CRITICAL THINKING – HANDOUT 7 – DIAGRAMMING ARGUMENTS

1. Argument Analysis

We have already discussed several critical thinking skills (CTS):

> CTS #1: the ability to identify passages of text and determine whether or not they are arguments,
> CTS #2: the ability to determine whether an argument is valid/invalid and strong/weak by using the imagination test.
> CTS #3: the ability to specify the *exact* conclusion of the argument.
> CTS#4: the ability to identify which premises (reasons) are relevant and which are irrelevant to a specific conclusion.

The next CTS we will discuss is the following:

> CTS#5: the ability to determine how different premises relate to each other in their support of the conclusion.

2. Argument Structure

Determining the structure of an argument is a three-step process.

> Step #1: Identify the exact conclusion.
> Step #2: Identify the statements/propositions/reasons that support that conclusion.
> Step #3: Consider how these statements are related to each other in their support of the conclusion, i.e. consider the *structure* of the argument.

Once an argument is fully analyzed, then it can be *evaluated* for whether it is strong, weak, valid, invalid, sound, cogent, and which reasons are relevant/irrelevant. In this lesson, we will focus on this third step, i.e. we will aim to determine the *structure* of the argument. In considering the structure of an argument, we are asking ourselves the following question:

> What relationship do the reasons/premises that support the conclusion have to each other?

There are two possible answers to this question:

> (1) **Independent Support:** The support offered by a reason R_1 for the conclusion C is *independent* of any other reason R_2, R_3, R_n that may also support the conclusion C; e.g. the support that R_1 provides C does not depend upon the support R_2 provides C such that R_1 can support C without R_2.
> (2) **Dependent Support:** The support offered by a reason R_1 for the conclusion C *depends* upon the support offered by some other reason R_2, R_3, R_n that purportedly supports C; e.g., the support that R_1 provides C depends R_2 such that without R_2, R_1 would not support C.

Note: These distinctions are not exactly the sharpest but let's try to work with them in a rough way.

2.1. Convergent Arguments

A **convergent argument type** is an argument where the support that reasons R_1, R_2, R_3 offer the conclusion are ***independent*** of each other. That is, its reasons offer the conclusion *independent support*.

EXAMPLE OF A CONVERGENT ARGUMENT

1 Ten eye witnesses saw Vic murder John.
2 Vic's bloody glove was found at the scene of the crime.
3 There is a video tape of Vic murdering John.
4 Therefore, Vic murdered John.

In the example above, premises (1)–(3) independently support the conclusion that *Vic murdered John*. To see this more clearly, consider what would happen if it were discovered that premise (2) was false. If this were the case, then the case for the conclusion argument would be **less convincing** and the conclusion argument would be **weaker**, but the falsity of premise (2) would not detract from the support provided by premises (1) and (3). *That is, if (2) were not the case, we wouldn't say that (1) and (3) no longer support (4).* The premises (1) and (3) still support the conclusion that *Vic murdered John.*

Another way of looking at convergent arguments is to consider the following question:

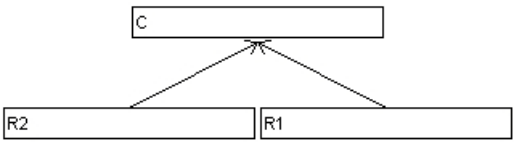
> **Detachability Question**: Assuming that reasons R_1 and R_2 support conclusion C, would the removal of R_1 detract from the support provided by R_2?

