

DEDUCTION

DEDUCTIVELY VALID ARGUMENT

: THERE IS NO POSSIBLE CASE WHEN THE PREMISES ARE TRUE, THAT THE CONCLUSION IS FALSE. IF THE PREMISES ARE ASSUMED TRUE, IT IS IMPOSSIBLE FOR THE CONCLUSION TO BE FALSE. (ALTERNATIVELY, ITS CONCLUSION MUST BE TRUE.) THIS LEAVES IT OPEN WHETHER OR NOT ITS PREMISES ARE IN FACT TRUE.

EXAMPLE OF A VALID ARGUMENT WITH FALSE PREMISES:

If Hillary Clinton is President of the United States, then Hillary Clinton is Chief Executive of the United States. (TRUE PREMISE)
Hillary Clinton is President of the United States. (FALSE PREMISE)
Therefore, Hillary Clinton is Chief Executive of the United States.

THIS ARGUMENT IS VALID BECAUSE IF ALL THE PREMISES WERE TRUE, THE CONCLUSION WOULD NECESSARILY BE TRUE. IN OTHER WORDS, A PRESIDENT OF THE UNITED STATES IS BY DEFINITION A CHIEF EXECUTIVE OF THE UNITED STATES, SO IF SOMEBODY IS PRESIDENT, HE OR SHE IS CHIEF EXECUTIVE. THE FACTUAL CLAIMS MIGHT NOT ALL BE TRUE, SINCE HILLARY CLINTON IS NOT PRESIDENT, BUT THE INFERENTIAL CLAIM - THE FORM OF REASONING BY WHICH WE MOVE FROM PREMISES TO CONCLUSIONS - IS VALID. HOWEVER, THIS ARGUMENT WOULD BE UN SOUND, BECAUSE ONE OF ITS PREMISES IS FALSE.

A DEDUCTIVELY SOUND ARGUMENT IS AN ARGUMENT THAT IS BOTH VALID AND HAS ALL AND ONLY TRUE PREMISES.

DEDUCTIVELY INVALID ARGUMENTS: IT IS POSSIBLE FOR PREMISES TO BE TRUE AND THE CONCLUSION FALSE.

ANY ARGUMENT WHICH IS INVALID IS NECESSARILY ALSO UNSOUND. THEREFORE, IT IS NECESSARY TO FIRST CHECK THE INFERENTIAL CLAIM - IS THE FORM OF REASONING VALID? - IN EVALUATING A DEDUCTIVE ARGUMENT. THEN IT IS NECESSARY TO CHECK THE FACTUAL CLAIMS - ARE THE PREMISES TRUE?

RECALL THAT STATEMENTS ARE SENTENCES THAT CAN BE EITHER TRUE OR FALSE. THUS, IN LOGIC, VALIDITY AND INVALIDITY ARE DEFINED PRECISELY AND TECHNICALLY IN TERMS OF "TRUTH VALUE CONDITIONS", THAT IS, TRUTH AND FALSITY OF THE COMPONENT STATEMENTS. STATEMENTS CAN BE EITHER TRUE OR FALSE, BUT DEDUCTIVE ARGUMENTS ARE EITHER VALID OR INVALID, NOT TRUE OR FALSE. IN TURN, A VALID ARGUMENT MAY BE SOUND OR UNSOUND.

EXAMPLES OF VALID ARGUMENTS:

1) True premises, true conclusion:

All teachers are mortal.
Amy Bush is a teacher.
Therefore, Amy Bush is mortal.

THIS IS BOTH A VALID AND A SOUND ARGUMENT. NOTICE THE FORM OF THE ABOVE ARGUMENT:

All T are M.
A is T.
Therefore, A is M.

WE START WITH A UNIVERSAL STATEMENT AND MOVE TO A PARTICULAR EXAMPLE OR MEMBER (Amy Bush) OF THE UNIVERSAL CATEGORY (all teachers). WE HAVE FIRST APPLIED A CERTAIN PROPERTY (mortal) TO THE UNIVERSAL CATEGORY AND THEN TO THE PARTICULAR EXAMPLE.

2) False premises, false conclusion:

All beagles eat mice.
Amy Bush is a beagle.
Therefore, Amy Bush eats mice.

WHY IS THIS VALID? THIS ONE IS TRICKIER THAN THE EXAMPLE THAT I GAVE ABOVE. BOTH PREMISES ARE FALSE. HOWEVER, IF AMY BUSH WERE A BEAGLE, AND IF BEAGLES ATE MICE, THEN IT WOULD NECESSARILY FOLLOW THAT AMY BUSH ATE MICE, JUST BY THE FORM OR STRUCTURE OF THE ARGUMENT. THIS IS THE SAME FORM OF ARGUMENT AS THE ABOVE EXAMPLE. WE COULD ISOLATE THIS FORM IN THE FOLLOWING MANNER:

THIS EXAMPLE:

ABOVE EXAMPLE:

All B eat M.
A is B.
Therefore, A eats M.

