

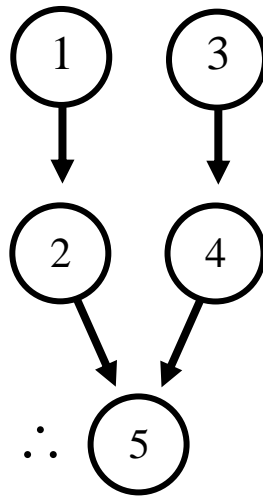
1.10. Validity Counterexamples Extended: Chain Arguments and Validity

We now have our first, informal test of validity: when assessing an argument for validity, using just what's known about the actual world and our imaginations, we try to think up a *validity counterexample* for that argument – a *possible situation where all the premises of the argument are true, but the conclusion is false*. If we manage to think of a validity counterexample, we know that the argument is **invalid**.

But given the way we've defined "validity counterexample" – referring to "*the premises*" and "*the conclusion*" – that test only applies to little 'one-step' arguments, which move directly from one or more premises to the main conclusion. That is: we've only defined "validity counterexamples" for **non-chain** arguments.

Chain arguments don't proceed directly from the original (top) premises to the main conclusion. Instead, the original premises yield a sub-conclusion, which can then turn around and (perhaps with other premises) yield another sub-conclusion, and so on – leading only in the end to the main conclusion. Since chain arguments insert a third element – sub-conclusions – between the top premises and the main conclusion, it's not clear what a validity counterexample for a chain argument would look like – or if there even could be such a thing. So it's not clear how we apply our informal test of validity to chain arguments.

But it's actually quite simple to do so. For recall that chain argument gets its name from the fact that it has two or more argument *links*, connected ("chained") together. So consider the following argument map.



An argument fitting this map is made of *three* argument links: the link from (1) to (2); the link from (3) to (4); and the link from (2) and (4) together, to the main conclusion, (5).

Now there's an old saying that *a chain only as strong as its weakest link*. And this turns out to apply to validity as well.

Chain Argument Validity Rule: a *chain* of arguments is valid if (and only if) every link in the chain is valid. (In other words: a chain argument is valid if (and only if) it is made *entirely* out of valid links.)

Each of the *links* in a chain argument will be a non-chain argument – a little ‘one-step’ argument *whose validity we already know how to test* (by searching for validity counterexamples). Since we can test each link of chain argument for validity, we can use the Chain Argument Validity Rule to test the entire chain argument.

So in the above argument map, we apply our informal test of validity to each of the links – (1) to (2), (3) to (4), (2) and (4) to (5) – searching for a validity counterexample for that link. And if we succeed in finding a validity counterexample for **even one** of these argument links, we know that the whole chain argument will be invalid as well.

Summary: Chain Arguments and Validity

- **Chain Argument Validity Rule:** a *chain* of arguments is valid if (and only if) every link in the chain is valid.
- **Testing a Chain Argument for Validity:** apply the informal test of validity (trying to imagine a validity counterexample) to each link in the chain argument. If there is a validity counterexample for *even one* link in the chain, the whole chain argument is invalid.