Only Scalar

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Abstract. In this paper I want to present a new proposal for a unified meaning of the particle *only* which accounts for the traditional distinction between a quantificational and a scalar *only*. It therefore avoids an unintuitive lexical ambiguity and tries to capture a generalization missed so far. For this purpose, different stages in the history of *only* will be reviewed, portraying the increasing complexity of the matter. As I will attempt to reduce the different meanings of *only* to a single one, a contextual parameter is necessary which imposes different orders on the associated alternative set. It is these different orders from which the different readings derive.

1 Introduction: Defining *Only*

It is a well-known fact that stating the meaning of *only* as defined in Horn (1969) and taken up in early versions of Alternative Semantics (Rooth (1985); Rooth (1992)), cf. (1), leads to wrong predictions for sentences containing focus on conjunctions as in (2a).

(1) $\textbf{only}(\phi, C) = \{w \in \phi | \neg\exists\psi \in C[w \in \psi \wedge \psi \neq \phi]\}$

(2) a. John only kissed [Sue and Mary]$_F$.
b. John kissed Sue and Mary.
c. John kissed Sue.

Even if the context predicate C is set to the focus alternative value, as Rooth proposed, alternatives like in (2c) are excluded which leads, in combination with what has sometimes been called the sentence's presupposition[1] (2b), to a contradiction.

Krifka (1993) managed to avoid this problem by introducing a solution (3) which is sensitive to subset relations among the alternatives.

[1]Whether it actually *is* a presupposition, an implicature or something else has been under debate for a long time. For recent opinions consult van Rooij and Schulz (2005), Roberts (2005) or Geurts and van der Sandt (2004) and reactions to this paper in *Theoretical Linguistics*, in particular Beaver (2004). Roberts talks about the "prejacent" of *only* instead of its "presupposition", whereas van Rooij and Schulz use the terminology "positive contribution" as opposed to the asserted "negative contribution".

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(3)

$$
\begin{array}{ll}
 & \textbf{only}\langle B, F\rangle \\
= & \{w \in B(F) | \forall F' \in \textsc{Alt}(F)[w \in B(F') \rightarrow B(F) \subseteq B(F')]\}
\end{array}
$$

The proposal makes use of the theory of Structured Meanings, cf. Krifka (1992), going back to work by von Stechow (1982) and Jacobs (1983). The problem in (2) is solved because, now, propositions which are entailed by (2b) and which are therefore less informative, like (2c), are not excluded anymore.

The following tree (5), a derivation of the sentence in (4), briefly recalls the system of compositional focus semantics according to Krifka (1992). Applying an F feature to some constituent (here the object DP) yields a background-focus structure $\langle B, F\rangle$, which ensures the identification of and the access to the focus even after the focused constituent has undergone semantic composition. It is to such representations that operators like the one defined in (3) apply.

(4) John ate [an APPLE]$_F$.

(5)

- S: $\langle \lambda \mathcal{Q}.[\![John]\!]([\![ate]\!](\mathcal{Q})), [\![an\ apple]\!]\rangle$
  - NP: $[\![John]\!] = \lambda P.P(\mathbf{j})$
  - VP: $\langle \lambda \mathcal{Q}.[\![ate]\!](\mathcal{Q}), [\![an\ apple]\!]\rangle$
    - V: $[\![ate]\!] = \lambda \mathcal{Q}x.\mathcal{Q}(\lambda y.\mathbf{ate}(xy))$
    - DP: $\langle \lambda \mathcal{Q}.\mathcal{Q}, [\![an\ apple]\!]\rangle$
      - F
      - DP: $[\![an\ apple]\!] = \lambda P.\exists y[\mathbf{apple}(y) \wedge P(y)]$
        - D: $[\![an]\!] = \lambda QP.\exists y[Q(y) \wedge P(y)]$
        - N: $[\![apple]\!] = \lambda y.\mathbf{apple}(y)$

In the following section I will introduce the reader to several aspects of the notion "scale" as it appears at various subareas of the semantics of focus and *only*. This is necessary in order to solve a number of known problems with the approach introduced so far.

