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Linked and Convergent Reasons — Again

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Argument diagrams, used in any number of textbooks on informal logic, were introduced as a way to exhibit the structure of arguments. Arguments of arbitrary complexity could be diagrammed:

Many argument diagrams can be done from the syntax of the discourse: $X$ since $Y$ signals $Y$ as the premise, $X$ as the conclusion; $X$ since $Y$, and $Y$ because $Z$ signals a chain argument from $Z$ to $Y$ to $X$; and so on.

The sticking point for argument diagrams comes when there are two (or more) premises that purport to entail their conclusion $X$ because $Y$ and $Z$. Now $Y$ and $Z$ can have two quite different relations to their conclusion $X$. They can “link” in their support of their conclusion, or they can “converge” on their conclusion. Here are two clear examples of each:

**Linked Reasons**

She’s either in the study or the kitchen. + She’s not in the study.

She’s in the kitchen.
Convergent Reasons

She typically goes to the kitchen around this time to make a cup of tea. I just saw her walking in the general direction of the kitchen.

She’s in the kitchen.

There are, we should agree, two very different argument structures here. And we must move beyond the pure syntax of the discourse to get at the difference in structure. *X because of Y and Z* merely positions *X* is the conclusion and *Y* and *Z* as the premises, but syntax can’t tell us whether *Y* and *Z* are linked or convergent. Various writers have tried to explain the distinction in various ways, though many of these accounts are wrong.

Copi and Cohen ask whether each of the premises (in the absence of the other) supports the conclusion independently (then the premises are convergent); or whether “neither premise supports the conclusion independently,” in which case the premises are linked. [Copi and Cohen (2002, 14). Copi and Cohen use “dependent” and “independent” instead of “linked” and “convergent.”] Trudy Govier, too, thinks linked premises “only support the conclusion in the argument when they are taken together” (Govier, 2002, 47). (Govier doesn’t use argument diagrams though she raises the linked-convergent distinction.) However, convergent reasons do not support the conclusion “independently.” After all, they are part of the same argument, and somehow work together. It also isn’t exactly true that one of a pair of linked premises does not support the conclusion. It may support its conclusion feebly—“She’s either in the study or the kitchen” makes it fifty-fifty that she’s in the kitchen—but it supports it.

Patrick Hurley writes that premises are linked when “one or more premises supports another in such a way that if one were omitted, the support that the others provide would be diminished or destroyed” (Hurley, 2000, 65). (His terminology is “conjoint” for “linked” and “horizontal” (!) for “convergent.”) But this confuses the support a premise provides on its own with its support when linked with another premise. “She’s either in the study or the kitchen” taken on its own supports its conclusion (“She’s in the kitchen”) with 0.5 probability, and that can’t be changed either by linking it with or unlinking it from “She’s not in the study.”

Moore and Parker think that premises are convergent when “the falsity of one would not cancel the support the other provides to the conclusion.” Premises are linked when “the falsity of either premise would automatically cancel the support the other provides for the conclusion …” [Moore and Parker (1994, 227)]. This, however, confuses logical support with truth. “No women are philosophers and Jane is a woman” logically supports “Jane is not a philosopher.” Yet the major premise is false. Falsehood therefore doesn’t “cancel” logical support. Take the linked example above. Suppose it’s false that she’s not in the study. Throw that premise out and still the remaining disjunction still lends 0.5 probability to its conclusion.

I should confess that I myself did not get the distinction exactly right in my first statement of it. “Reasons are dependent,” I wrote, “when together they make the overall strength of the argument much greater than they would considered separately. . . . Reasons are independent when together they do not make the overall strength of the argument much greater than they would considered separately” (Yanal, 1988, 42-43). Yet we should not consider even
independent (convergent) reasons “separately,” for they figure in the same argument. And how are we to understand “greater”? Greater than what?

