Philosophy 3304 Intro to Logic
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Conjunctive Syllogisms
& Dilemmas[1]

I. Conjuctive Syllogisms

A. Definition

Hypothetical syllogisms are based on "if/then" sentences.
Disjunctive syllogisms are based on "either/or" sentences.
Conjunctive syllogisms are based on "both/and" sentences.

Conjunction is a logical operation in which an operator (in this case
the conjuctive, "and," symbolized by " . "), is used to connect
exactly two propositions in such a way that the resulting compound
proposition is true if and only if both component propositions are
true, and false if either or both of the conjuncts are false.

A truth-functional proposition whose component statements are
connected by the truth-functional operator "and" is called a
conjunction; the component statements of a conjunction are called
"conjuncts."

For example, if a man tells his wife, "Tomorrow morning I will wash
the car, and I will fix the fence," when is he telling the truth? If he
does both tasks the next morning, he has told the truth (or at least
predicted it!). If he only washes the car but does not fix the fence,
or if he fixes the fence and does not wash the car, he has not lived
up to his commitment and the statement is falsified. A compound
that is the conjunction of two statements is true if and only if each of
the component statements is true.

"P and Q" is true if and only if "P" is true, and "Q" is true.

Conjunctive syllogisms are the only kind that yield two conclusions
(or more) from only one premise. By simply joining together two
propositions or terms in the first premise, we can separate them
and affirm each as a separate conclusion. If both terms together
are true, then each one separately is true also. THIS DOES NOT
INDICATE ANY RELATION BETWEEN THE TERMS. THEY

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[1] NB: This material is taken from several logic texts authored by N. Geisler, H.
Kahane, and others. I make no claim to originality in this material.

MIGHT HAVE NOTHING AT ALL TO DO WITH EACH OTHER, BUT THE FACT THAT BOTH ARE TRUE MAKES THE SYLLOGISM VALID.

Both P and Q are true.	P . Q
Therefore, P.	\ P
Therefore, Q.	\ Q

There are four possible combinations of conjuctive statements based on their truth value:

1. Chemistry is a science (T), and termites cannot read (T).
2. Cats can talk (F) and humans can talk (T).
3. Washington was the first U.S. president (T), and Lincoln is still alive (F).
4. Trout are mammals (F), and beagles are reptiles (F).

Based on these four examples, the truth conditions for conjunctions can be summarized by the following truth table:

P	Q		P and Q
T	T	T	
F	T	F	
T	F	F	
F	F	F	

B. Examples of valid conjunctive syllogisms

1. Christ is both fully God and fully man.
2. Christ is fully God.
3. Christ is fully man.

1. Christians are elected to salvation and Christians have free will.
2. Christians are elected to salvation.
3. Christians have free will.

1. Roses are red and violets are blue.
2. Roses are red.
3. Violets are blue.

1. Mickey Mantle was a baseball player and Babe Ruth was a baseball player.
2. Mickey Mantle was a baseball player.
3. Babe Ruth was a baseball player.

C. Negative Conjunctive Syllogism

It is possible to negate the entire conjunct: "not [p and q]." It is necessary to negate the entire conjunct since in a conjunction, it is the whole proposition that is asserted to be true. In negating a conjunction, it does not necessarily mean, however, that both p and q are false. If both p and q are false, then the whole is false. However, if only one of the conjuncts is false, then the whole is false as well. For example, if we say:

"2 + 2 = 4 and 2 + 3 = 7,"

then the whole conjunction is false (note the inclusive quotation marks), because the truth of the conjunction depends on the truth of both of its parts. And in the above example, the second part is false. Thus, if a conjunction is negated, then one or both of the conjuncts must be false.

If not "P and Q"
Then, either "not P" or "not Q" or "not P and not Q"

Conjunctions as a whole must be denied. If one part of the statement is false, then the conjunct is false as a whole (even if one part happened to be true). Both conjuncts must be true for the conjunction as a whole to be true. Thus, if you are arguing against a conjunction, you need only show that at least one of the terms is false in order to show that the conjunct as a whole is false. Here is a good example:

1. Deism = God exists (P) and miracles are not possible (Q).
2. But, miracles are possible (not Q; i.e., miracles are possible, since God exists)
3. Therefore, the entire conjunct that God exists and miracles are not possible (i.e., Deism = P and Q) is false.

The world view of deism requires for its articlation two premises: that God exists and miracles are not possible. Without either, you do not have deism. But to assert that God exists and to deny miracles is contradictory since you have already accepted the biggest miracle of all, namely, creation. Therefore, it is possible to deny the second conjunct ("no" to no miracles) on the basis of the first conjunct (God). But to deny one of the two conjuncts necessary to deism is to deny deism as a whole. How 'bout that! Try other examples from physics and psychology.

1. The molecule of water requires two atoms of hydrogen and one atom of oxygen (H_2O).

2. This molecule has two atoms of hydrogen and two atoms of oxygen (H2O2).
3. Therefore, this molecule is not water, but is hydrogen peroxide(?).