2 On the Nature of Scales

Scalar Implicatures

Rooth (1992) claims that a sentence with a free (unbound) focus is able to trigger a Gricean quantity implicature. Assuming a universe of two individuals and their sum we can establish a partial order as in (6). By uttering the sentence (7a), not only its semantic content (7b) is asserted but it is furthermore implied that the statement was the strongest the speaker was able to make in comparison to alternative statements obtainable by means of replacing the focused constituent with other elements from the partially ordered set in (6). In particular, we may conclude (7c) and thus derive (7d).

(6)

$$\begin{tikzcd} & \text{Carl}\oplus\text{Fred} & \\ \text{Carl} \arrow[ur] & & \text{Fred} \arrow[ul] \end{tikzcd}$$

(7) a. CARL$_F$ passed.
  b. Carl passed. (from (a), assertion)
  c. It is not true that Carl$\oplus$Fred passed. (from (a), scalar implicature)
  d. Fred didn't pass. (from (b),(c))

Several Readings of *Only*?

Another role played by scales directly concerns the meaning of *only*. Various authors, e.g. Bonomi and Casalegno (1993) or Krifka (1993), have pointed out that *only* is ambiguous between a "quantificational" and a "scalar" reading. Consider the following case (8) of focus on an indefinite, which has the two readings exemplified by (9a) and (9b), whereas the latter is, in addition, underspecified with regard to *how* the focused phrase is compared to its alternatives.

(8) John only ate [an APPLE]$_F$.

(9) a. *There was an apple x which John ate, and John didn't eat anything but x.* (quantificational)
  b. *What John ate was an apple and nothing more substantial/nutritious/expensive/healthy/toxic. . .* (scalar)

Krifka (1993) proposes to analyse the former reading differently from cases with focus on proper names as seen above in (2). He suggests an analysis in which the indefinite takes scope over the *only* operator, leaving behind a focused trace. This, however, would mean that the analysis given before in (3) is far less general than previously thought.

Furthermore, the "scalar" reading (9b) doesn't get formally specified in Krifka (1993) at all and has received much less attention in the literature than quantificational *only*. It is therefore certainly not only *my* intuition that what should be pursued is the establishment of a unified semantics for *only* which on the one hand gives the right results when applied to a broad range of categories and on the other hand derives both the quantificational and the various scalar interpretations. For that reason, I would like to elaborate on the following two hypotheses.

Hypothesis 1. Only *is always scalar (in a sense to be specified).*

Hypothesis 2. *The different readings of* only*-sentences are due to different scales associated with the focused elements.*

Scale for the "Quantificational Reading" (All-properties Scale)

In order to express the "quantificational" reading of *only* using a definition based on Krifka (1993) it might be helpful to take into account that an individual may be represented as the set of all its properties. When comparing different individuals, it is normally impossible to establish an order on these unless we decide beforehand what the ordering is supposed to express. However, if sums of individuals are taken into account as well, a partial order becomes salient naturally, viz. an order as in (10), which is of course related to the one in (6) above.

Think of a universe consisting of three individuals: the president (**p**), the vice-president (**v**) and the secretary of state (**s**) and their sums. They are represented in terms of generalised quantifiers (sets of properties) as the nodes of the graph. Here, 'the president' et al. are being treated as names. An arrow ('$\rightarrow$') should be read as '$\supseteq$'. Note, furthermore, that the null element – if we want to include it at all – does not correspond to the quantifier 'nobody' as one might perhaps assume but rather to the set $\mathcal{P}$ of all properties.

(10)

$$\begin{tikzcd}[column sep=small]
& & \lambda P.[P(\mathbf{p}) \wedge P(\mathbf{v}) \wedge P(\mathbf{s})] & & \\
\lambda P.[P(\mathbf{p}) \wedge P(\mathbf{v})] \arrow[urr] & & \lambda P.[P(\mathbf{p}) \wedge P(\mathbf{s})] \arrow[u] & & \lambda P.[P(\mathbf{v}) \wedge P(\mathbf{s})] \arrow[ull] \\
\lambda P.P(\mathbf{p}) \arrow[u] \arrow[urr] & & \lambda P.P(\mathbf{v}) \arrow[ull] \arrow[urr] & & \lambda P.P(\mathbf{s}) \arrow[ull] \arrow[u] \\
& & \mathcal{P} \arrow[ull] \arrow[u] \arrow[urr] & &
\end{tikzcd}$$

The graph expresses statements like the following, that the set of properties which the president, the vice-president and the secretary of state have in common is smaller or equal than the set of properties that the president and the vice-president have in common, and that set is smaller than the set of properties the president has. If *only*, in the spirit of (3), is to operate on such a graph it will keep the quantifiers which are ranked lower than the one in focus but throw out those ranked higher.

