are retained, though they are synthesized, and perhaps reinterpreted, in light of the intuitive insight. The readjustment of previously known facts is so easy that when the insight is attained it escapes notice and we imagine that the process of discovery is only rational synthesis.
- Finally, intuition in discursive reasoning is often overlooked, disguised as it is in the language of logic. In short, the intuitive is mistaken for the logical. Knowledge when acquired must be thrown into logical form and we are obliged to adopt the language of logic since only logic has a communicable language. Logic is the only valid means by which we are able to organize and systematize empirical facts. Meaning certainly is conveyed in symbols, poetry, and metaphors, yet the presentation of facts in logical form contributes to confusion between discovery and proof.

In the most simplest of terms: intuition is the integral of experience. You add the sum of all your "tiny" experiences over the years (yes, all of them), and end with an aggregate of experiences. If a Doctor notices that 90% of his patients have lied to him about their medical illnesses, he can intuit that his next patient may lie to him as well, and he can employ countermeasures. There is no inductive reason to be applied here, nor deductive reasoning (he has not yet seen this future patient). He must *intuit*.

You can also intuit MCAT VR passage answers, and intuit what an author may feel about XYZ. Do not confuse intuition for guessing; for guessing is merely conjecture without data. It is based upon ignorance. Intuition rests on the sum of all

of your personal experiences (including, but not limited to, your interactions with others, journals and history books you have read etc.).