1. Human beings consist of a body and soul.
2. This being has no soul.
3. This being is not human.

II. Dilemmas

A. General description

The dilemma form of an argument is easily recognizable. As in a real life debate, this type of argument attempts to force one to affirm at least one of two positions, neither of which he/she wants to affirm. A dilemma certainly makes one think about the implications of what one believes.

A dilemma sets forth two hypothetical statements in a conjunctive manner in the first or major premise. Then in the second or minor premise, a disjunctive "either/or" statement either affirms that one or the other of the antecedents is true (constructive), or denies that one or the other of the consequents is true (destructive). The conclusion forces one to choose between (1) the consequents on the basis of affirmed antecedents or (2) the denied antecedents on the basis of denied consequents.

B. Constructive dilemmas

In a constructive dilemma, the first premise consists of two conjoined conditional or hypothetical statements, and the second premise asserts the truth of one of the antecedents. The conclusion, which follows logically by means of two modus ponens steps (affirming the antecedents in the hypotheticals), asserts the truth of at least one of the consequents.

If P then Q and If R then S
Either P or R
Therefore Q or S

(P ... Q) and (R ... S)
P v R
\ Q v S

Consider these examples:

1. If this punch contains lemon, then Vince will like it, and if this punch contains lime, then Steve will like it.
2. This punch contains either lemon or lime.
3. Therefore, either Vince or Steve will like it.

1. If God exists, I have everything to gain by believing in Him.
2. And if God does not exist, I have nothing to lose by believing in Him.
3. Either God exists or God does not exist.
4. Therefore, I have everything to gain or nothing to lose by believing in Him. (Pascal's Wager!)

1. Was the baptism of John from heaven or from men? (Mark 11: 27ff.)
2. If we say "from heaven," he will say, "Why did you not believe him?"
3. If we say "from men," the people will stone us for they considered John a prophet.
4. John's baptism was either from heaven or from men.
5. Therefore, either Jesus will condemn our unbelief or the people will stone us.

C. Destructive dilemma

The destructive dilemma is similar in form to the constructive dilemma, but the second premise, instead of affirming the truth of the one of the antecedents, denies one of the consequents. The conclusion, which follows validly from two modus tollens steps, results in the denial of at least one of the antecedents.

If P then Q and If R then S
Either not Q or not S
Therefore not P or not R

(P ... Q) and (R ... S)
~ Q v ~ S
\ ~P v ~R

1. If this punch contains lemon, then Vince will like it, and if this punch contains lime, then Steve will like it.
2. Either Vince will not like it or Steve will not like it.
3. Therefore, either this punch does not contain lemon or this punch does not contain lime.

D. Refuting constructive and destructive dilemmas

There are three tactics that can be used to avoid a dilemmas, even if it is formally valid. First, when you find you own views put on the horns of a dilemma, you can "take the dilemma by the horns," that is, you can dispute the implications of either of the hypotheticals in the first or major premise. Second, you can "go between the horns" by showing that there is a valid third alternative to the two options specified in the minor or second premise. If a third alternative can be found, then neither of these disjuncts need be true. Third, you can "counter the dilemma" by answering a dilemma with another dilemma. So you can either deny the conjunction, or the disjunction, or the conclusion overall!

1. Going between the horns

   1. If God willed the moral law arbitrarily, then he is not essentially good.
   2. If God willed the moral law according to an ultimate standard beyond himself, then He is not God (because there is something beyond Him).
   3. But God willed the moral law either arbitrarily or according to a standard beyond him.
   4. Therefore, either He is not good, or He is not God.

   CAN YOU THINK OF A WAY TO GO BETWEEN THE HORNS OF THIS DILEMMA SPECIFIED IN THE MINOR PREMISE?

2. Taking the dilemma by the horns (from Albert Camus' The Plague in which a priest declares that the sickness is a judgment of God upon the people and chooses not to help them).

   1. If one helps the sick, then he is fighting against God who sent the plague.
   2. If one does not help the sick, then he is being cruel and inhumane.
   3. One must either help the sick or not help them.
   4. Therefore, one must either fight against God, or be cruel and inhumane.

   CAN YOU THINK OF A WAY TO COUNTER ONE OF THE HYPOTHETICALS IN THE MAJOR PREMISE?

3. Countering the dilemma

This is typically done by changing either the antecedents or the consequents of the conjunctive premise while leaving the disjunctive premise as it is, so as to obtain a different conclusion.

1. If taxes increase, the economy will suffer.
2. If taxes decrease, needed governmental services will be curtailed.
3. Taxes must either be increased or decreased.
4. Therefore, if follows that the economy will either suffer or that needed governmental services will be curtailed.

1. If taxes increase, needed government services will be extended.
2. If taxes decrease, the economy will improve.
3. Taxes must either increase or decrease.
4. Therefore, it follows that needed government services will be extended or the economy will improve.

- If we encourage competition, we will have no peace.
- If we do not encourage competition, we will make no progress.
- We must either encourage competition or not encourage competition.
- Therefore, we will either have no peace or make no progress.

1. v. If we encourage competition, we will make progress.
2. vi. If we do not encourage competition, we will have peace.
3. vii. Either we must encourage competition or not encourage it.
4. viii. Therefore, we will either make progress, or we will have peace.