Scale for the "Scalar Reading" (One-dimensional Scale)

There is, however, a possibility to compare individuals in a more direct way. This is what corresponds to the so-called "scalar interpretation" of *only*-sentences. In order to perform such a comparison, some contextual or otherwise salient information is necessary, which indicates the aspects according to which the different individuals are to be compared. For example, we might take a set $\mathcal{A}$ denoting authorities or powers. Then the subset $\lambda P.P(\mathbf{p}) \cap \mathcal{A}$ will represent the set of properties of the president that pertain to his authorities, for instance, the right to appoint ministers. I will write such an intersection as $[\lambda P.P(\mathbf{p})]^{\mathcal{A}}$. If we assume that there is always a way in which individuals can be ranked in terms of subsets of certain qualities, which they have (or don't have), and if the set $\mathcal{A}$ therefore is chosen in the appropriate way, then an ordering arises as in (11).[2]

(11) $[\lambda P.P(\mathbf{s})]^{\mathcal{A}} \subseteq [\lambda P.P(\mathbf{v})]^{\mathcal{A}} \subseteq [\lambda P.P(\mathbf{p})]^{\mathcal{A}}$

The obtained scale is a one-dimensional, a total order. It expresses that the set of relevant properties (e.g. authorities) that the secretary of state has is contained in that of the vice-president which is in turn contained in that of the president.[3]

[2] Landman (1989) describes in the second part of his article on groups how individuals can have different properties in different roles they play in society, e.g. John may have two jobs, as a judge and as a janitor, where John as a judge (denoted $j \upharpoonright J$) may have a different income than John as a janitor ($j \upharpoonright J'$). Although the intersections of quantifiers that I am using may have some similarities with Landman's restricted individuals they don't have the same closure conditions which Landman claims for the latter.

[3] Whether it is indeed always nested sets of progressively decreasing numbers of *authorities* on which the hierarchy between these people is legally founded is of course a matter of how things are in reality. Many

What we are doing here is to make a selection from the domain of properties. This selection emphasises a certain aspect with regard to which individuals are compared. The so-called "quantitative reading" of *only*-sentences is nothing more than the generalisation of that comparison to all properties that make up the individuals. This will then lead back to the situation in which two individuals do not stand in the $\subseteq$ relation as could be read off the figure in (10) where it held, for instance, that $\lambda P.P(\mathbf{v}) \not\subseteq \lambda P.P(\mathbf{p})$.

What remains to be done is to spell out the uniform reading of *only* in terms of a context parameter $\mathcal{C}$, which accounts for the limitation towards a certain aspect of an individual. In this paper, I shall only concentrate on focus on nominals.

(12)
$$\begin{array}{ll} & \mathbf{only}(\langle B, F\rangle, \mathcal{C}) \\ = & \{w \in B(F) | \forall F' \in \textsc{Alt}(F)[w \in B(F') \rightarrow (F \cap \mathcal{C}) \subseteq (F' \cap \mathcal{C})]\} \end{array}$$

When applying this definition to example (4) we obtain the following result:

(13)
$$\{w \in \lambda w.(\exists x[\mathbf{apple}(x) \wedge \mathbf{ate}(\mathbf{j}x)](w)) | \forall \mathcal{Q} \in \textsc{Alt}[\![\textit{an apple}]\!] \\ [w \in ([\![\textit{John}]\!]([\![\textit{ate}]\!](\mathcal{Q}))) \rightarrow ([\![\textit{an apple}]\!] \cap \mathcal{C}) \subseteq (\mathcal{Q} \cap \mathcal{C})]\}$$

If we instantiate for $\mathcal{C}$ either the set $\mathcal{P}$ of all properties or the set $\mathcal{H}$ of all qualities concerning the healthiness of food we arrive at the two readings in (14).

