

Deductive vs. Inductive?

As far as we're concerned thus far, there are two different kinds of argument forms: inductive and deductive. Within those argument forms, however, there are further distinctions to be made. Not all deductive arguments are created equal, and not all inductive arguments are either.

	Deductive
Valid	In light of the assumption that the premises are true, it necessarily follows that the conclusion is true.
Invalid	In light of the assumption that the premises are true, it does not necessarily follow that the conclusion is true. (hard to come up with examples)

Valid = An argument such that if the premises were true, then the conclusion would necessarily follow.

All toasters are items made of gold.

All items made of gold are time-travel devices.

Therefore, all toasters are time-travel devices.

Invalid = An argument such that if the premises were true, then the conclusion would not necessarily follow.

Either disciplining people is always wrong or it's not always wrong to discipline people for committing crimes.

Disciplining people hurts them.

Therefore, disciplining people is always wrong.

	Deductive
Sound	The premises of a valid argument are in fact true. Thus, the conclusion is guaranteed to be true.
Unsound	The premises of a valid argument are either: (i) in fact false, (ii) the argument is invalid, or (iii) both. Thus, the conclusion is not guaranteed to be true.

***There are many valid arguments which are *not* sound. Understanding this distinction is essential!**

Sound = An argument such that it is valid **with** all true premises.

No felons are eligible voters.

Some professional athletes are felons.

Therefore, some professional athletes are not eligible voters.

Unsound = Either a valid argument with one or more false premises, an invalid argument, or both.

All spider monkeys are elephants.

No elephants are animals.

Therefore, no spider monkeys are animals.

	Inductive
Strong	If it probably follows that, given the combined truth of the premises that the conclusion is true , then the argument is strong.
Weak	If it probably does not follow that the premises support the truth of the conclusion, then the argument is weak.

Strong = An inductive argument such that if the premises were true, then the conclusion would probably be true.

It has snowed in Massachusetts every December in recorded history.

Therefore, it will snow in Massachusetts this coming December.

Weak = An inductive argument such that if the premises were true, the conclusion would not be true on probabilistic grounds.

Steve Howe, Alan Wiggins, and LaMarr Hoyt are baseball players and all have been involved with drugs.

Therefore, it must be the case that all baseball players use drugs.

	Inductive
Cogent	The premise(s) of a strong inductive argument are in fact true. Thus, the conclusion is likely to be true.
Uncogent	An inductive argument that is weak or which has (i) one or more false premises

Cogent = A strong inductive argument with all true premises.

Every day that I have been alive, the sun has risen in the East and set in the West.

Therefore, tomorrow, the sun will rise in the East and set in the West.

Uncogent = An inductive argument with that is either weak, or has one or more false premises,.

Constructing the great pyramid at Giza required lifting massive stone blocks to great heights.

Probably the ancient Egyptians had some antigravity device to accomplish this feat.

Decision Tree:

Deductive ↙↘		Inductive ↙↘			
Valid ↙↘		Invalid ↓	Strong ↙↘		Weak ↓
All True Premises	At Least One False Premise	↓	All Premises Actually Support Conclusion	At Least One Premise Does Not Actually Support Conclusion	↓
Sound	Unsound	Unsound	Cogent	Uncogent	Uncogent