On Line Processing of ACD Gives No Evidence for QR

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Antecedent Contained Deletion (ACD) as in (1) has been used as evidence for a level of LF at which the object is raised out of the matrix since at least as early as Sag (1976):

(1) Sarah read the/every newspaper that Katie did (while visiting Spain).

Conventional wisdom is that the relative clause in (1) requires read t to be present or supplied at the ellipsis site, and an antecedent supplying this is available only if the object undergoes QR. But there are alternatives. Cormack, (1984), Jacobson (1992, 2003) and others show that under assumptions in Categorial Grammar (and related theories), all that needs to be supplied in (1) is a 2-place relation which is available as the meaning of read in the matrix.

Recently, Hackl, Koster-Hale and Varvoutis (HKV) (2012) revisit ACD, and attempt to provide new evidence for the QR analysis based on on-line processing results. Assuming that the processor applies the minimal steps necessary to compute a meaning, then – in the version of (1) with the as determiner – QR will not apply until the ellipsis site is encountered. There should thus be a cost at that site, which would be absent for the every case, since QR would have already applied. HKV did find a slowdown in reading times after the ellipsis site in the the condition compared to the every condition, and also the the condition has lower acceptability in off-line judgments. They further considered cases like (2) (a portion of their Exp. 2):

(2) Sarah was reluctant to read the/every newspaper that Katie was.

Here they claim that every should have no advantage, reasoning as follows: As known since Sag (1976), these require a de re reading in which the object has widest scope. The "do as little as possible" processor will indeed have already applied QR to every but only to the edge of the read clause. But this does not resolve the antecedent containment paradox. In both conditions, then, the processor needs to perform QR at the ellipsis site. Their prediction was borne out: in Big Ellipsis as in (2), every had no advantage over the (actually, the reverse held).

We present experimental evidence that the HKV effect has nothing to do with QR. We show that the effect is due to reduced acceptability of stimuli like (1) with the because of heavy pressure to insert also or to use the same. (Similar cases requiring also or too are discussed in, e.g., Kaplan 1984, Amsili 2012). The pressure is absent or greatly reduced with every, and we hypothesize that when the events are "the same" there is pressure in this configuration to call attention to that fact unless some other connection can be established (e.g., a causal connection or a connection given by context). We show that every naturally allows speakers to establish a causal connection, much more so than does the. Finally we show that HKV's result that every loses its advantage over the in the "big ellipsis" Exp. 2 is predicted by our account, but is actually not predicted by theirs, and we speculate on why the has a greater advantage here.

By way of elaboration: First there are weaknesses in the reading time data. Some of this is addressed separately in Gibson, Mahowald, Piantadosi, and Levy (submitted). Moreover, an attempted replication of HKV's Experiments 1 and 2, using 80 participants in each (more than HKV's experiments: 50 and 48) demonstrated no reliable effect.

We did, however, replicate the judgment contrast in cases like (1), using a judgment task run on Amazon's Mechanical Turk with 80 speakers, and using the exact stimuli used in HKV. We conclude that the acceptability contrast is real, but is independent of QR. Note that while HKV compared (1) to a case with a full verb, they used a different verb (with a different meaning) than the one understood at the ellipsis site. They did not compare sentences like (1) to corresponding ones with the full verb read (rather
than ellipsis) in the relative clause. They (very briefly) defend the lack of running this control by positing that use of the same verb may cause the processor to supply deaccented prosody, which itself - under a certain set of assumptions - would trigger QR (to satisfy the conditions on deaccenting). But this logic is invalid. First it is not at all clear that deaccenting in the corresponding spoken materials (with a full identical verb) would require identity of LF (and hence force QR). Actually, it is well known (see, e.g., Lakoff 1971, Rooth 1992) that deaccenting in general does not require identical LFs or any kind of linguistic identity; material can be deaccented in virtue of information which is inferred. But suppose that deaccenting of the full verb in the case at hand does require identity of LF (and hence QR). It is still true that there is no reason to think that the processor would supply deaccented prosody - for the processor cannot "know" to deaccent unless it has already inferred the meaning, which is of course what it is trying to do. (Note that not every instance of a repeated verb allows deaccenting; deaccenting is allowed only when the overall semantics is right.) In fact, if identity of LF is required here then there is no reason to conclude that full repeated verb (read in (1)) must be deaccented, and so again no reason to speculate that the processor would supply deaccented prosody. After all, if deaccenting is licensed only when QR occurs, then - since nothing (in the grammar) forces QR in the the case - deaccenting would simply be optional; its conditions need not be met. We therefore conclude that the same verb condition is an essential control. We ran this, and there remains an advantage for every over the (albeit weaker). Since the same verb condition does not force QR, we conclude that the HKV effect is not driven by QR. Our hypothesis predicts that the advantage remains, and we will show that it is also consistent with the advantage being weaker.

Since we posit that the effect is due to a pressure to insert also (or some similar form such as the same) in the the condition, we also tested cases like (1) where the object has the form the/ever newspaper that Katie also did. Indeed the advantage for every disappears. While the presence of also would (under a certain set of assumptions) itself trigger QR in the the condition, this is no different than the situation with ellipsis. The also-driven QR does not happen until later (when also is encountered), so the same penalty should be present. But it isn't.

But why is there no (or less) pressure to insert also with every? We hypothesize that this pressure disappears if an independent connection can be established between the events, and use of every allows for a natural causal connection (which we label the "copycat" reading). We tested this on Mechanical Turk (40 subjects and 20 items for each condition) using a judgment task asking subjects the likelihood of (for example) the following sentence being true following the every and the the condition (with full verb in the frame sentence): Sarah read The Globe because Katie read the Globe. Subjects rated the because sentences as significantly more likely to be true in the every condition, confirming that every more easily supports a causal connection. That the establishment of an independent connection (such as a causal connection) is sufficient to remove the pressure for also is shown by additional experimental evidence: the penalty for the (without also) disappears entirely if prior context establishes a connection.

The full paper will address in greater detail HKV's Experiment 2. Here we address just one aspect: the lack of advantage for every over the in the "Big Ellipsis" condition in 2. First, contrary to HKV's claims, their model predicts that every should still have an advantage. Although QR is needed in either case, the "minimal processor" hypothesis predicts that in the the condition 2 QRs are necessary, because the processor cannot "know" in advance that the low QR will not result in a good antecedent, and so it would perform that first. Hence the every condition requires 1 instance of QR while the the condition requires 2. In our account, though, the availability of the "copycat" reading is absent in Big Ellipsis for every. This is because Big Ellipsis requires a de re interpretation. In any example where the matrix verb/adjunctive expresses an attitude on the part of the subject, the possibility of "copycat" reading is absent if the object DP is out of the scope of that attitude. Indeed at least 65% of the HKV stimuli have this property (and others are also such that the de re interpretation removes the copycat reading). In sum, then, the HKV effect seems to be independent of QR; the consequences of this is that grammatical architectures making no use of LF are perfectly consistent with the HKV effect.