(14)

a. $\{w \in \lambda w.(\exists x[\mathbf{apple}(x) \wedge \mathbf{ate}(\mathbf{j}x)](w)) | \forall \mathcal{Q} \in \textsc{Alt}[\![\textit{an apple}]\!]$
$[w \in ([\![\textit{john}]\!]([\![\textit{ate}]\!](\mathcal{Q}))) \rightarrow [\![\textit{an apple}]\!] \subseteq \mathcal{Q}]\}$

b. $\{w \in \lambda w.(\exists x[\mathbf{apple}(x) \wedge \mathbf{ate}(\mathbf{j}x)](w)) | \forall \mathcal{Q} \in \textsc{Alt}[\![\textit{an apple}]\!]$
$[w \in ([\![\textit{john}]\!]([\![\textit{ate}]\!](\mathcal{Q}))) \rightarrow ([\![\textit{an apple}]\!] \cap \mathcal{H}) \subseteq (\mathcal{Q} \cap \mathcal{H})]$

Disappointingly, neither of them gives us a correct result. The meaning in (14a) should be compatible with (15).

(15) John ate a green apple.

However, as the latter is not entailed by John's eating an apple (or rather $[\![\textit{an apple}]\!]$ is not a subset of $[\![\textit{a green apple}]\!]$), it will be excluded and likewise for all other colors; which results in the absurd claim that John's apple seems to have had no color at all.

The reading (14b) is compatible with all quantifiers denoting things which which are healthier than an apple, e.g. kiwis.[4] This, however, is what should have been *excluded* by the statement that John only ate an apple.

democracies feature a head of state equipped with less authorities than e.g. their head of government. In those cases the selection of properties establishing the hierarchy between them can not always be figured out as easily.

[4]Nutritionists may forgive me if I am mistaken here.

3 A Solution in Terms of Background Alternatives

There is a systematic reason why the above readings are bad. The authors van Rooij and Schulz (2005) point out that approaches quantifying over focus alternatives run into trouble if the focused constituent is an indefinite or a disjunction.

(16) a. John only kissed [Jane or Mary]$_F$.
b. John kissed Jane or Mary.
c. John kissed Jane.
d. John kissed Mary.

Sentence (16a) results in the exclusion of both (16c) and (16d), which, in combination with (16b), yield a contradiction. This is essentially the same problem as with (15) above. To overcome this serious shortcoming, van Rooij and Schulz (2005) (quoting von Stechow (1991) on an idea by Groenendijk and Stokhof (1984)), propose an account in terms of so-called background alternatives. The formulation in (17) is an adaptation of one of their definitions. As a qualification, the approach is only supposed to apply to upward monotonic quantifiers[5] whose alternatives are likewise upward monotonic. This is in line with assumptions made in von Stechow and Zimmermann (1984) and von Stechow (1991).

(17)
$$\begin{aligned} & \textbf{only}\ \langle B, F\rangle \\ = \ & \{w \in W | (B(w))(F(w)) \wedge \neg\exists v \in W[(B(v))(F(v)) \wedge B(v) \subset B(w)]\} \end{aligned}$$

Applied to our example, this yields (18).

(18)
$$\begin{aligned} & \textbf{only}\ \langle \lambda\mathcal{Q}.[\![\textit{John}]\!]([\![\textit{ate}]\!](\mathcal{Q})), [\![\textit{an apple}]\!]\rangle \\ = \ & \{w \in W | [\![\textit{John ate an apple}]\!]^w \wedge \\ & \neg\exists v[[\![\textit{John ate an apple}]\!]^v \wedge \lambda y.[\textbf{ate}(\textbf{j}y)(v)] \subset \lambda y.[\textbf{ate}(\textbf{j}y)(w)]]\} \end{aligned}$$

What is going on here? The approach quantifies over possible worlds and only allows those worlds w to get added to the meaning of the *only*-sentence if the matrix clause $[\![\textit{John ate an apple}]\!]$ holds in them and the extension of the background predicate "being eaten by John" in w is minimal among all worlds in which the matrix clause holds. For (18) this will mean that the meaning of the sentence consists of only those worlds in which John ate an apple and not more than that. This approach also solves the disjunction problem from example (16a), cf. (van Rooij and Schulz (2005), albeit maybe not as nicely as one would have hoped.[6]

[5] A quantifier $\mathcal{Q}$ is upward monotonic iff it holds that $\forall P \forall P'[(\mathcal{Q}(P) \wedge P \subset P') \rightarrow \mathcal{Q}(P')]$.

