Thinking Critically

An Introduction

An Academic Survival Guide

Paul Gamache

The Academic Skills Centre
Trent University
Peterborough, Ontario

Introduction

For Russell ... rational thought is not the quest for certainty, but an adventure, an act of self-liberation and of courage, which changes the thinker by making him more awake and more alive.

Erich Fromm, *Prophets and Priests.*

A Story to Begin...

A few years ago, two friends and I went on a day trip to Syracuse. Early in the morning, the three of us, equipped with flashlights, stumbled through the predawn gloom to the car. Pam was to drive, so I got in the front passenger seat while Bill stretched out in the back. Pam turned the key, and nothing. No grinding, no coughing, nothing. Her newly purchased used car wouldn't start.

Now I know next to nothing about car mechanics, but I got out of the car anyway, unlatched the hood, and shone my flashlight around the engine looking for I know not what. Since I had no idea what to look for, it was no surprise that I found nothing. After a minute or two of imitating someone who knew what he was doing, I told Pam to try it again. She did ... and the car started!

Quickly, I jumped back in, and off we went.

When we got to the border, the U.S. customs officer asked us to turn the car off while he inspected our faces and our stories. Satisfied, he waved us through. Pam turned the key, but, once again, the car wouldn't start. This time, Pam raised the hood and shone her flashlight on the engine. I reached over from the passenger seat and turned the key. Nothing. The Customs officer was getting impatient. As Pam re-entered the car, I grabbed my flashlight, jumped out of the car, and began to shine it around the engine compartment. I felt ridiculous, but the car started! On we went, marvelling at the magical properties of my flashlight.

Later that day, we prepared for the drive home. Once again, Pam was driving, but this time I claimed the back, so Bill sat in the passenger seat. Pam turned the key, but no dice! The Colt was as dead as Michael Jackson's career. Out I jumped with my trusty flashlight while the others waited confidently in the car.

I went through my by-now customary routine, then signaled Pam. She turned the key and nothing! My magic flashlight had failed! I tried again, this time ensuring that my every movement was perfect. That is, the same as it had been when it had worked. Maybe I had offended the Gods of the Flashlight somehow. Still nothing! We were in a fix, out of luck.

Just then, a fellow approached the car parked directly in front of us. Seeing our raised hood, he stopped to enquire whether or not he could be of service seeing as he was, he explained, a mechanic. He examined the engine, but he could find nothing wrong. I told him that the car had been failing to start intermittently all day. He asked me how we had got it going. I dithered; he pressed. Finally, I sheepishly told him about my magic flashlight. He quickly bade us goodbye, jumped in his car, banged down the locks, and screeched off.

There was nothing left to do but call a tow truck. As Bill got out of the front seat to look for a pay phone, I gave the engine one last sweep with my flashlight, and Pam turned the key one last time.

WOW! It started! The Gods of the Flashlight hadn't abandoned us after all! We piled in, and off we went.

Unfortunately, we needed gas. We drove as far as we could, then stopped at a station where we were forced to turn the motor off while refuelling. Naturally, it refused to start. I jumped out and repeated the flashlight ceremony, but to no avail. Finally, we decided to push the car away from the gas pump while we decided what to do. As Bill left the passenger seat, Pam gave one last turn of the key. The motor started! And as it started, I realized why, and why it hadn't started before.

A Digression: Rationality vs. Magic

To be rational is to believe that everything happens for a reason and that we can discover these reasons. As a rational person, I looked for a reason why the car would start; the only factor I could see was my waving the flashlight around the engine compartment. Thus, I constructed a whole ritual out of what seemed to be silly actions. But hey! It had seemed to work! And it is perfectly understandable to continue with whatever seems to work, rational or not.

Unfortunately, my theorizing was based on ignorance, not knowledge. I really didn't know why it had worked, only that it had. And when it stopped working, I didn't know why since I never knew why it had worked in the first place. Although I tried to be rational, I was practicing magical, not rational thought.

Magical thought is built on ignorance and faith, whereas reason is built upon knowledge and understanding. With magic and superstition, we don't / can't understand, we just accept. I didn't understand how shining my flashlight on

the motor could cause it to start, but I did it anyway. Because I lacked the knowledge and understanding of the actual cause, I was left to perform a series of actions which were in the end completely unreliable (and embarrassing!).

Our thought, if it is to be reliable and effective must be built on rationality, not magic. But how many of the things that we do can we explain other than to say that they work? From clearing a TV picture by thumping the side of the set to buying brand name products to sprinkling quotations throughout our essays to voting for our leaders to believing experts. Of all kinds, our actions are based on faith: faith that we are acting logically, faith that we have the whole picture, faith that we can distinguish what is sound from what is bogus. But faith is not enough; we must strive to know and understand by examining everything, critically and dispassionately.

The Value of Thinking Critically

Without the ability to critically examine ideas and assertions, we run the very real risk of being manipulated by advertisements, political slogans, and other propaganda. As L. A. C. Brown writes in Techniques of Persuasion: From Propaganda to Brainwashing, [t]he fundamental mechanism employed by all forms of propaganda is... suggestion, which may be defined as the attempt to induce in others the acceptance of a specific belief without giving any self evident or logical ground for its acceptance…

An increased ability to distinguish the sound from the unsound will lead to an increased resistance to manipulation, superstition, and ignorance. Reason, said John Dewey... liberates [us] from the bondage of the past, due to ignorance and accident hardened into custom. It projects a better future and assists [us] in its realization.

... The End of the Story

Apparently, certain Japanese cars built during the late 70's and early 80's had a device which disabled the ignition when the driver or front passenger's seat belt was unbuckled. In Pam's Colt, the driver's seat belt was buckled behind the seat, but the passenger's belt remained unused.