For convergent arguments, the answer to the "detachability question" is *no*. If the removal of a reason from the argument does not take away the support offered by other reasons, then that reason is not linked to other reasons in the argument. What this implies is that we could detach each of the reasons found in the above argument and create an argument where that reason directly supports the conclusion:

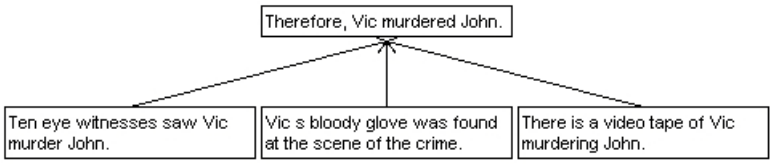
REASONS THAT OCCUR IN A CONVERGENT ARGUMENT CAN BE USED IN STAND-ALONE ARGUMENTS

1 Ten eye witnesses saw Vic murder John; *therefore*, Vic murdered John.
2 Vic's bloody glove was found at the scene of the crime; *therefore*, Vic murdered John.
3 There is a video tape of Vic murdering John; *therefore*, Vic murdered John.

Graphically, convergent arguments are represented by writing the reasons below the conclusion and each reason/premise separately points to the conclusion:



Applying this diagram to the above argument, we get the following:



2.2. Linked Arguments

A **linked argument type** is an argument where the support that reasons R_1, R_2, R_3 offer the conclusion depend upon each other.

Example of a Linked Argument	
P1	The murder of John occurred 35 minutes from Indigo.
P2	Two witnesses claimed Vic was at Indigo at 11:30PM
P3	Forensic evidence shows that John was murdered at 11:30PM.
4	Vic did not murder John.

The above argument is a linked argument since the support that each of the reasons (1)–(3) provide the conclusion depend upon each other. For example, if (2) is shown to be false, i.e. the witnesses are covering for Vic and he was not at Indigo, then the support that (1) and (3) provide (4) is also removed. While it still may be true that (1) and (3) are true, they no longer support (4). Similarly, if (3) were false and forensic evidence showed that John was murdered at say 10PM rather than 11:30PM, then the support provided by (1) and (3) would be removed.

Consider again the detachability question:

> **Detachability Question**: Assuming that reasons R_1 and R_2 support conclusion C, would the removal of R_1 detract from the support provided by R_2?

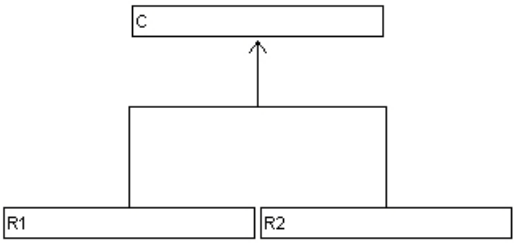
If the answer is *yes*, then R_1 depends upon R_2. The support offered by R_1 depends upon the support offered by R_2, and vice versa.

REASONS THAT OCCUR IN A LINKED ARGUMENT CAN NOT BE USED IN STAND-ALONE ARGUMENTS

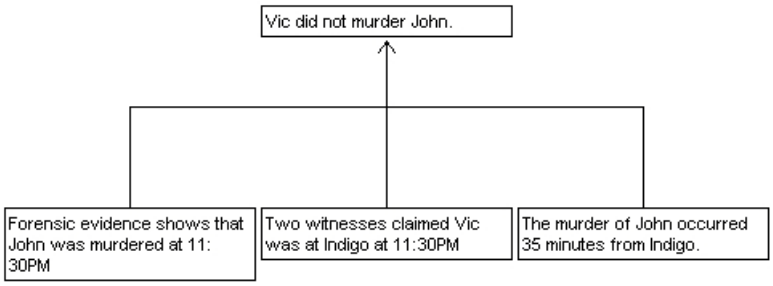
1 The murder of John occurred 35 minutes from Indigo; *therefore,* Vic did not murder John. X
2 Two witnesses claimed Vic was at Indigo at 11:30PM; *therefore,* Vic did not murder John. X
3 Forensic evidence shows that John was murdered at 11:30PM; *therefore,* Vic didn't murder John. X

Notice that in contrast to the above argument where P1, P2, and P3 can be said to support the conclusion, when P1, P2, and P3 are used to support the conclusion on their own, they sound very strange.