[6] As far as I can see, the approach in van Rooij and Schulz (2005) interprets *or* as exclusive disjunction. Consider a world w_1 in which John kissed Jane and nobody else, and a world w_2 with John kissing both

The problem with (18) for us is now that we are once more talking about extensions of predicates, i.e. sets of individuals, but as we saw in section (2), in order to describe both readings of *only* we need to be able to talk about quantifier meanings and sets of them. So we consider an equivalent representation to the one in (18), namely (19), which we obtain when we type-raise the background predicate to denote a function from quantifiers to truth values.

(19)

$$\begin{array}{rl} & \mathbf{only}\ \langle \lambda \mathcal{Q}.[\![John]\!]([\![ate]\!](\mathcal{Q})), [\![an\ apple]\!]\rangle \\ = & \{w \in W | [\![John\ ate\ an\ apple]\!]^w \wedge \\ & \neg\exists v[[\![John\ ate\ an\ apple]\!]^v \wedge \\ & \lambda \mathcal{Q}.[\mathcal{Q}(\lambda y.\mathbf{ate}(\mathbf{j}y))(v)] \subset \lambda \mathcal{Q}.[\mathcal{Q}(\lambda y.\mathbf{ate}(\mathbf{j}y))(w)]]\} \end{array}$$

While the ordering relation in (18) involved extensions containing individuals, e.g. $B(w_1) = \{a\}; B(w_2) = \{a,b\} \models B(w_1) \subset B(w_2)$, we are now dealing with extensions of predicates of type $\langle\langle\langle e,t\rangle, t\rangle, t\rangle$, like in (20).

(20)

$$\begin{array}{rrcl} & B'(w_1) & = & \{[\![an\ apple]\!], [\![something]\!], \ldots\} \\ & B'(w_2) & = & \{[\![an\ apple\ and\ a\ kiwi]\!], [\![an\ apple]\!], [\![a\ kiwi]\!], \\ & & & [\![something]\!], [\![at\ least\ two\ things]\!], \ldots\} \\ \models & B'(w_1) & \subset & B'(w_2) \end{array}$$

It doesn't matter what the exact extensions are, what is important is the fact that the subset relations are preserved. The proof for this runs as follows: Assume two predicates A, B of type $\langle e,t\rangle$ and their type-raised counterparts A', B' of type $\langle\langle\langle e,t\rangle, t\rangle, t\rangle$, functions from upward monotonic quantifiers to truth values. We want to show that $A \subset B$ iff $A' \subset B'$.

First assume $A \subset B$. We define $A' := \lambda\mathcal{Q}.\mathcal{Q}(A)$, $B' := \lambda\mathcal{Q}.\mathcal{Q}(B)$ and assume a quantifier $\mathcal{Q}_1 \in A'$. It holds that $[\lambda\mathcal{Q}.\mathcal{Q}(A)](\mathcal{Q}_1)$ and therefore $\mathcal{Q}_1(A)$. By monotonicity and our initial assumption it follows that $\mathcal{Q}_1(B)$ from which we get, by λ-abstraction, $[\lambda\mathcal{Q}.\mathcal{Q}(B)](\mathcal{Q}_1)$ or, equivalently, $\mathcal{Q}_1 \in B'$. We have, therefore, shown that $A \subset B \models A' \subset B'$.

In the reverse direction, we assume $A' \subset B'$ and $x \in A$. The quantifier $\mathcal{Q}_2 = \lambda P.P(x)$ thus holds for A, i.e. $\mathcal{Q}_2(A)$. By λ-abstraction this is equivalent to $(\lambda\mathcal{Q}.\mathcal{Q}(A))(\mathcal{Q}_2)$ or

Jane and Mary. A non-exclusive interpretation of *or* should make (16a) true in w_2. However as the background predicate is not minimal in w_2 (after all, there is also w_1), (17) will predict the exclusion of w_2. I admit that this *is* actually a way how the sentence (16a) can be understood; so after all the effect might not been unwanted. In any case, this problem does not immediately carry over to the cases of indefinites that I am discussing.