Stephen Thomas, whose book was among the first to use argument diagrams extensively, comes closest to getting the distinction right. “An argument is ‘linked’ when it involves several reasons, each of which is helped by the others to support the conclusion. …When two or more reasons do not support a conclusion in a united or combined way, but rather each reason supports the conclusion separately and independently of the other, the argument is convergent” (Thomas, 1981, 53-54). Thomas is correct to say that linked premises “help” each other to support the conclusion — though so do convergent premises. The problem is to try to understand how linked premises “unite” or “combine” differently from convergent premises.

Dissatisfied with the extant accounts of the distinction, I made a second try at it (Yanal, 1991). Consider convergent arguments. Their diagrams picture their premises to be independent from one another. But this is deceptive, for the premises together make the conclusion more likely true than each premise considered separately. On the other hand, the premises of linked arguments together make their conclusion far more likely true than each premise considered separately. How, then, to mark this distinction with more specificity? How, in other words, to describe how premises link to establish their conclusion, and to distinguish this from how they converge on their conclusion?

In the case of convergent arguments, assume that any single premise confers a certain probability on the conclusion. “She typically goes to the kitchen this time of day to make a cup of tea” confers some likelihood on “She’s in the kitchen.” Suppose that 4 out of 5 days she goes to the kitchen at this time to make tea. Then that premise confers on its conclusion a probability of 0.8. Now there is a remainder of uncertainty of 0.2 of whether she’s in the kitchen now. The second premise, that I’ve seen her walking in the direction of the kitchen, removes some of that uncertainty. Suppose that I’m generally right about what I see — say 75% of the time. Then we can say that the second premise reduces the uncertainty by 75%, or 0.75 times 0.2, which is 0.15. (To say the same thing in the positive, the second premise increases the certainty by 0.15 by removing the uncertainty of 0.15.) We’re then entitled to add the probabilities of the two premises, 0.8 + 0.15, and see that our two premises support the conclusion with a probability of 0.95. We’ll call this the ordinary way of summing probabilities.

In the case of linked arguments, the premises don’t sum in the ordinary way. To see this, suppose we were to sum the probabilities of the premises in the ordinary way. Take the premise, “She’s either in the study or the kitchen.” This premise in itself confers a probability of 0.5 that she’s in the kitchen. The second premise, “She’s not in the study,” in itself confers a low probability that she’s in the kitchen — oh, say, 0.1 to make multiplication easier, but of course it must be much smaller. (Compare: “She’s not in the study, therefore she’s in Tibet.”) If the first premise leaves an uncertainty of 0.5, and the second premise takes away some of that uncertainty (0.1 times 0.5 = .05), and if we sum the probabilities in the ordinary way, we shall say that the premises, “She’s either in the study or the kitchen, but she’s not in the study” confer a probability of 0.55 (.5 + .05) on the conclusion, “She’s in the kitchen.” But this of course is quite wrong. The premises together confer a probability of 1.0 — of certainty — on their conclusion. If she’s either in the study or the kitchen, and she’s not in the study, then she must necessarily be in the kitchen.

My theory, then, can be summed up this way. Convergent arguments have premises whose probabilities sum in the ordinary way. Linked arguments have premises whose
probabilities don’t sum in the ordinary way. Linked arguments have reasons that “jump” ordinary probability sums.

Despite some confusion to the contrary, the linked-convergent distinction does not map onto the deductive-inductive distinction. While deductive arguments (whose conclusions are supported by more than one premise) are linked, inductive arguments can have linked reasons as well. An observer notes that of 100 crows each is black. He then infers that all crows are black. Is his argument convergent or linked? Would his argument diagram have one-hundred arrows or just one? If his observations sum in the ordinary way, any single black crow observation lends some slight probability to the conclusion that all crows are black, and of course leaves a large remainder of uncertainty. The next single black crow observation takes away some small bit of the remainder of uncertainty. And so does the next, and the next, and so on. Suppose one observation of a black crow makes it 0.001 likely that all crows are black, leaving an uncertainty of 0.999. Suppose the second observation of a black crow takes away 0.001 of uncertainty, leaving a mere 0.998. And so on, until 100 crows later we come to (about) 0.98 of uncertainty, or 0.02 of certainty, that all crows are black.

