

Theory, is, as I have said, a comparison of different kinds of entailment in different formalisms. The next level is, roughly, the comparison of comparisons. The next level is the comparison of these, and so on.

The final matter I wish to draw attention to here is the following. In a precise sense, any formalism F has a “biggest” formal model, namely, F itself. But as we have seen, even in mathematics we find entailment structures that are not formalizable. Let us use natural language for the sake of illustration. There is certainly a lot of entailment in natural language; suppose we want to model it. That is, suppose we want to place a natural language into the box occupied by F_1 in figure 3F.2 above. Then what?

In fact, we can find a host, an *unlimited number, of distinct formalisms* F_2 that we can put into a modeling relation with the language. No one of them, nor indeed, no aggregate of them, can replace the language, in the sense of completely duplicating its entailment structure. In short, the totality of formal models of something that is not itself a formalism to begin with is

1. indefinitely large, and
2. is not itself a formalism.

These will turn out to be pregnant and profound conclusions. We can get some sense of their ultimate import if we replace the word “formalism” with the word “machine.” Much lies ahead of us before we can make this kind of substitution sensible. But it will turn out that the conclusions we have drawn above, which have so far concerned only those formal entailment structures specifiable in terms of syntax alone, can be exported to comparison of *any* kind of entailment structures whatever. I now turn to the question of whether there are any others, and if so, what they might be like.

3G. Entailment in the Ambience: Causality

I now turn from the internal, formal world of the self to the external world that constitutes its ambience, the world we have come to look upon as populated by *natural systems* and their environments. I thus turn to the world of science, in the broadest sense.

The fundamental question for us, at this point, is the following: is there, in this external world, any kind of *entailment*, analogous to the inferential entailment we have seen between propositions in a language or formalism? Obviously, if there is not, we can all go home; science is not only impossible but also inconceivable.