Thus, the car would start only when the front passenger got out of the seat. It had nothing whatsoever to do with my flashlight!

Introduction

Nine times out of ten, in the arts as in life, there is actually no truth to be discovered, there is only error to be exposed.

—H. L. Mencken, *Prejudices*.

Critical thinking. For many, the term means finding fault. To most people, that's what criticism and being critical mean being negative. But, in its academic sense, criticism means something different: it is an analytical evaluation of something. This evaluation can be negative, but it can also be positive; usually, it will be a combination of the two.

The point is that critical thinking is analytical thinking, not necessarily negative thinking. So what does analytical mean? What is analysis anyway? Well, to analyse means to break something up into its parts to see what it is made of and how it works. This is as true for an idea as it is for an object; when we analyse an idea, we break it up into its logical parts, arrange those parts into the proper order, supply any missing but essential elements, then examine the resulting argument for truth, validity, and soundness.

This is what you will be doing when you are asked to read and respond to a piece of academic writing. Academics write to present their viewpoints, arguing that their particular interpretation is the 'correct' one. But one person's point of view may very well contradict another's, and both may differ from yours. It will be up to you to read, understand, and evaluate each interpretation, adopting what you find of value. So how do you do this? By reading and thinking critically by analysing.

Critical thinking is not the only method of thinking; it may not even be the best method of thinking; but, without a doubt, in university it is the most common method of thinking. In fact, much of your university education will consist of training in this skill, and to a large extent how successful you are will determine how well you will do in your studies. So it is important that you learn how to think and to write, for that matter critically.

Critical thinking is methodical thinking; that is, thinking that follows a method. This method is called logic. Therefore, in order to understand what critical thinking is and how to do it, we must first look at some basics of logic.

The Basics of Logic Definition

Logic, reason, reasoning, rationality, thinking, making sense: these terms are often used interchangeably. Indeed, our language reveals the value we place on logic: 'it stands to reason,' 'as any rational person can see,' 'be reasonable,' 'that's unreasonable,' 'that doesn't make any sense,' 'a senseless act,' and so on. In fact, those who are deemed to be acting 'irrationally' against logic and reason are considered to be mentally deficient, often called 'insane.' Since our society places such a high value on logic and the ability to reason, it is worth our while to find out exactly what we mean by 'logic' and 'reason'.

'Logic' is defined in the Oxford English Dictionary as 'the science of reasoning, proof, thinking, or inference'; 'logical' is defined as 'not contravening the laws of thought, correctly reasoned.' As you can see, logic is equated with thinking itself to think is to behave logically, or so we believe. Since it is a science, logic operates according to rules, or guidelines the laws of thought. And central to logic, similar to science, are facts.

The Role of Facts

The basic building blocks of knowledge are facts: things that we know about the world (for example, my car is red). But facts are neither logical nor illogical; they just are. 'Facts' can be true or false (technically, the term 'fact' means that by definition it is true; if not, it is an error, not a fact), but they are not in themselves logical. Now facts are fine as far as they go, but they really don't go very far at all, certainly not nearly as far as we want to go. Yes, today is Tuesday, but what about tomorrow? Do I really have to wait until tomorrow arrives to know that it is Wednesday? Of course not; I can use the definition of a week and logic to figure it out even though I don't yet have the 'facts.' Thus, I can know now that a week from tomorrow will be Wednesday; I don't have to wait for the day to arrive in order to know.

The first thing to remember about logic is that it is an operation (as in a mathematical operation mathematics is pure logic). This means that logic is a process, something that we do. Gathering the facts is not enough; it's what we do with the facts that matters. Logic allows us to discover (infer) further facts by processing the facts that we already have. Thus, we can say that logic is a characteristic of our thinking; what we do with our facts can be logical or not.

Premises, Presuppositions, and Assumptions

The second thing to remember, and this is an extremely important point, is that logic needs a starting point from which to move, or, to put it another way, raw material with which to build.

This raw material may be proven fact ('today is Tuesday'), but it doesn't have to be. Often, it is assumed to be fact, that is to say, something which may or may not be true. We don't yet know - but which we have agreed 'for the sake of argument' to consider as fact ('let's say that today is Tuesday'). This agreement gives us a starting point from which to move.

These assumed 'facts' are called assumptions, presuppositions, and, very often, premises (not to be confused with a house or building). All logical thought has them; indeed, they form the foundation of all logical arguments. The important thing to remember about assumptions and premises is that they are not necessarily true; they are not necessarily false, either. When we assume that they are true ('for the sake of argument'), we agree to treat them as fact, but we never actually checked; we assumed. Eventually, we will have to check them. Indeed, checking the truth of premises is one of the main ways to see if an argument is sound or not (and the reason academics spend so much time in research).

A Note on the Nature of Assumptions

As rational creatures, we expect a certain consistency in what we call reality. We expect to see the same world (more or less) when we wake in the morning as we saw the previous evening when we went to sleep. We assume certain basic things about the world so that we don't have to keep re-proving the same things over and over every day. 'Taking certain things for granted' allows us to focus our attention on learning new things. This is fine.

But what if some of what we have always taken for granted isn't, in fact, the case? No matter how valid our subsequent reasoning is, our conclusions will always be unsatisfactory because our reasoning is based on a mistaken view of the world. Good thinking depends on accurate information.

Take feminist criticism for example. Feminists argue that for hundreds, perhaps thousands, of years people have been operating under a number of false 'yet unexamined' assumptions: that women are just like men (except less so), that women are inferior to men, that knowing about men automatically tells us about women, and so on. And, they argue, these false assumptions have led, inevitably, to unsound arguments and unsatisfactory conclusions (and actions!). Thus, feminists call for an uncovering and examination of our culture's most basic assumptions followed by a rethinking of society's views about gender.