That is, if our observer’s premises are summing ordinarily. Intuitively, though, 100 observations of black crows should make it more than .02 probable that all crows are black. Granting the intuition, then, after observing a hundred black crows, we are entitled to say that the probability that all crows are black jumps beyond 0.02. Clearly we can’t say it is 1.0 certain that all crows are black, which is why linked enumerative inductions aren’t deductive arguments. But the set of observations confers more probability on its conclusion than their ordinary sum. Hence enumerative inductions are linked.

While I still think my theory is correct, I’ve come to see that it conflicts with four presumptions about argument diagrams.

The first I’ll call the presumption of priority. Argument diagrams are typically introduced in informal logic texts as a graphical way of exhibiting the structure of an argument. [Copi and Cohen and Hurley introduce argument diagrams in the first chapter of their respective texts (diagrams have been edging closer and closer to chapter 1 in successive editions of Copi). Moore and Parker introduce diagrams in their eighth chapter, though this is the first chapter introducing arguments. Govier brings in the linked-convergent distinction in her second chapter, which speaks to the structure of arguments.] What we can call the basic sequence in teaching logic is this: Structure first, logic second. Until we know which parts of an argument are premises and which conclusions, we can’t evaluate the logic of the argument. Argument diagrams are presumed to provide the structure of arguments.

The second is the presumption of neutrality. A deductively valid argument as well as a fallacious argument both have a premise-conclusion structure. Since argument diagrams are presumed to function as the first part of the basic sequence. If so, they must be neutral with respect to the logic of the arguments thus diagrammed.

The third and fourth I’ll refer to as the presumptions of completeness and correctness. Argument diagrams should be able to diagram any argument. There should be no argument that is, somehow, undiagrammable. And there should be exactly one correct diagram for an argument. No argument can be of two very different structures.

These first two presumptions — priority and neutrality — are violated by the very distinction between linked and convergent reasons, at least on my theory. For on my theory we must evaluate the logic of the argument before we can do the diagram. Students must know, for example, that the premises of disjunctive syllogisms link, though they can only know this if we
already know that the premises render the argument’s conclusion as certain, that is, as not summing ordinarily. Students must know that the probability that the premises of enumerative inductions confer on their conclusion jumps beyond their ordinary sum. But this entangles evaluation with rendering structure.

The presumptions of completeness and correctness are also violated in the case of fallacious arguments. We have no trouble diagramming the following *ad hominem*:

Peter is a Communist.

His history of the Soviet Union must be biased.

But now consider the following fallacy:

*All cats are mammals. All dogs are mammals. So all cats are dogs.*

Are its premises linked or convergent? That is, do their probabilities sum ordinarily or do they “jump”? Consider the premises separately. “All cats are mammals” confers no probability on “All cats are dogs.” Ditto for “All dogs are mammals.” Since the probabilities are zero, the comparison between ordinary sums and jumping sums becomes pointless. If we *had* to choose between a linked and a convergent diagram, we would be forced to say either that the probabilities neither sum ordinarily nor jump (thus violating the presumption of completeness), or that the probabilities both sum ordinarily and jump (thus violating the presumption of correctness). This is an unfortunate consequence.

It may be thought these are the unfortunate consequences of my way of distinguishing linked from convergent premises, and therefore should be seen as a reductio ad absurdum of my theory. However, *any* way of distinguishing linked from convergent reasons that relies on the way the premises support their conclusion, which all extant distinctions in one way or the other do, will ultimately have to face up to the same problems.

In conclusion: There *is* a linked-convergent distinction, though (a) it does not capture all multi-premised arguments; (b) it presupposes a kind of logical evaluation and cannot simply expose structure neutrally; and (c), because of (a) and (b), it seems best not to introduce the linked-convergent distinction right from the beginning in teaching informal logic — and perhaps informal logic should get along without the distinction altogether. Surprisingly, Monroe Beardsley, who seems to have introduced argument diagrams, does not draw the linked-convergent distinction. He uses diagrams in but one section to exhibit the structure of long and complicated arguments (Beardsley, 1966, Ch. 1.3). The remainder of his book proceeds happily without them, and without the linked-convergent distinction, as do any number of popular critical thinking textbooks today.
References