One way of graphically representing linked arguments is as follows:



Applying the above structure to the argument above, we have the following:



Notice how that reasons in the above argument do not separately point to the conclusion but collectively support it.

In short, while in a convergent argument, the supporting reasons separately support the conclusion, in a linked argument, the supporting reasons stand and fall together.

Exercises

1. Bacon boosts your metabolism and tofu doesn't. Bacon improves your eyesight while tofu makes it worse. Bacon raises your IQ, while tofu impairs your ability to think clearly. Therefore, Bacon is healthier than Tofu.
2. All men are mortal. Socrates is a man. Therefore, Socrates is mortal.
3. Jane will go to the party or she will stay home or she will go to her friend's apartment. Jane won't go to the party because she went to a party last night. Also, Jane won't go to her friend's apartment because she had a bad fight with that friend. Therefore, Jane will stay home.
4. Diane is a really shady person. I loaned her ten dollars last week and she never paid me back. She gave Jon a ride to the mall and Jon said she was drunk! Finally, Diane was recently arrested for writing bad checks.
5. Ladies and gentlemen of the jury, you should convict the defendant Victor Perez of murder in the first-degree. Now, Vic stands accused of murdering John Santellano, and ladies and gentlemen of the jury, the facts support this beyond a reasonable doubt. Consider that a bloody black glove was left at the crime scene. And, Vic owns a black glove. Consider that the defendant, poor John Santellano was killed with a knife. Now, ladies and gentlemen of the jury, Vic owns a knife. Finally, you heard a witness testify that the person who killed Mr. Santellano was wearing a PSU jacket. Yes, ladies and gentlemen of the jury. Vic owns a PSU jacket.

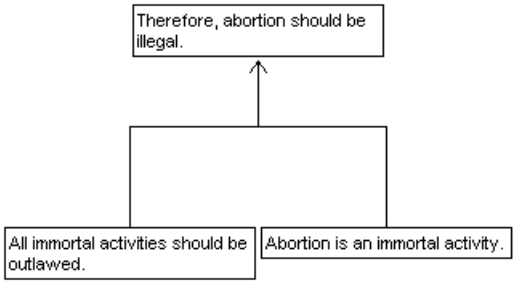
3. Subarguments

Consider that in the examples we have been considering that reasons are given for a conclusion. But note that a reason can itself be a conclusion and so *reasons can have reasons*, i.e. a premise

in an argument can have an argument that purports to support it. A **subargument** is an argument given in support of a reason or premise. It is an argument supporting part of a larger argument. To illustrate, consider the following *linked argument*:

A Simple Linked Argument	
P1	All immortal activities should be outlawed.
P2	Abortion is an immortal activity.
C	Therefore, abortion should be illegal.

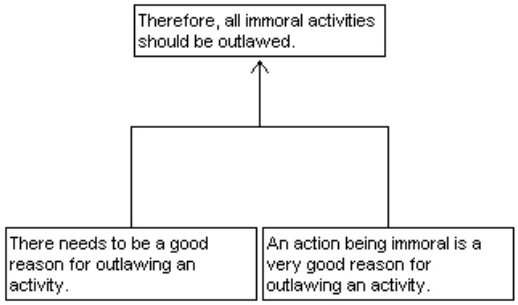
Diagramming the above argument, we get the following:



While the above argument is indeed *valid*, the argument is controversial because it is not evident that either of the premises is true. Thus, we might ask: why would anyone accept P1 or P2? One way of providing a defense of P1 and P2 is by giving an argument for each premise. Starting with P1 we can construct an argument that makes P1 the conclusion and provide reasons in support of P1.