So it is very important to remember that all arguments, whether logical or not are based upon premises / assumptions/presuppositions, and that these have to be checked to see if they are, in fact, true. Remember to check all assumptions: your own as well as those of the author or speaker.

Values: 'Well, That's My Opinion'

Assumptions themselves are often conclusions based upon evidence and argument. We have reasons for assuming these things. If we follow the trail of assumptions and reasons far enough back, we will come at last to a basic belief that has been assumed to be true but which cannot be 'proven'. This is often called a value, sometimes an unverified hypothesis a basic belief that has been taken on faith. Since values are the foundation on which personal philosophies are built, people with differing values will usually have differing views on many things. The resulting disagreements cannot be resolved through logic since they have come about because of differing starting points, not errors in reasoning or mistaken facts.

All logic needs a starting point a basic belief, hypothesis, or value. Take, for example, my belief that all sports cars should be red. Let's say that you prefer black. Which of us is 'right?' Is there any point in arguing? There is room in the world for differences in opinion as long as those differences are based upon proper reasoning. 'It is difference of opinion,' wrote Mark Twain, 'that makes horse races' . But we are not justified in believing whatever we want.

Just be sure that what you think are your most basic beliefs actually are just that, and not simply unexamined prejudices in disguise (e.g. males are logical; females are emotional). Check everything you believe why do you believe this? What makes you think so? Leave no belief unexamined. And for logic's sake, root out all of those prejudices that are lurking in the background!

Conclusions and Arguments

Once we have a couple of premises/assumptions, we can apply logic to 'figure out something else.' This process of figuring out is called inferring and what we infer is called a conclusion; the whole thing is called an argument. Thus, arguing, in its academic sense, is not bickering and disagreeing; rather, it consists of stating a number of premises/assumptions, then inferring the logical conclusion.

Applying Critical Thinking to Reading

Five Steps for Analyzing Arguments

Step: 1: Paraphrase the Argument
Step: 2: Break the Argument into Premises and Conclusions
Step 3: Arrange the Premises and conclusions into logical order
Step 4: Supply the missing premises needed to make the argument valid
Step 5: Evaluate the logic for validity and the premises for truth

Step 1: Paraphrase the Argument

This first step is necessary to ensure that you know exactly what is being claimed or argued. If you can't put the argument into your own words, you really don't understand it. And if you don't understand it, you can't evaluate it.

Make sure that you understand all of the terms that are used; pay attention to how familiar terms are used as well. Sometimes, a writer will use familiar terms in unusual or unexpected ways. For example, what does '100% pure' mean when it refers to chocolate? Since chocolate is produced by blending a number of ingredients, in what sense is it 'pure'?

Often, arguments depend upon certain definitions. Take 'natural,' for instance. If we define 'natural' as anything that is not 'man made,' then a forest is natural and a city is not. But if we argue that humans are themselves a part of nature like trees, then anything they do is natural, including building cities. (In fact, the latter definition makes everything natural because humans and their actions are all a part of nature.) One definition makes chocolate unnatural, whereas the other makes dioxin natural. Clearly, the operative definition here is of great importance. (Are humans themselves 'natural' or 'man made'?)

It is important to note here that you are not obliged to accept the definitions used by a writer, merely to understand them. .Whether it be 'molecule,' 'fact,' 'law,' 'art,' 'wealth,' 'gene,' or 'whatever,' writes Neil Postman, 'it is essential that students understand that definitions are hypotheses, and that embedded in them is a particular philosophical, sociological, or epistemological point of view'. It is very important to determine the 'sense' of each word a writer has

used, how he/she has defined it, but, as Postman goes on to argue, 'neither you nor I are under any obligation to accept [his] definition …

'It is my privilege to prevent him from pre-empting [a] word. I will use [words] as I choose, not as he chooses, and it is my intention to persuade others that my definition is more useful than his. In short, the definition of something is usually the starting point of a dispute, not the settlement. '

Take the debate over abortion, for example: accepting either side's definition of 'life' and 'murder' obliges you to accept all of its argument: if life begins at conception, then abortion is murder; but if life begins at birth, then abortion is not murder. The whole debate turns on definitions.

BEWARE: *Don't dismiss differences in conception and definition as 'Just semantics' and therefore of no importance! Words are all we have to express our ideas; they should always be taken seriously, never dismissed lightly.*

Step 2: Break the Argument into Premises and Conclusion

Most simple arguments used as examples in texts on logic are written in the proper order. But rarely are arguments this neat or convenient. Often, it is difficult to separate what is being assumed or claimed from what is being concluded, especially since what is concluded will usually itself become a premise for a further argument (a long, connected series of arguments like this is called a 'chain of reasoning'; the final conclusion is reached through a series of intermediary arguments, 'links').

If you're lucky, the writer will have indicated the premises and conclusion with guide words. Here are some examples:

Conclusion :

therefore …
thus …
hence …
consequently …
so …
clearly then …

Premises:

because
since
for
assuming
based on
Let's assume

These guide words are often used right before a premise or a conclusion. For example:

Premise/Assumption:
Conclusion
Premise / Assumption
Premise / Assumption
Conclusion
Conclusion

Let's assume *that business owners want to reduce their costs as much as possible.* ***Clearly****, business owners will try to reduce their heating costs as much as possible* ***since*** *heating costs make up a large part of their operating expense. Because the southern US has warmer winters than Canada heating costs will,* ***therefore****, be lower in the southern US.* ***Thus****, business owners will seriously consider locating in the southern US instead of Canada.*

Sometimes guide words come between premises / evidence and conclusions. For example:

*'His actions (evidence) … s****how…that*** *… (conclusion) he doesn't care.'*

'*The fact that he doesn't care (conclusion)* ***is shown by*** *… (evidence) his actions.*'

'*Her statement (evidence) … implies that … (conclusion) she will take action.*'

'*That she will take action (conclusion) … is implied by… (evidence) her statement.*'

How can you distinguish a premise/ assumption from a conclusion when there are no guide words? Well, remember that by definition premises are assumed to be true 'for the sake of argument' without evidence, whereas conclusions are based upon evidence (in other words, a statement with no proof is an assumption whereas a statement with proof is a conclusion). So figure out which claims are simply asserted with no attempt made to prove their truth; these are the premises/assumptions.

