

Non-Boolean conjunction with atomic and plural subjects

Mathieu Paillé
McGill University

Introduction. Predicate conjunctions are amenable to two construals, known as the Boolean and non-Boolean construals (BC and NBC); BC (1a) is set-intersective, NBC is not (1b). (1b) isolates an NBC because it's impossible for a single individual to talk and sing at the same time.

- (1) a. All the children are short and Swedish.
b. All the children are talking and singing.

NBCs are usually discussed in the literature using plural subjects as in (1b), but examples with atomic subjects occasionally surface. Krifka (1990) gives (2).

- (2) The flag is green and white.

Krifka's reasoning for viewing (2) as an NBC is that "green and white are contradictory" (p. 187); hence the acceptability of (1) must be the result of an NBC, in parallel with (1b). Despite the initial appeal of this analysis, I argue that there is in fact no NBC with atomic subjects: conjoined predicates with atomic subjects are only ever given a BC, whether in (2) or elsewhere.

Making the conjunction in (2) explicitly Boolean. Marked conjunctions in English (*both ... and* and *as well as*) single out a BC (at least in certain syntactic configurations: Schwarzschild 1996). The compatibility of these marked conjunctions with BCs is seen in (3), in contrast to their infelicity with NBCs in (4).

- (3) a. All the children are **both** short and Swedish.
b. All the children are short **as well as** Swedish.
(4) a. (i) All the children are (**#both**) talking and singing.
(ii) John and Mary are (**#both**) 28 and 31 years old. (adapted from Krifka 1990)
b. (i) **#All** the children are talking **as well as** singing.
(ii) **#John** and Mary are 28 **as well as** 31 years old.

If a BC is unavailable for (2) (as Krifka suggests), variants of the sentence with *both* or *as well as* should be ruled out. This is not the case:

- (5) a. The flag is **both** green and white. b. The flag is green **as well as** white.

This is the first crack in the hypothesis that (2) is evidence for an NBC: we've now learned that a Boolean interpretation must be available with what was supposed to be a strictly NBC example. Since a BC is available, Krifka's assumption that colours are "contradictory" must be incorrect (presumably because the adjectives are in fact lexically gradable: Kennedy & McNally 2010).

Making the conjuncts in (2) explicitly incompatible. Having seen that a BC exists for (2), we turn to asking whether an NBC exists too. Recall that one way to isolate an NBC is to conjoin predicates which are incompatible with one another, as in (1b) (and as originally intended by Krifka for (2)). We therefore test for an NBC in (2) by modifying the conjuncts to make them explicitly incompatible with one another. This can be done by modifying the colour terms with maximizers like *entirely* (e.g., Rotstein & Winter 2004) or the universal *all*: something can't be 'entirely/all green' and 'entirely/all white' at the same time.

To set up the experiment, I begin with a plural version of (2), i.e. (6), since it is assumed that an NBC exists there. Given the existence of an NBC for the plural (6), it is possible to make the colours explicitly incompatible with one another (7).

- (6) The flags are green and white.
 (7) a. The flags are entirely green and entirely white.
 b. The flags are all green and all white.

If an NBC exists with an atomic subject as in (2), it should be possible to create sentences identical to those in (7) but with an atomic subject. They would mean that the atomic flag has an entirely green part and an entirely white part. But in fact, doing this creates a contradiction:

- (8) a. #The flag is entirely green and entirely white.
 b. #The flag is all green and all white.

The failure of the experiment in (8) is evidence that the NBC is *not* available here. Given that (7) and (8) form minimal pairs, it is clearly the subject's atomicity in (8) that is preventing the NBC.

The empirical picture beyond (2). We've seen that an NBC is unavailable with conjoined colour terms predicted of an atomic subject (despite initial appearances). But this is not a special fact of colour adjectives; conjoining incompatible predicates and attempting to predicate them of an atomic subject generally shows that an NBC is lacking in these configurations.

- (9) a. #The forest is sparse and dense. c. #The table is wet and dry.
 b. #The land is flat and hilly. d. #The room is hot and cold.

The NBC would have given these examples the meaning 'x has a P part and a Q part' (e.g., the table is wet in places and dry in others) but in fact, these examples are all contradictory.

There is one class of predicates that offers a counterexample, namely materials.

- (10) The table is metal and wood.

As was the case with colours, an NBC analysis has (at first glance) some appeal: (10) means part of the table is metal, part of the table is wood. But here too, it certainly isn't an actual NBC:

- (11) a. The table is **both** metal and wood.
 b. The table is metal **as well as** wood.
 c. #The table is **entirely** metal and **entirely** wood.

(compare: The tables are entirely metal and entirely wood)

I suggest that the 'NBC-like' reading for colours and materials comes from the predicates' lexical meaning rather than the conjunction per se. Colours might best be analyzed as gradable (Kennedy & McNally 2010) and materials as involving a null operator akin to the phrase 'partially made of.'¹

Accounting for the lack of NBC. The conclusion is that NBCs are available with conjunctions predicated of non-atomic subjects, but not of atomic subjects. This puts conjunction in the set of expressions that treat the atomic parts of pluralities and the subatomic parts of atoms differently (Wagiel 2018). I conclude with a brief note on how this could be accounted for. Krifka (1990) proposes a type-flexible *and* which has the following denotation for $\langle et \rangle$ predicates. The conjunction is basically non-Boolean; the Boolean meaning is just a special case where $x' = x''$.

- (12) $\lambda x. \exists x', x'' [x = x' \oplus x'' \wedge P(x') \wedge Q(x'')]$

The lack of NBC with atomic subjects can be explained by modifying (12) so that x' and x'' must be taken from the domain of (singular or plural) individuals. Hence, they can be atoms or pluralities but not subatomic parts. This forces a BC with atomic subjects: if x is an atom made up of x' and x'' , and these two are not subatomic, then it must be that $x' = x''$.

¹In fact, some languages do not even use conjunction to 'put together' colours and materials. German, for example, uses compounding for colours and materials but *und* for the predicates in (9).

References

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