

## The Trouble with the Informal Test

The informal test of validity can be summed up like so: using both facts about the world and the imagination, try to discover a validity counterexample for a given argument. If such a search is successful, and a validity counterexample is found, the argument is invalid.

When introducing this test I said it was a rough, limited test of validity. Truth be told, it's really only *half* a test.

Here's why: if investigation of the actual world shows that the premises of the argument are actually true while the conclusion is false, then the actual world is itself a validity counterexample for the argument in question.

But even if the actual world doesn't count as a validity counterexample, the argument can still be proven invalid so long as some *other* possible situation is found which qualifies as a validity counterexample. In that case we appeal to the imagination: if imaginatively scouring the sea of possibilities yields a hit – a validity counterexample for the argument in question – that too suffices to prove the argument invalid. For a merely *possible* situation fills the bill as a validity counterexample for the argument, so long as that situation makes the premises of the argument true and conclusion false.

The trouble begins in cases where we draw a blank: when, after scouring the actual world and the conceivable possibilities, we fail to discover any counterexamples for the argument in question. **Should failure to think up a validity counterexample assure us that the argument is valid?**

There are good reasons not to answer “yes” here. Humans have a long history of misjudging the possible – specifically, of dismissing as impossible options later accepted as genuine possibilities. From science to politics, medicine to mathematics, we recognize as real possibilities what earlier ancestors did not see when thinking through the very same issues. As concerns validity, that translates into an aptitude for overlooking counterexamples.

That worry is a fairly general one: that we can't be confident in advance about the borders of the possible. Our practice here will follow a tradition in logic of setting the bar as low as possible for possibilities: we consider any

situation possible so long as its description isn't a flat-out *contradiction in terms*. So for purposes of logic we consider a flying pig just as possible as a flightless one, and a unicorn existing to be just as possible as a unicorn not existing. About the only sort of situation *not* possible by this standard is a unicorn *both existing and not existing*.

But even with the borders of the possible marked in such a clear and broad way, a further challenge comes in *recognizing* validity counterexamples when we meet them. Keep in mind: a possible situation will count as a validity counterexample *for a certain argument*. So beyond the worry over whether a particular situation is possible, recognizing that situation as a validity counterexample involves comparing it with the argument in question, and seeing whether the situation makes all the premises of the argument true but the conclusion false.

Two problems can arise here. **First**, if the argument is stated in a language we don't understand – say, Swedish or Swahili – we'll be powerless to tell whether the sentences of that argument are true or false in a given situation. For understanding the **meaning** of a sentence is generally a prerequisite to determining the **truth or falsehood** of that sentence in a particular situation. That's why you can look out the window and tell whether it's true in the current situation that "*It's raining*," but not whether "*It's zhaqti*": because you understand the meaning of the first sentence, but not of the second.

That restricts us to recognizing validity counterexamples for arguments in languages we understand. But that's fine: we can content ourselves with detecting counterexamples for English arguments, leaving it to our bilingual brethren to translate that test into other languages.

Yet even within the comfortable confines of our native language, where our grasp of meanings is at its most intuitive and natural, we face the **second** problem of **complexity**: we quickly become confused as sentences become complex in structure.

Note that so far we've found validity counterexamples only for arguments of the simplest sort, with a small number of uncomplicated sentences. In that case our bare grasp of English meanings is sufficient to think up a counterexample, if there is one.

Not so with the following complex, dessert-enhanced argument.

1. If we have either ice cream or cake, then either we'll have ice cream without having pie or we'll have both brownies and sherbet.
2. We'll have cake and brownies but we won't have both pie and fudge.
3. Unless we have pie without having fudge, we'll have neither brownies nor sherbet.

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∴ Either we'll have sherbet without having ice cream, or we'll have fudge without having ice cream.

Imagine, for instance, a situation where we have every dessert listed here except fudge. Does that qualify as a validity counterexample for this argument? Even armed with a fine knowledge of English, you very likely have no clue.

Here we certainly understand each word, and even longer stretches of words taken in isolation. But moving from trees to forest, we're stumped: it's difficult to understand exactly what claim is being staked by any one of those premises – and all the more so taking all three together with the conclusion. And with meaning the traditional prerequisite for determining truth or falsity, we are equally at a loss even to measure this ready-made situation against the argument and decide if it qualifies as a validity counterexample – not to mention dreaming up such a counterexample from scratch.

Our tendency to be **boggled by complexity**, even in the familiar terrain of our own native language, undercuts the informal imagination-based search for validity counterexamples. Our original question was: if we try and fail to imagine a counterexample for an argument, what does this tell us about the argument's validity? We see now that if the argument is at all complicated, drawing such a blank really tells us **nothing**: our imaginative search may have failed because there really are no counterexamples, or because counterexamples exist but our mental resources were overwhelmed by complexity. And that means the informal, imagination-based test of validity will at best work only in the simplest cases; more difficult examples call for a more robust test not so easily boggled by complexity.

The situation here is roughly analogous to our grasp of arithmetic. For basic sums –  $2+3$ ,  $5+1$ , or  $6+4$  – we can see the correct answer in an simple mental glance. But for more difficult sums – say,  $348,297 + 862,378$  – we have no such intuitions. In those cases we give up trying to juggle figures in our heads, resorting instead to the familiar mechanical procedure of summing one column, carrying digits to the next column, and repeating as necessary.

By its nature such a mechanical procedure is not so intuitive. But given the fragility of our intuitions in the face of complexity, we see that's not entirely a bad thing.

Our test of validity will follow a similar course in later chapters – replacing simple intuitive judgments of validity with more mechanical but resilient methods. Those methods take us beyond informal logic, into the domain of **formal logic**.