The conclusion rests upon these premises. They are being used as evidence of the validity of the conclusion. Let's look at an example:

Conclusion: what is being proven
Premise: no proof offered
Premise: no proof offered
Premise: no proof offered
Premise: no proof offered
Conclusion: what is being proven

Canada is becoming a colder, less caring place in the 90's. Governments are increasingly reluctant to spend money on society's less fortunate. Citizens are volunteering less and giving less to charity. Violence, especially random, senseless behaviour, is on the increase; drivers are even shooting at one another because of minor driving indiscretions on our highways.
No one seems to give a hoot anymore about his fellow man.

Look carefully at the piece above. Each sentence seems to be a statement of 'fact'; but some sentences are claims without proof. These are the premises/assumptions, claims assumed to be true with no attempt to prove their truthfulness. The first and last sentences are also claims, but these claims are conclusions (both actually say the same thing in different words); the writer has tried to prove these particular claims by presenting the premises as 'evidence.'

In most well constructed paragraphs, the conclusion (the point being argued) is contained in the topic sentence. In the example above, as in many (but not all!) paragraphs, the topic sentence is the first sentence. The last sentence is often the concluding sentence, which will contain a restatement of the conclusion. So your ability to separate premises from conclusions will be greatly enhanced by your ability to recognize topic sentences and supporting evidence.

Thus, each paragraph in an essay is itself an argument. The conclusion of each paragraph then goes on to become one of the premises in the section argument. The section conclusions, when combined, form the premises which lead to the overall conclusion. After all, what is a thesis if not a final conclusion based upon the argument presented in the essay as a whole?

(Of course, this method of examining arguments in your readings can he used to improve your writing as well. See Page 30 for more on this matter.)

Step 3: Arrange the Premises and Conclusion in Order

Arguments come in all sorts of arrangements, not all of them clearly laid out in the 'standard' order of premises leading to a conclusion. For example, someone might say this:

He hasn't called, and it's after 5. I'll have to go by myself since he's not coming.

Your task of evaluating this argument can be made much easier by rearranging it into a standard order:

Premise:	Its 5 and, he hasn't called;
Premise:	If he hasn't called by 5 then he's not coming;
Premise:	If he is not coming, then I will go by myself;
Conclusion:	Therefore, I will go by myself

If you are to arrange arguments into a standard pattern, it helps to know what these standard patterns are. There are many, many valid patterns; here are some common ones:

1) If A, then B.	If I go, then I'll see you there.
A.	I'll be going.
Therefore B.	Therefore, I'll see you there.
2) Either A or B.	Either I will go or I will stay.
Not A.	I don't want to go.
Therefore, B.	Therefore, I'll stay.
3) If A, then B.	If it is winter, then it is cold.
Not B.	It is not cold.
Therefore, Not A.	Therefore, it isn't winter.
4) If A, then B.	If I go, I'll see you there.
If B, then C.	If I see you there, I'll buy you a drink.
Therefore	
If A, then C.	Therefore, if I go I'll buy you a drink.
5) A.	I'm going.
If A, then B.	If I go, then I'll buy the drinks.
If B, then C.	If I buy the drinks, you'll get drunk.
Therefore C.	Therefore, you'll get drunk.
6) All As are Bs.	All bartenders are good listeners.
X is an A.	Willie is a bartender.
Therefore X is a B.	Therefore, Willie is a good listener.
7) All As are Bs.	All bartenders are good listeners.
All Bs are C.s.	All good listeners keep quiet.
Therefore	
All A.s are C.s	Therefore, all bartenders keep quiet.

Step 4: Supply any Missing Premises and Conclusions

If we are to ever get anywhere in our reasoning, we must assume some things simply 'for the sake of argument.' Doing this allows us to focus our attention on the issue at hand instead of endlessly defining terms or gathering evidence. For this reason, few arguments contain all of the premises that the writer assumed. Some arguments don't even provide the conclusion, instead letting

the evidence 'speak for itself.' In these cases, you must also provide the implied conclusion yourself: for example, '*Our product is the best*' implies, 'So buy it.'

Often, many assumptions are not only unstated, but unacknowledged; in other words, the writer isn't even aware of his/her own assumptions. This isn't a problem if those assumptions are true, but if they are false, problems arise. This is why you should uncover and make explicit all assumptions.

So how can you supply these missing assumptions/premises? Well, first assume that the conclusion is true. Then ask yourself, 'under what conditions would this be true? What is presupposed? This is true only if [supply the conditions]' For example, suppose someone said this:

Immigrants take jobs away from Canadians. Therefore, they should be kept out of Canada.

Put into standard order, this argument looks like this:

Premise: *Immigrants take jobs from Canadians.*

Conclusion: *Immigrants should be kept out of Canada.*

Clearly, some premises are missing. So ask yourself, 'under what conditions would the conclusion follow?' The answer(s) will be missing premises.

Missing Premise: *Those who take jobs from Canadians should be kept out of Canada.*

Thus, the complete argument looks like pattern #1 found on page 9.

If A, then B.	*If people take jobs away from Canadians, then those people should be kept out of Canada*
A.	*Immigrants take jobs away from Canadians.*
Therefore, B.	*Therefore, Immigrants should be kept out.*

Similarly, the following argument is also missing some steps:

I applied for a job yesterday. I'm sure that I'll get it!

