

Color incompatibility and predicates of degree

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One of the central doctrines of the *Tractatus* is the view that the following division of meaningful propositions is exclusive and exhaustive:

- Logical truth (tautology)
- Contradiction
- Contingent proposition

Prima facie problems for this sort of view are posed by any propositions which appear to be necessary truths, but do not appear to be logical truths. Wittgenstein discusses a number of such examples in the *Tractatus*. A particularly important one is the following:

6.3751 For example, the simultaneous presence of two colours at the same place in the visual field is impossible, in fact logically impossible, since it is ruled out by the logical structure of colour.

Let us think how this contradiction appears in physics: more or less as follows — a particle cannot have two velocities at the same time; that is to say, it cannot be in two places at the same time; that is to say, particles that are in different places at the same time cannot be identical.

Here Wittgenstein notices that color incompatibilities seem to be necessary truths; hence, by the doctrines of the *Tractatus*, they must be logical truths. In the second half of this remark, he attempts to explain how color incompatibilities are logical truths by suggesting that they can be analyzed in terms of the incompatibility of a single particle being in different places at the same time.

(How might such an analysis work?)

However, as Ramsey (1923) noticed, this seems to push the problem back a step rather than to solve it. At best, we have an analysis of color incompatibilities in terms of necessary truths of physics, like

If x and y are in different locations, then $x \neq y$.

but we still have no explanation of the latter.

Eventually, Wittgenstein (1929) came to think that problems like color incompatibilities required a fundamental revision in the views of the *Tractatus*. In this paper, Wittgenstein focuses on the internal relations between ‘properties which admit of gradation’, like temperatures, weights, and degrees of brightness. He notes, correctly, that there are necessary claims of this sort, which are analogous to necessary truths involving color incompatibility.

He then argues that these claims will involve numbers, and that there’s no way to eliminate this reference to numbers in favor of purely logical claims:

“One might think — and I thought not so long ago — that a statement expressing the degree of quality could be analyzed into a logical product of single statements of quantity . . . But this will not do as an analysis of a statement of degree. For let us call the unity of, say, brightness b and let $E(b)$ be the statement that the entity E possesses this brightness, then the proposition $E(2b)$, which says that E has two degrees of brightness, should be analyzable into the logical product $E(b) \& E(b)$, but this is equal to $E(b)$; if, on the other hand, we try to distinguish between the units and consequently write $E(2b) = E(b') \& E(b'')$, we assume two different units of brightness; and then, if an entity possesses one unit, the question could arise, which of the two . . . it is; which is obviously absurd.” (167-8)

The moral Wittgenstein drew from this was a far-reaching one:

“I maintain that the statement which attributes a degree to a quality cannot be further analyzed, and, moreover, that the relation of difference of degree is an internal relation . . . The mutual exclusion of unanalyzable statements of degree contradicts an opinion which was published by me several years ago and which necessitated that atomic propositions could not exclude one another.”

One of the principal explanatory ambitions of the *Tractatus* was the explanation of necessary truth. Seeing that the system of that book could not provide such an explanation was, arguably, one of the motivations for Wittgenstein’s change in view.

References

- Frank Ramsey, 1923. Critical Notice of the *Tractatus Logico-Philosophicus*. *Mind* 32:465–478.
- Ludwig Wittgenstein, 1929. Some Remarks on Logical Form. *Proceedings of the Aristotelian Society* Supplementary volume 9:162–171.