Conditional Logic

The rules of conditional logic underlie much of the design of the Logical Reasoning and Logic Games sections. Here's an outline of what you need to know.

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1. Conditional rules are guarantees

Fundamentally, conditional statements are about guarantees: if we know one thing to be true, then another thing must be true. Thus, any statement with a term like *probably* will by definition *not* be a conditional statement.

> *"If an integer ends with 2, then it will be even."*

Here's a rule from the world of math. From this rule, we can deduce that if it's a true an integer ends in 2, it must be true that that number is even. "If..., then..." is the most basic construction for a conditional statement. The rule is commonly written without the "then," and has the same meaning when it is.

2. Conditional rules always yield inferences

Every conditional statement tells us one additional fact—this fact is known as the contrapositive. Basically, the contrapositive tells us that if the result isn't true, the trigger must not have been true as well.

> *"If an integer is not even, it cannot end with 2."*

Since we know that every integer that ends with 2 *must* be even, we also know that if a certain number is not even, it cannot end with 2. Notice that we reversed the positioning of the original statements and negated them. That's typically all you have to do to infer the contrapositive. The contrapositive is simple enough to understand, but keep in mind that the LSAT will constantly try to tempt you with false inferences, those that either reverse or negate, but don't do both. The false inferences for this original conditional would be "If a number is even, it must end with two," and "If a number does not end with two, it cannot be even." We know both of these statements are false (any number that ends with 6, for example, will be even), and neither of them are ones that can be properly inferred from the original statement.

3. Conditional rules can be linked

Very often, we are given multiple conditional rules that can be linked together—that is, the consequence of one condition sets off another condition and so on. In these situations, it's important that you're able to see these links clearly, and it's also important that you are able to distinguish them from false linkages.

> *"If I go to the movie, then I will eat popcorn."*
>
> \+
>
> *"If I eat popcorn, then I will get a stomachache."*
>
> =
>
> *"If I go to the movie, then I will get a stomachache."*

Per the first statement, if I go to the movie, it must be true I will eat popcorn, and per the second statement, if I eat popcorn, it must be true that I will get a stomachache. Therefore, we can conclude that if I go to the movie, I will get a stomachache. Note that we cannot infer that if I got a stomachache, I ate popcorn, or went to the movie. I could have eaten an entire cheesecake and given myself a stomachache.

4. Conditional rules can be compounded

Either the trigger or the consequence of a conditional statement can be compounded by the use of "and" or "or." These compound statements are generally simple enough to understand, but you want to careful in thinking about their contrapositives.

> *"If I am amused or tickled, then I will giggle."*

From this statement, we know two distinct truths: if I am amused, I will giggle, and if I am tickled, I will giggle. What can we infer? If I don't giggle, that means I was neither amused nor tickled.

> *"If the picture is 4 inches wide and 3 inches tall, then it will fit in the frame."*

Here's another compound conditional statement—this one involves the term "and" instead of "or." In this case, we need to know two different things before we can guarantee that the picture will fit in the frame—we need to know that the picture is 4 inches wide and that it is 3 inches tall. What is the contrapositive? What would we know if the picture didn't fit in the frame? That it wasn't 4 inches wide or it wasn't three inches tall.

5. The true challenge of conditional logic is the wording

Once you get the reasoning down, whether or not you are successful handling conditional situations on the LSAT will be determined by your understanding of the *language* of conditional logic. Conditional statements can be written in a variety of ways. And while most of these ways are simple enough to understand, the danger is that we use many of these terms in our everyday lives without the same expectation for exact and absolute meaning that is required of us on the exam, and if we aren't careful it's easy for us to misconstrue the meaning of a conditional statement.

> *Any integer that ends with 2 must be even.*
>
> *An integer can end with 2 only if it is even.*
>
> *"If an integer ends with 2, then it will be even."*
>
> *An integer can't end with 2 unless it is even.*
>
> *Every integer that ends with 2 will be even.*

These are all different ways of saying the same thing. The two phrases that consistently cause test takers the most trouble are *unless* and *only if*. Make sure you familiarize yourself with all common conditional forms, and make sure you get enough practice so that you are comfortable handling any and all conditional statements on test day.