More and more different

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In 1996, Kyle Johnson[1] got me interested in sentences like (1a). The truth conditions of the relevant, universal NP dependent reading are reasonably clear, (1b), but how to compositionally derive them is less so. It seems that the scope of the NP *every boy* is the relation in (1c) while the NP quantifies over pairs of boys. This is very stipulative. It has little to do with any normal meaning of the NP and the overt material in the sentence.

(1)   a.   Every boy read a different book.
      b. $\forall x, y[\text{boy}(x) \ \& \ \text{boy}(y) \ \& \ x \neq y \rightarrow x$ read a different book than $y]$
      c. $\lambda x. \lambda y. x$ read a different book than y

I have been worrying about this problem for the last 20 years. In Beck (2012) I developed an analysis of data like (2a) — pluractional comparisons — along the lines of (2b) ($e \leq E$ means e is a contextually relevant part of E). Plural quantification (2c) is a key feature of the analysis, and it is not particularly stipulative, except perhaps for the reference to the predecessor event of the event quantified over 'pred(e)', which is not overtly expressed in the sentence. The idea with the sequence saves us from quantifying over pairs of years in (2). There is universal quantification over parts of a plurality, and what would be the second member of the pair is the relevant other part of the plurality (the predecessor). The apparent universal NP *every year* is not a quantifier; instead, it indicates that the relevant parts of the plurality that is universally quantified over by the PL operator are years, (2d).

(2)   a.   Nutella gets more expensive every year.
      b. $\forall e[e \leq E \ \& \ \text{year}(e) \rightarrow$ Nutella is more expensive in e than in pred(e)]
           The situation/event E can be divided into years such that in each relevant year, Nutella is more expensive than in the predecessor of that year.
      c. $\text{PL}^{seq}(P)(E)$ is only defined if $\{e : e \leq E\}$ is a sequence.
           Then, $\text{PL}^{seq}(P)(E) = 1$ iff $\forall e[e \leq E \rightarrow P(e)]$
           i.e., the relevant parts of the big situation/event E are a sequence, and all of them are P events.

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1 Johnson (1996).

d. every year: $\forall e[e \leq E \to \text{year}(e)]$
    i.e. all relevant parts of the big event E are years.

e. $$\xrightarrow{\hspace{7cm}}$$
    $$|\text{—e1—}|\text{—e2—}|\text{—e3—}|\text{—e4—}|$$

    $$|\text{————————E————————}|$$
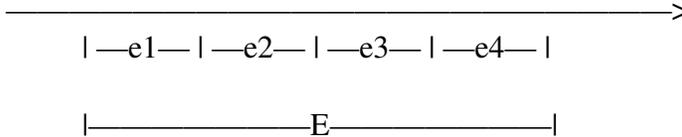
Nutella is more expensive in e2 than in e1, and in e3 than in e2,...

There is some reason to think that (1a) and (2a) are semantically parallel. It is possible to find examples in which the universal NP in pluractional comparisons like (2a) is an argument instead of an adverbial, (3b) and (4b). Parallel data with *different* can be constructed, (3a) and (4a).

(3) a. Each stage had a different challenge.
     b. Each stage had yet a harder challenge.

(4) a. Every (subsequent) question added a different/yet another problem.
     b. Every (subsequent) question added yet a harder problem.

But (3b), (4b) require a little bit of work. Simply replacing *different* with a comparative as in (5) does not work. (3), (4) suggest that indications that a sequence of events is talked about help with the acceptability of the comparative: *subsequent*, *yet*. (6) provides further illustration.

(5) a. Every boy read a different book.
     b. #Every boy read a longer book.

(6) a. Each stage had a different mountain.
     b. #Each stage had a taller mountain.
     c. Each subsequent stage had yet a taller mountain.
         = each subsequent stage had a taller mountain than the stage before.

This difference between data like (1) and data like (2) can be motivated by the difference between the comparison made by the comparative vs. the comparison made by *different*: in order to be non-contradictory, the comparative requires a sequence while *different* does not, cf. (7). The sequence allows the predecessor to be identified. The PL^{seq} operator in (2c) presupposes that a sequence is given. If nothing indicates that this is the case, the example is not acceptable. This is what happens in (5b), (6b). In (3b), (4b) and (6c), indicators (*subsequent*, *yet*) that there is a sequence make PL^{seq} possible.

(7) a. Each stage had a different mountain than every other stage.   *OK*

b.   Each stage had a taller mountain than every other stage. *Contradiction*

So let us assume, then, that my 2012 analysis in (2) should be extended to (3b) and (4b) as sketched below:

(8)   a.   Each stage had yet a harder challenge.
       b. $\forall e[e \leq E \,\&\, \text{stage}(e) \rightarrow e$ had a harder challenge than $\text{pred}(e)]$
             The stages can be divided into a sequence of subevents such that in each subevent, there was a harder challenge than in the predecessor event.

(9)   a.   Every (subsequent) question added yet a harder problem.
       b.   The situation and the questions can be divided into a sequence of relevant subparts such that in each subsituation, the question in that subsituation was harder than the predecessor question in the predecessor situation.

That is, (3b) and (4b) are instances of plural quantification. This may seem surprising since they do not appear to contain any plural. But (i) we are concerned with pluralities of events here which are not directly visible in English, and (ii) the NPs *each stage* and *every question* are actually plural dependent expressions in this analysis, cf. (2d), hence they do indicate that there is plural quantification.

    The following data from coordination and ellipsis argue that this analysis also be extended to (3a) and (4a):

(10)   a.   Every event lead to a different and ever more complex reaction.
       b.   Each new question added a different and yet more difficult challenge.

(11)   a.   Each stage will produce a different outcome and each outcome, a yet more difficult challenge.
       b.   Each stage added a different challenge, or perhaps a more difficult problem.

I assume that in these examples, the compositional environment that licenses the relevant reading of the comparative and of *different* is the same. In (11b), for example, ellipsis requires an identical constituent 'each stage added', as seen in (12). The requirement of identity at an interpretively relevant level leads to the conclusion that the analysis with the PL^{seq} operator and a plural dependent reading of 'each stage' that the ellipsis clause requires (cf. (8b)) is also present in the antecedent clause.

(12)   [[a different challenge] [each stage added __]] or perhaps
       [[a more difficult problem] [each stage added __]]

It follows that there is an analysis of universal NP dependent *different* in which universal quantification comes from a PL operator. The universal NP merely makes this visible. Such an analysis avoids the problems sketched for (1).

I leave the job of spelling this out to Kyle.

References

Beck, Sigrid. 2012. Pluractional Comparisons. *Linguistics & Philosophy* 35. 57–110.

Johnson, Kyle. 1996. Topics in Syntax. Lecture Notes. Ms., University of Massachusetts, Amherst.