When 'And' is Too Much and 'Or' is Not Enough

Mei Rose Connor

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The source of inspiration for this project was the author's own research on the Sevenfold Predication of Jaina theology and cosmology. For background, the Jaina take a pluralistic approach to theology and cosmology that is reflected in the Sanskrit word *Anekantavada*, which glosses to something like 'non-one-sidedness thesis'. This pluralism comes into the Jaina system of reasoning known as *Saptabhangivada*, or Sevenfold Predication Thesis [Bur64]. Employing the word *syad*, each of the seven truth predicates begins with a statement that can be translated as *possibly*, *it may be*, or *in some ways*. The seven predicates are:

1. *Syād-asti*, Possibly it exists.
2. *Syān-nāsti*, Possibly it does not exist.
3. *Syād-asti-nāsti*, Possibly it exists; possibly it does not exist.
4. *Syāt-asti-avaktavyaḥ*, Possibly it exists; possibly it is not assertible.
5. *Syān-nāsti-avaktavyaḥ*, Possibly it does not exist; possibly it is not assertible.
6. *Syād-asti-nāsti-avaktavyaḥ*, Possibly it exists; possibly it does not exist; possibly it is not assertible.
7. *Syād-avaktavyaḥ*, Possibly it is not assertible [Gan02].

The author chooses to abbreviate 'it exists' as φ. It would seem, from these translations, that two truth values do not suffice to not to introduce a contradiction or tautology of the form $\varphi \wedge \sim\varphi$ or $\varphi \vee \sim \varphi$ for the third truth predicate. This reveals the meaning of the title of the paper: somehow, 'and' is much too strong, causing a contradiction, but 'or' is much too weak, causing a tautology.

There is also the question of what to do with the seventh predicate, as well as those predicates involving it in combination with φ and $\sim \varphi$. While it would seem possible to resolve it with a strong or weak Kleenean logical operator such as U, it is known that there are no tautologies in a system with either type of Kleenean logical operator. [BHQ23] It also leaves the question of the negation of these logical predicates unanswered, as the negation of the truth value U is U. The truth tables for the strong and weak Kleenean conjunction (1a and 2a respectively), disjunction (1b and 2b respectively), and negation (1c and 2c respectively) are shown in the tables below for reference. The author does not deny, however, that there are interesting and "non–trivial" [BHQ23] consequence relations.

Adding a Gödelian truth value $\mathbb{U}$ is also unsatisfactory. This is because the negation of $\mathbb{U}$ in a Gödelian system is F, which does not seem to match the interpretations of the connectives. For reference, the truth table of Gödelian negation is given below.

Thus, the logic (and the linguistics and philosophy) seem to point the author to a modal solution. Interpreting the box and diamond operators of modal logic in the provability sense (with $\Box\varphi$ being interpreted as 'φ is provable' and $\Diamond\varphi$ being interpreted as 'φ does not introduce an inconsistency')

	T	U	F
T	T	U	F
U	U	U	F
F	F	F	F

(a) Kleenean strong conjunction

	T	U	F
T	T	T	T
U	T	U	U
F	T	U	F

(b) Kleenean strong disjunction

T	F
U	U
F	T

(c) Kleenean strong negation

Figure 1: The truth tables for Kleenean strong logical connectives

	T	U	F
T	T	U	F
U	U	U	U
F	F	U	F

(a) Kleenean weak conjunction

	T	U	F
T	T	U	T
U	T	U	U
F	T	U	F

(b) Kleenean weak disjunction

T	F
U	U
F	T

(c) Kleenean weak negation

Figure 2: The truth tables for Kleenean weak logical connectives

T	F
$\mathbb{U}$	F
F	T

Figure 3: The truth table for Gödelian negation

while minding the caveat below, seems to resolve some issues. However, one of the problems introduced in the beginning of this paper remains: how to prevent a semantically useless statement like $\Diamond \varphi \vee \sim \Diamond \varphi$. If one accepts the Law of Excluded Middle, this is a tautology. This result suggests that the *Saptabhangivada* may be non–classical not only in the structure of its truth values, but also in its notions of valitdity and derivability. This is a work in progess, as the truth–value system of the *Saptabhangivada* must be solidified before any notion of syntactic derivability or semantic validity can emerge.

The paper will attempt to resolve some of the problems mentioned above, as well as make further inroads into the syntax and semantics of the *Saptabhangivada*.

References

[BHQ23] Samara Burns, Dana Hägg, and Zesen Qian. *What If? An Open Introduction to Non-Classical Logics*. Ed. by Aldo Antonelli et al. The Open Logic Project, 2023.

[Bur64] George Bosworth Burch. "Seven-Valued Logic in Jain Philosophy". In: *International Philosophical Quarterly* 4.1 (Feb. 1964), pp. 68–93. DOI: 10.5840/ipq19644140.

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