A Subargument for Premise 1	
P1.1	There needs to be a good reason for outlawing an activity.
P1.2	An action being immoral is a very good reason for outlawing an activity.
P1	**Therefore, all immoral activities should be outlawed.**

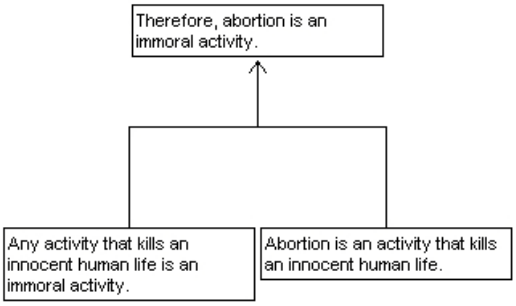
Diagramming this subargument, we get the following:



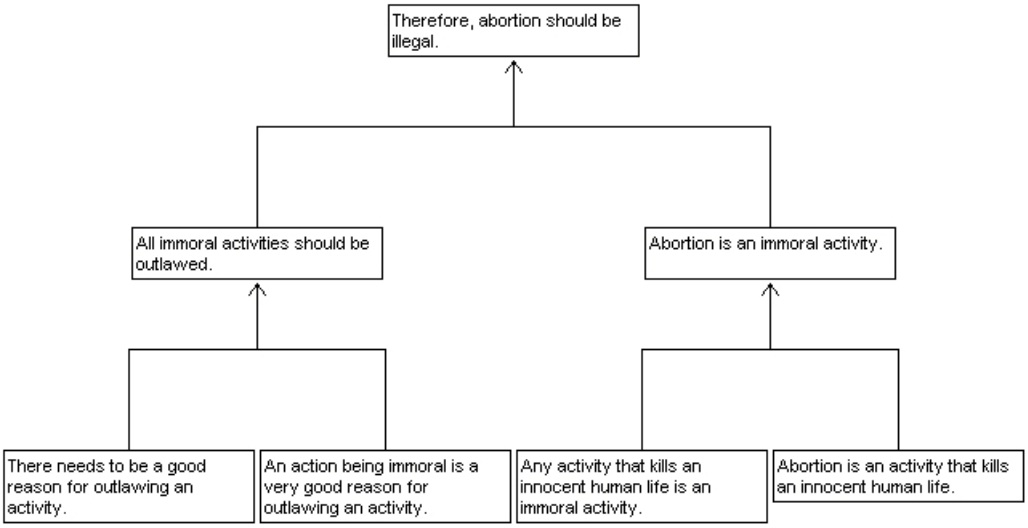
Moving to premise P2 in the original argument, we can construct an argument that makes premise P2 the conclusion.

A Subargument for Premise 2	
P2.1	Any activity that kills an innocent human life is an immoral activity.
P2.2	Abortion is an activity that kills an innocent human life.
P2	**Therefore, abortion is an immoral activity.**

Diagramming just the subargument, we get the following:



Attaching both of these subarguments to the original argument, we get the following:



Notice now that the premises of the original argument are supported by separate arguments (subarguments).

A Complex Linked Argument	
P1.1	There needs to be a good reason for outlawing an activity.
P1.2	An action being immoral is a very good reason for outlawing an activity.
IC1 / P1	**All immortal activities should be outlawed.**
P2.1	Any activity that kills an innocent human life is an immoral activity.
P2.2	Abortion is an activity that kills an innocent human life.
IC2 / P2	**Abortion is an immortal activity.**
C	**Therefore, abortion should be illegal.**

Notice that in the complex linked argument, P1 and P2 now play the role both of a premise used to support C and a conclusion supported by P1.1 / P1.2 and P2.1 / P2.2 respectively. When a proposition plays both the role of a premise and a conclusion in an argument, we call it an **intermediate conclusion** (IC).

The introduction of subarguments raises an important philosophical question:

Question #1: What are the ultimate premises (reasons) of an argument?

There is no easy answer to this question.