Here is the argument with the missing premises inserted into it (pattern #5).

A.	*I applied for a job.*
If A, then B.	*If I apply for a Job, I will get an interview.*
If B, then C.	*If I get an interview, then I will get the job.*
Therefore, C.	*Therefore, I will get the job!*

One last point: remember that not all unstated premises will relate to the issue at hand. For example, in the argument above, it has been assumed that there is, in fact, a job opening, that it will be filled, that it hasn't yet been filled, that the

application went to the right place, that it didn't get lost, that it arrived on time, and so on. There are many, many assumptions made whenever we say anything; the trick is to figure out which relate to the argument and which do not.

Step 5: Evaluate the Argument for Soundness

In order to evaluate any argument, we need to complete two sub steps.

Checking, the Soundness of Arguments

There are two questions to ask about any argument: 1. Is the logic valid? 2. Are the premises true?

If the answers to both is yes, then the argument is sound. But if the answer to one or the other or both, is no, then the argument is unsound. This applies to all arguments.

Soundness: Checking for Validity

Checking the truth of premises is often a long, laborious process that involves a great deal of research. Checking the validity of an argument, on the other hand, can be done through examination and analysis; it takes far less time and effort than does checking the premises. For this reason, it is better to start off by checking the validity of an argument than by checking the truth of its premises.

For an argument to be valid its **logic must be valid**; that is, the conclusion must follow logically from the premises. Please note here that an argument's validity is independent of the truth of its premises. The question is, is the logic valid? If the premises were true (even if they aren't), would the conclusion necessarily follow?

For example:

> Premise #1: Peterborough is in Ontario
>
> Premise #2: Ontario is in Canada.
>
> Conclusion: Peterborough is in Quebec.

Here, both of the premises are true, but so what? The conclusion doesn't follow logically. In this case, the problem lies, not with the truth or falsehood of the premises, but with the shoddy logic of the argument. Thus, the argument above is invalid, even though its premises are true. What about this argument?

> Premise #1: All pigs can fly.
>
> Premise#2: This animal is a pig.
>
> Conclusion: Therefore, this animal can fly.

This argument is valid; that is, its logic is correct even though both the first premise and the resulting conclusion are wacko. The point is, if the first premise were true, then the conclusion would follow. So, this argument is valid, even though one of its premises is false. Similarly, the first argument on page 28 is also valid since its logic is impeccable. Try this one:

The government, which holds the majority of seats in the legislature, argues that it is justified in cutting spending on social programs since it is "just doing what the public elected us to do." Officials claim that welfare abuse is widespread; most people taking cheques aren't entitled, they claim. The introduction of "workfare" will get those too lazy to find a job *back into the workforce*. "It's all the fault of the previous governments," said one. "They complain about our policies, but they are the ones who got us into this mess in the first place."

This piece contains a number of "pseudo arguments"— logical fallacies that look like sound arguments but really aren't: appealing to the people, overgeneralization, appealing to authority, straw man, ad hominem argumentation, and more. Let's look at some logical fallacies.

Five Types of Fallacious Arguments

As mentioned, there are many valid forms of argumentation. There are, however, many forms of argumentation that are invalid even though they seem to be persuasive. In these cases, their persuasive power arises from their superficial resemblance to valid forms of reasoning. Don't be fooled!

Logical fallacies tend to arise from five broad causes:

1) Missing evidence;
2) Irrelevant evidence;
3) Inadequate or insufficient evidence;
4) Oversimplification of complex situations;
5) Ambiguities in our language.

Let's look at each of these types more closely.

1. Missing Evidence

a. Begging the Question

Definition: asserting something and then trying to prove it by saying the same thing in other words.

Example 1:

> *The new landfill was chosen by a panel of experts. Their expertise has been amply shown by the fact that they chose this site.*

This is an example of what is often called "circular reasoning." The assertion that the site was chosen by experts – is backed up by 'evidence' – choosing this site makes them experts – that is actually the original assertion. There is, in fact, no proof offered at all, just a restatement of the original assertion.

Example 2:

Smoking must be bad for your health.	Assertion
There are now many laws restricting it, and the government wouldn't have passed these laws if smoking weren't harmful to your	Evidence.

health.

Again, what has been assumed is what is eventually concluded. Thus, the 'argument' goes nowhere; in fact, it's not an argument at all since there is no evidence.

2) Irrelevant Evidence

a. Evading the Issue

Definition: trying to prove a point with evidence not directly related to the issue.

Example 1:

Doctors and nurses have a lot of education;	Premise #1
both groups work hard;	Premise #2
both improve the health of patients.	Premise #3
Therefore doctors and nurses deserve a salary increase of 10%.	Conclusion

These premises may be true, but what do they have to do with the conclusion? Nothing. As stated, they have no logical connection to the conclusion. Thus, the 'conclusion' remains unsupported – a mere opinion, not a conclusion at all.

Example 2:

Taxpayers pay too much.	Premise #1
Hospitals often duplicate each other's services.	Premise #2
Health care spending is often wasteful,	Premise #3
Grants to health care, therefore, should be cut.	Conclusion

Maybe yes, maybe no; but these three premises do not lead logically to this conclusion.

Remember, we aren't checking the truth of the premises here, just the validity of the logic. The three premises may, in fact, be true; but the logic here is still fallacious.

There are two common diversionary tactics related to evading the issue, often used to draw attention away from the point under dispute:

- ***the red herring*** - a topic that is tangential to the issue (e.g. most nurses are women; the tax structure is unfair);
- ***the straw-man*** - setting up an opponent that is overly simple or extreme, then knocking him down; arguing a position that no one in fact

holds (e.g. claiming that nurses. demand for pay equity with doctors is unreasonable, when no nurses are demanding this).

b. Appealing to Authority

Definition: invoking authority as the last word on a topic. The opinion of this authority is used to close off further discussion; once the authority is cited, nothing more need be, or can be, said on the subject.