All T are M.
A is T.
Therefore, A is M.

WE START WITH THE UNIVERSAL CATEGORY (beagles) AND MOVE TO A PARTICULAR EXAMPLE OR MEMBER OF THAT CATEGORY (Amy Bush). WE HAVE FIRST APPLIED A CERTAIN PROPERTY (eating mice) TO THE UNIVERSAL CATEGORY AND THEN TO THE PARTICULAR EXAMPLE. THUS, THIS IS THE SAME FORM AS ABOVE. IF "eating" SEEMS NOT QUITE THE SAME AS "is" WE CAN REPHRASE "All beagles eat mice" AS "All beagles are things that eat mice", and "Amy Bush eats mice" as "Amy Bush is a thing that eats mice":

All B is M.
A is B.
Therefore, A is M.

HOWEVER, THIS IS AN UN SOUND ARGUMENT BECAUSE ITS PREMISES ARE FALSE.

3) False premises, true conclusion:

All beagles teach philosophy.
Amy Bush is a beagle.
Therefore, Amy Bush teaches philosophy.

IT HAPPENS THAT THE CONCLUSION OF THIS ARGUMENT IS ONE THAT WE WOULD ACCEPT, ALTHOUGH THE PREMISES ARE FALSE. THIS IS AN EXAMPLE OF A VALID, BUT UNSOUND ARGUMENT. IT IS VALID BECAUSE IT HAS THE VALID LOGICAL OR INFERENTIAL FORM WE HAVE USED IN THE FIRST TWO EXAMPLES. HOWEVER, ALTHOUGH WE WOULD ACCEPT THE CONCLUSION, THE ARGUMENT REMAINS UNSOUND BECAUSE THE PREMISES ARE FALSE. THE SOUNDNESS OF AN ARGUMENT DOES NOT DEPEND UPON THE TRUTH OF ITS CONCLUSION, BUT UPON THE TRUTH OF ITS PREMISES PLUS THE VALIDITY OF ITS LOGICAL FORM.

NOT EVERY ARGUMENT WITH THESE COMBINATIONS IS VALID. IN OTHER WORDS, NOT EVERY FORM IS A VALID ONE. LOOK AT TABLE 1.1 ON PAGE 44 OF YOUR TEXT. COMPARE THE TWO TOP EXAMPLES.

All wines are beverages. TRUE
 Chardonnay is a wine. TRUE
 Therefore, Chardonnay is a beverage. TRUE

THIS IS BOTH VALID AND SOUND. IT IS A CATEGORICAL SYLLOGISM IN A VALID FORM, AS WE HAVE SEEN ABOVE:

All W are B.
 C is W.

Therefore, C is B.

HOWEVER, COMPARE THIS (ABOVE) FORM TO THE FORM OF THE EXAMPLE IN THE RIGHT HAND COLUMN:

All wines are beverages. TRUE
 Chardonnay is a beverage. TRUE
 Therefore, chardonnay is a wine. TRUE

ALTHOUGH BOTH PREMISES AND CONCLUSION ARE TRUE, THIS ARGUMENT IS BOTH INVALID AND UNSOUND. WHY? NOTICE THAT THE FORM OF THIS ARGUMENT DIFFERS FROM THE ONE ABOVE: THE TOP EXAMPLE STARTS WITH A UNIVERSAL STATEMENT ABOUT THE CATEGORY OF all wines, AND MOVES TO A PARTICULAR EXAMPLE OR MEMBER (Chardonnay) OF THIS CATEGORY. FIRST A CERTAIN PROPERTY (beverages) IS ASSIGNED TO THE UNIVERSAL CATEGORY (all wines), THEN IT IS ASSIGNED TO THE PARTICULAR EXAMPLE (Chardonnay).

HOWEVER, IN THE SECOND EXAMPLE, WE START WITH A UNIVERSAL STATEMENT ABOUT THE CATEGORY OF all wines, AND MOVE TO A PARTICULAR EXAMPLE OF A DIFFERENT CATEGORY OR TO THE PROPERTY ITSELF - THAT OF BEVERAGES. THAT IS WHERE THE PROBLEM LIES. BY COUNTEREXAMPLE WE MIGHT BE ABLE TO SEE MORE CLEARLY HOW THIS MOVE DOES NOT NECESSARILY WORK:

All dogs are mammals. TRUE PREMISE
 A cat is a mammal. TRUE PREMISE
 Therefore, a cat is a dog. FALSE CONCLUSION

IN THIS COUNTEREXAMPLE WE SUBSTITUTE A MORE FAMILIAR EXAMPLE WHICH USES THE SAME FORM. FIRST WE COULD ISOLATE THE FORM OF THE CHARDONNAY EXAMPLE (ABOVE) BY SUBSTITUTING LETTERS:

All W are B.
 C is B.
 Therefore, C is W.

The substitution that we have chosen uses this same form:

All D are M.
 C is M.
 Therefore, C is D.