> **Hypothesis #1 (a rationalist hypothesis):** There are certain self-evident premises or "axioms" that we accept as true. We know them directly through a kind of intellectual (rational) insight. Examples include logical truths like "*a is a*," mathematical truths like "*2+2=4*," definitional or "analytic" truths like "all bachelors are unmarried men", and certain rational insights like "If I am thinking, then I must exist."
> **Hypothesis #2 (an empiricist hypothesis):** There are certain self-evident premises or "axioms" that we accept as true. We know them directly through a kind of immediate sensory perception, i.e. through some sort of unprejudiced observation of things as they are. Examples include: propositions like "snow is white", "fire burns the flesh", "there is a red patch of color in front of me"

Exercises

1.

> Liz: God exists.
> Jon: Why?
> Liz: Well, the creation of the universe had to be caused by something
> Jon: Why?
> Liz: Well, because everything has cause.
> Jon: Why?
> Liz: Because everything is intelligible.

2. Russia increased gun-control legislation and firearm-related homicides went down. Australia increased gun-control legislation and firearm-related homicides went down. In fact, statistics show that the more you increase gun-control legislation, the more firearm-related homicides go down. This shows that more guns equals more death while fewer guns equal fewer deaths. We want to decrease the number of homicides in the USA. Therefore, we should increase gun-control legislation in the USA.

3. Consider again the following argument discussed earlier:

> Ladies and gentlemen of the jury, you should convict the defendant Victor Perez of murder in the first-degree. Now, Vic stands accused of murdering John Santellano, and ladies and gentlemen of the jury, the facts support this beyond a reasonable doubt. Consider that a bloody black glove was left at the crime scene. And, Vic owns a black glove. Consider that the defendant, poor John Santellano was killed with a knife. Now, ladies and gentlemen of the jury, Vic owns a knife. Finally, you heard a witness testify that the person who killed Mr. Santellano was wearing a PSU jacket. Yes, ladies and gentlemen of the jury. Vic owns a PSU jacket.

What we saw was that this argument is *convergent*. Suppose now that you are Victor Perez's defense attorney. There are two ways of attacking the above argument. First, you might argue that the evidence is all circumstantial and there isn't enough of this kind of evidence to dismiss doubt that Vic did not kill John. However, the other way to attack the argument is to show that

one of the premises is false. Discuss which premise it makes the most sense to attack and how undermining its plausibility would undermine the argument.

4. Enthymemes & Unstated Assumptions

An **enthymeme** is an argument that contains an unstated premise that is (i) unstated because it is deemed to be so obvious that it does not need to be stated and (ii) necessary for that argument to be valid.

Example of an Enthymeme	
1	John has lied in the past.
2	Therefore, you cannot trust John.

The above argument is an enthymeme as it is missing the obvious premise that *you cannot trust someone who has lied in the past*.

Argument	
1	John has lied in the past.
A2	**You cannot trust someone who has lied in the past**
3	Therefore, you cannot trust John.

While many people have a negative view of assumptions in general—e.g. we often say 'that's just an assumption' or 'that's just an assumption'—unstated assumptions are either *legitimate* or *illegitimate*. An assumption is **legitimate** if it is *uncontroversial* or *true* while an assumption is **illegitimate** if it is *controversial* or *false*.

Example of an Enthymeme with a legitimate assumption missing	
1	John is a man.
2	Therefore, John is a mortal.

The missing assumption is *all men are mortal*.

Example of an Enthymeme with two legitimate assumptions missing	
1	There is black smoke coming from under the door.
2	You should get outside as soon as possible.

In the above case, there appears to be *two* missing assumptions: (1) *if there is black smoke coming from under the door, then there is fire in the next room*, and (2) *if there is a fire in the next room, then you should get outside as soon as possible*.

Example of an Enthymeme with an illegitimate assumption missing	
1	Smoking marijuana is morally wrong.
2	Therefore, smoking marijuana should be illegal.

The missing assumption is that *all moral wrongs should be illegal*. This assumption is, while perhaps not false, is nevertheless controversial. Some possible moral wrongs that are not illegal: not tipping a waiter/waitress, cheating on your spouse, gluttony, drunkenness in the privacy of your own home, swearing at a child or grandparent, suicide.