Example:

Welfare fraud is widespread in Ontario according to the Minister.	Assertion
And who are we to doubt him? After all, he is the expert	Evidence

Welfare fraud may, in fact be widespread; but it isn't true simply because some authority has said that it is true. What's needed – and what's missing – is evidence that we can examine and evaluate. Remember, simply saying something doesn't necessarily make it so; always look for the proof.

Arguments exist, and should be considered, independent of the authority of the arguer; logic is not a matter of power relationships.

A related trick is to appeal to an authority outside of one's field of expertise. Just because a person is an authority on medical procedures, for example, doesn't automatically mean that this person is an authority on morals. Perhaps we should listen to a doctor's medical view of abortion, but why should we believe his/her moral position any more than, say, a car mechanic's position?

Example:

Wayne Gretzky is a real good hockey player. I saw him in an ad for Dimwit's Pizza last night.	Premise
I think I will try one; after all Wayne knows a good pizza when he sees one.	Conclusion

Many celebrity advertisements are based on this technique. The question is, does this person's area of expertise extend to the issue at hand? If not, then why should we pay him/her more heed than anyone else?

c. Ad Hominem Arguments: Arguing .Against the Person.

Definition: ignoring the argument and making personal attacks against the arguer.

I don't like him, so I'm not going to listen to him!)

Example 1:

The black defendant is innocent.	Conclusion #2
The arresting officer – a white man – is a bigot.	Premise
He must have planted the evidence.	Conclusion # 1

Perhaps the officer is a bigot; but how does that affect the evidence? If the evidence was planted, then the defence should be attacking the officer's actions, not his personality or beliefs. Neither conclusion follows from the (irrelevant) premise.

Example 2:

This environmental group is against polluting the river!	Conclusion
That's how they raise their money—by causing a: disturbance!	Premise

Perhaps that is how they raise money—by raising awareness. But what does that have to do with polluting the river? If the environmental group keeps quiet, will the pollution go away? Obviously not. The speaker here is employing an *ad hominem* argument—attacking the arguer and ignoring the argument.

One associated variation of the *ad hominem* attack is guilt by association, sometimes called "tarring with the same brush." The assumption here is that all members of the group are the same, and that since we need not consider the argument of a discredited group we need not consider the argument of a member of that group.

Example:

We can't believe the testimony of this police officer.	Conclusion
It's well known that the police force is full of racists, and racists lie.	Premise
He must have planted the evidence.	Premise #2

This is prejudice, not reason.

Another variation assumes that some people, by definition are incapable or more capable of something than others.

Example 1:

He is unsuitable for a position as a coach for this team	Conclusion
because he never played pro-ball	Premise #1
Only ex-pros know how to coach other pros.	Premise #2

Example 2:

She would make an excellent judge	Conclusion
because she's a woman; she'll bring women's perspective to the bench.	Premise

Both may be true, but neither is automatically true; in any event, this isn't logic. Would all women automatically be good judges? Are all good coaches ex-pros? No.

d. Arguing from Ignorance

Definition: asserting that something must be true since no one has proved that it isn't; asserting that something must be false since no one has proved that it is true.

Example:

Aliens from other worlds are here amongst us.	Conclusion
I know that this is true because no One Premise has ever disproved it.	Premise

Aliens from other worlds do not exist	Conclusion
I know that this is true because no one has ever proved that they do exist.	Premise

Based on what has not been proved about something, we cannot with certainty know anything at all. We can suspect; we can hope; we can believe; but we cannot know.

e. Appealing to the People/Popularity

Definition: attempting to justify a claim by pointing out its popularity. The fact that many people think something proves that it is so.

Example:

Putting welfare is the right thing to do	Conclusion
because the public wants it.	Premise

Logic is never a matter of numbers; neither is it to be confused with democracy. Bad logic is bad logic, no matter how many people subscribe to it.

As your mother used to say when you wanted to do something because everyone else is doing it, would you jump off a cliff if everyone else were doing it? Remember that popular support doesn't make anything logical. It just makes it popular.

Often, class, national, religious, or professional identity is used in the place of evidence. The supposition is that a collection of these people must always be right.

Example:

Nine out of ten doctors recommend...

Doctors can be wrong, too. Trust evidence, not opinion

f. Appealing to Emotion/Compassion

Definition: playing on our feelings and emotions instead of presenting and examining evidence.

The more common name is a "sob story."

Example 1:

This man should not be held responsible.	Conclusion
He only robbed the bank because he needed money for his dear mother's operation.	Premise

Example 2:

This woman is not guilty of anything.	Conclusion
She is the victim of her husband's cruelty. Can't you feel her pain?	Premise

This approach confuses understanding with acceptance. Knowing about people's upbringing or situation can help us to understand why they do what they do, but we are still not obliged to accept their actions.

The converse is also true: if we can be made to hate a person or group enough, we will abandon reason in favour of emotion – and usually violent action. This is called "scapegoating": identifying and blaming a handy source for all of one's problems regardless of the evidence.

g. Appealing to Force

Definition: using explicit or implicit 'threats' to get others to agree. These threats may be moral, physical, or psychological.

Examples:

You will be damned to hell if you keep on sinning. You will be poor in your old age unless you save with us .The more you resist us, the harder you are making it on yourself.

Each of these examples attempts to substitute fear for thought. 'If you know what's good for you, you'll shut up and do what I say' may be effective, but it isn't logic.

