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Necessary Consequence: Constructing Valid Arguments (Part 2)

by Michael Holloway

Earlier this year (Volume 11, Number 2), we started looking at techniques for constructing valid arguments. In particular, we noted that the simplest way to construct a valid argument is to follow a pattern (or form) of argument that is known to be valid. We explained two particular valid forms of argument: *modus ponens* (If P then Q; P; therefore, Q) and *modus tollens* (If P, then Q; not Q; therefore, not P). Finally, we discussed the fallacy of *affirming the consequent,* which results from perverting the modus ponens argument pattern. In this column, we'll first look at an invalid deviation from the modus tollens pattern, and then consider another valid argument pattern.

The fallacy of *denying the antecedent* occurs when someone makes an assertion of the following form:

> If P, then Q.
> Not P.
> Therefore, not Q.

This form of argument is deceptively similar to the valid modus tollens pattern, but it is invalid (recall that an *invalid* argument is one in which the premises can be true, but the conclusion can be false). Arguments of this form are invalid because things other than just P may lead to the truth of Q. The following example illustrates the point.

> If Jonathan Edwards wrote *The Institutes of the Christian Religion*, then he was a brilliant theologian. Jonathan Edwards did not write *The Institutes of the Christian Religion*. Therefore, Jonathan Edwards was not a brilliant theologian.

Certainly, the author of *The Institutes* was a brilliant theologian, but this work is not the only one ever written that demonstrates theological insight. So the fact that Edwards did not write *The Institutes* does not mean that he was not a brilliant theologian.

Modus ponens and modus tollens are probably the most commonly used valid argument patterns, and, not surprisingly, the fallacious corruptions of these patterns are probably the most commonly committed fallacies. Although many arguments can be formulated using only these two patterns, other patterns are often necessary also. One such additional useful argument form is known as the *hypothetical syllogism*. (Why, you ask, doesn't this have a Latin name like so many of the other terms in logic? I do not know.) The hypothetical syllogism looks like the following:

> If P, then Q.
> If Q, then R.
> Therefore, if P, then R.

That is, if we know that P implies Q and we know that Q implies R, then we may conclude that P also implies R. Here are some arguments that make use of the hypothetical syllogism form.

If the Bible is the Word of God, then Romans 3:23 is true.
If Romans 3:23 is true, then everyone is a sinner.
Therefore, if the Bible is the Word of God, then everyone is a sinner.

If Joe obeys God's Word, then Joe rears his children in the Lord.
If Joe rears his children in the Lord, then he will have faithful children.
Therefore, if Joe obeys God's Word, then he will have faithful children.

If the ball is set well, then it will be easy to spike.
If the ball is easy to spike, then it will probably result in a point.
Therefore, if the ball is set well, it will probably result in a point.

In using the hypothetical syllogism, one should always keep in mind exactly what it proves. Taking the second illustration above, does that argument prove that Joe has faithful children?

No, it does not. All the argument proves is that *if* it is the case that Joe obeying God's Word means he rears his children in the Lord, and *if* it is the case that Joe rearing his children in the Lord means he will have faithful children, *then* it is also the case that Joe obeying God's Word means he will have faithful children. It may be that Joe will not obey God's Word; this means both premises in the argument are true, and the conclusion is true, but the entire argument is irrelevant because it does not apply. (Of course, it could be that rearing children in the Lord does not always result in faithful children; in which case, the second premise is false, and we can conclude nothing about the truth of the conclusion. However, the need to demonstrate the truth of the premises applies all arguments, not just to the form we're considering here.)

Given the limitation just discussed, some of you may be questioning whether the hypothetical syllogism has much practical value. In practice, the hypothetical syllogism is rarely used alone; it is used most frequently in combination with modus ponens, using a form like the following:

If P, then Q.	
If Q, then R.	
Therefore, if P, then R.	*hypothetical syllogism*
P.	
Therefore, R.	*modus ponens*

Recasting the argument about Joe in this form, we have

If Joe obeys God's Word, then Joe rears his children in the Lord.
If Joe rears his children in the Lord, then he will have faithful children.
Therefore, if Joe obeys God's Word, then he will have faithful children.
Joe obeys God's Word.
Therefore, he will have faithful children.

This argument, assuming that the premises can be shown to be true, does establish that Joe will have faithful children. Interested readers are invited to provide arguments to demonstrate whether the premises are true. Of course, the assignment will be more interesting if you consider cases beyond just Joe.