3) Inadequate or Insufficient Evidence

a. Hasty Generalization/ Overgeneralization

Definition: drawing conclusions from too few examples, too little evidence, or atypical examples. This fallacy is often referred to as 'Jumping to conclusions' because that's exactly what is done – seeing one case and jumping to a sweeping conclusion for all cases.

Examples:

> *I had a Ford once; it was nothing but trouble. All Fords are trouble.*
>
> *All women are overly emotional; just look at my wife.*
>
> *Government workers are underworked. I went into an office the other day and no one was doing anything.*

The first question to ask when examining a study is "how large was the sample size?" The second is "what was the composition of the participants?" Would you accept a conclusion about what Canadians think based on a sample size of three? How about if those surveyed about the effects of poverty were all millionaires?

b. Ignoring Exceptions

Definition: basing an argument on a general rule without considering whether the case in question is an exception to that general rule.

Example:

No one should cut another person.	Premise #1
If someone does cut another person, he/she should be arrested.	Premise #2
Therefore, all surgeons should be arrested.	Conclusion

The problem here is that the first premise is too broad to be useful; its general nature leads to problems when applied to specific (i.e. exceptional) cases.

4) Oversimplification of Complex Situations or Issues

a. Complex Questions

Definition: asking a question that assumes a point not granted; combining two questions into one. This is often referred to as a "loaded question."

Example 1:

Have you, stopped beating your wife?

This, of course, is the famous "law School loaded question." What can you answer? 'Yes . I no longer beat my wife?' Or, 'No. I am still beating my wife?' Either answer admits that you at one time beat your wife, which may not be the case. The questioner assumes too much.

Example 2:

Have you stopped abusing drugs?

Again, how can you answer such a question if you've never abused drugs?

The solution here is to separate complex questions into a number of simple ones:

Have you ever beaten your wife? If so have you stopped? Have you ever abused drugs? If so, have you stopped?

b. Either-OR Over-simplicity

Definition: arguing a complex issue with a number of possible positions as if it were a simple 'either/or' issue. That is, asserting that there are only two possible answers or positions when there are in fact more.

Example:

Is personality a matter of nature or nurture?

Perhaps it is a combination of the two. The question forces the answerer into choosing one of only two positions when there are more possibilities. The assumption here is that all issues are either black or white with no shades of grey. (Beware: sometimes proofs will do this to stimulate debate.)

c. False Causes

Definition: seeing cause and effect where there is none.

Example:

Studies have shown that every serial killer caught in the past twenty years has owned and used a toaster.	Premise
Clearly, toasters help to create serial killers	Conclusion

What nonsense! This is superstition, not logic. Recently, a major-league baseball team which had lost nine games in a row had a bust of Pelvis removed from the broadcast booth; they claimed that the King's presence had caused the team's losing streak. Their reasoning was all shook up!

d. False Analogies

Definition: claiming that two things that are similar in one regard are therefore similar in all regards.

Example:

The human, body is just like a machine.	Premise
Therefore I should not exercise because I don't want to wear it out	Conclusion

In some ways, the human body is like a machine (is .analogous. to ...). But not in all ways. It is essential that you find and acknowledge the limits of every analogy; that two things are alike in one way doesn't mean that they are alike in all ways. Sure, in some ways death resembles sleep . but does that mean that death is sleep? Of course not.

c. Poisoning the Well

Definition: asserting that the argument in question must be accepted without question; reinterpreting contrary evidence so that it is no longer contrary; explaining away every objection. (Just as poisoning a well prevents anyone else from benefiting from it, seizing control of all evidence prevents those who disagree from using it for themselves.)

Example:

Everyone is this way: you are too. If you disagree, you are in denial.
In addition, the fact that you disagree proves that you are in denial.

There's no way out of this circularity . 'I'm right and you're wrong; the fact that you disagree just proves that you're wrong.' No matter what you say, you're wrong when you argue within a closed system such as this. The fact that there is no evidence of U.F.O's proves that they do exist . no evidence is evidence that the government is covering up. Thus, every objection is explained away.

5) Ambiguities in our Language

a. Amphiboly

Definition: faulty grammar, punctuation, positioning of qualifying phrase, and so on. The problem here is that the phrasing or language may not mean to the reader what it meant to the writer.

Example 1:

Never withhold herpes infection from a loved one.

Does this mean be sure to give your loved one herpes? Or tell your loved one that you have herpes? As written, it could mean either. But they're not the same!

Example 2:

The police officer shot the man with a knife.

How can one use a knife to shoot another? This is illogic created by faulty wording, not faulty thought. The way to correct or avoid this problem is, of course, to reword the expression or argument to make it clearer.

Always inform a loved one of herpes infection.

The police officer shot the man who was wielding a knife

Admittedly, these examples are rather simplistic, perhaps silly, but the principle is important nevertheless: the words that are chosen matter! This error will creep in most often when you are paraphrasing an argument. Should you choose ambiguous or incorrect wording, your subsequent analysis may be way off base. I once wrote a whole essay around my misreading of 'arid' as 'arable', which is the opposite meaning. Make sure that you understand the writer's words, and that your paraphrase captures the author's meaning precisely.

b. Accent

Definition: ambiguity created by misplaced emphasis.

Example:

He should not have treated his wife that way in public.

This sentence can have a number of meanings depending upon which words are stressed; as the stresses change, the meaning changes. For example, we could read this as

He should not have treated his wife that way IN PUBLIC.

Should he treat her that way only in private? Similarly, we could read it as this:

HE should not have treated his wife that way in public.

Does this mean that it's ok for others to treat her in this way? How about this:

He should not have treated HIS WIFE that way in public.

Does this mean that he should treat others in this way? The problem here arises because the 'proper' i.e., the intended reading is not clear to the reader, thus allowing for a number of different meanings depending upon where the stresses are placed. Always try a number of readings to see if the meaning shifts.

c. Composition and Division

Composition: what is true of the parts of a group must also be true of the whole.

Example:

The players on our team are the best.	Premise
Therefore, our team will be the best.	Conclusion

This isn't necessarily true, especially if the players won't play together, as a team.

Division: what is true of the whole of a group must also be true of its parts.

Example:

Our team is the best	Premise
therefore, our players must be the best.	Conclusion

In both cases, the fallacy comes from mistaking what may be the case, what is often the case, or what is usually the case for what must always be the case. Remember, 'usually' does not mean 'always.'

d. Confused Figures of Speech

Definition: taking the similarities of form or grammar of words to indicate similarities in meaning; confusing one sense or meaning of a word with another sense or meaning for that same word.

Example:

ineligible = not eligible
inconsistent = not Consistent
incontestable = not contestable
So, inflammable = not flammable

Boy! Is this ever not true! A variation can occur if we assume that all nouns work in the same way that is, to stand for people or things. But we can't conclude that all subjects of discussion are the same kind of things simply because they are named by the same type of words – nouns.

For example, what is the brain? Where is it located? How about the mind? What is it? Where is it located? Both 'brain' and 'mind' are nouns, but that does not mean that they are the same kind of concept and can be treated in the same way.

There are more fallacious forms of argumentation; these are just a few. No matter what argument you are analysing, don't automatically assume that the logic is correct. Check! For practice, check the argument at the bottom of page 13. See how many of these fallacies you can find.

Soundness (cont): Checking the Truth of the Premises

The second step in determining the soundness of an argument is to check the truth of its premises. Frankly, most scholars have a pretty good grasp of logic; as a result, you may not find many academic arguments that are illogical. You must, then, examine the premises for truth.

This can be as simple and quick as comparing a premise to your own experience, or it can be as complicated and time-consuming as replicating a researcher's study to check the findings. Either way, check the facts. By definition, false assumptions lead to unsound arguments.

False Premises usually invalidate an argument. For example:

Premise #1: *Tuesday is immediately followed by Thursday*
Premise #2: *Today is Tuesday.*
Conclusion: *Therefore tomorrow is Thursday*

Now, the conclusion here is clearly incorrect. The problem lies in the first premise. It's false.

Thus, it is very important to check the premises of every argument to see if they are, in fact, true. Remember, by definition, false premises don't invalidate an argument (but they will make it unsound. Consider the following, for example:

Premise #1: *Tuesday is immediately followed by Wednesday.*
Premise #2: *Today is Tuesday.*
Conclusion: *Therefore, tomorrow is Wednesday.*

This is a valid argument in that it is an acceptable pattern. But if today isn't Tuesday, then premise #2 is false; therefore, the conclusion, that tomorrow is Wednesday, will be wrong, making the argument unsound even though it is valid. But won't the argument be sound when Tuesday rolls around? Sure. This means that the argument will sometimes be sound and sometimes unsound; it is limited because one of its premises is itself limited to one day per week. This argument will still be useful every Tuesday, but only then. So, in addition to checking everything else, cheek the circumstances or the situation.

Remember: true premises + valid reasoning = sound arguments

Applying Critical Thinking to Writing

Generally speaking, you can apply your critical skills in two situations: to respond to someone else's arguments in a critique or review, and to present your own argument in an essay. Let's look at critiques/reviews first.

1. Critiques/Reviews

Although the specific structure and content will vary depending upon the course, the subject, and the purpose of your response, critical responses tend to consist of the following four sections (in this order):

1) An introduction which relates the topic at hand to the general field of scholarship so that the importance of the discussion is revealed;

2) A summation/paraphrase of the argument (as brief as possible);

3) A critical evaluation of the argument, first considering the validity of the logic, then examining the truthfulness of the premises (if necessary, supplying any missing premises), finally raising any objections that you think other readers may have, then replying to them;

4) A conclusion which briefly sums up your assessment of the argument and relates its importance to the broader field of study.

The third section, your critical evaluation, is the most important part of your review. For this reason, it should be the longest and most informative. Generally, a good critical evaluation will include the elements listed below:

a. A summation of the parts of the author's argument (including any hidden premises) that are of particular relevance or interest to you;

b. An examination of the logic to see if the argument is valid;

c. An examination of the premises (one at a time) to see if they are true;

d. An examination of close alternatives/adaptations of the author's basic argument to see if it can be improved.

For more details, consult our Survival Guide, Writing Academic Reviews.

2. Essays

Not all essays need be constructed around a formal argument. But for those that do and this depends on the subject the following is a typical pattern:

Premise A
Premise B
Premise C
Therefore, Conclusion

Introduction

The introduction contains the thesis which is the overall conclusion that the whole essay is designed to 'prove.' In addition, the introduction presents an overview/preview/blueprint which outlines in general your argument and its order. Your argument will consist of a number of premises leading logically to your conclusion. Your essay will consist of evidence which supports your premises.

First Section

The first section states your first premise, then indicates the reasoning and examines the evidence for it. As stated earlier, most premises are themselves conclusions of prior arguments based upon other premises; thus, each section premise is in fact a conclusion – a 'sub-conclusion.' Each section is, in itself, a small argument.

Second Section
Third Section
Fourth Section
Conclusion

As many sections as needed. Each section follows the pattern of the first: state the section's premise/conclusion, then present the evidence and reasoning that support it.

The conclusion of the essay presents, or restates, the overall conclusion of your argument – the thesis – as well as a summation of the entire argument.

Two tips:

1. Omit, both premises and conclusions which are. uncontroversial and likely to be "Obvious" from the start.

2. Try starting with those premises which the reader is likely to believe and moving toward premises and a conclusion, less likely to be believed without proof.