$A'(\mathcal{Q}_2)$. From our initial assumption we get $B'(\mathcal{Q}_2)$, therefore $\mathcal{Q}_2(B)$ and thus $x \in B$. We have proved that $A' \subset B' \models A \subset B$.

After many detours we have reached a satisfactory stage concerning the formulation of what used to be the "quantificational" reading of *only*. But what about the "scalar" reading? In section (2), I argued for the introduction of a contextual variable that tells us whether to take the entire quantifier meanings of the focused constituent into account or to limit our view to certain classified properties contained in that quantifier. A similar move will be proposed below although the approach is still not as homogeneous as what one probably would like to achieve eventually. My final definition for *only* is (21).

(21) $$\begin{aligned} & \mathbf{only}(\langle B, F\rangle, \mathcal{C}) \\ = \; & \{w \in W | (B(w))(F(w)) \wedge \neg\exists v[(B(v)(F(v)) \wedge [B(v)]^{\mathcal{C}} \subset [B(w)]^{\mathcal{C}}]\} \end{aligned}$$

B applied to some world w is again a set of quantifiers. But it may become subject to some modifications. First, we define the quantifier intersection of $B(w)$ with a context variable $\mathcal{C}$ of the type of a set of predicates.

(22) $$[B(v)]^{\mathcal{C}} := \begin{cases} \textit{if } \mathcal{C} = \mathcal{P}: & \{\mathcal{Q}^{\mathcal{C}} | \mathcal{Q} \in B(v)\} = \{\mathcal{Q} \cap \mathcal{C} | \mathcal{Q} \in B(v)\} \\ \textit{otherwise}: & \bigcup\{\mathcal{Q}^{\mathcal{C}} | \mathcal{Q} \in B(v)\} \\ & = \{(\mathcal{Q}_1 \cap \mathcal{C}) \cup \cdots \cup (\mathcal{Q}_n \cap \mathcal{C}) | \mathcal{Q}_{i;1\leq i\leq n} \in B(v)\} \end{cases}$$

If $\mathcal{C}$ is the set of all properties we will receive the meaning in (19). However, for $\mathcal{C} = \mathcal{H}$, a set of properties denoting certain qualities we receive for $[B(v)]^{\mathcal{H}}$ the union of the properties contained in the quantifiers intersected with $\mathcal{H}$. This should give us one of the "scalar" interpretations for "John only ate an APPLE$_F$", namely (23).

(23) $$\begin{aligned} & \mathbf{only}\ \langle \lambda\mathcal{Q}.[\![\textit{John}]\!]([\![\textit{ate}]\!](\mathcal{Q})), [\![\textit{an apple}]\!]\rangle \\ = \; & \{w \in W | [\![\textit{John ate an apple}]\!]^w \wedge \\ & \neg\exists v[[\![\textit{John ate an apple}]\!]^v \wedge \mathbf{Y}_v \subset \mathbf{Y}_w]\} \end{aligned}$$

Here, $\mathbf{Y}_w$ stands for the set $\bigcup\{\mathcal{Q} \cap \mathcal{H} | \mathcal{Q} \in \lambda\mathcal{Q}.[\mathcal{Q}(\lambda y.\mathbf{ate}(\mathbf{j}y))(w)]\}$, i.e. the union of all the property-denoting sets obtained by intersecting the quantifiers in the denotation of the background in world w with the set $\mathcal{H}$ of health properties.

The following assumptions shall be made: we assume again that John ate an apple in w_1, an apple and a kiwi in w_2, as well as, an apple and a peanut in w_3. All sets $B(w_i)$ for $1 \leq i \leq 3$ will contain at least the objects $[\![\textit{something}]\!]^{\mathcal{H}}$ and $[\![\textit{an apple}]\!]^{\mathcal{H}}$. $B(w_2)$ will additionally contain at least $[\![\textit{a kiwi}]\!]^{\mathcal{H}}$ and $[\![\textit{an apple and a kiwi}]\!]^{\mathcal{H}}$. Furthermore, $B(w_3)$ will contain at least $[\![\textit{a peanut}]\!]^{\mathcal{H}}$ and $[\![\textit{an apple and a peanut}]\!]^{\mathcal{H}}$. The set $\mathcal{H}$ will impose the scale in (24) on the quantifiers.

(24) $[\![\textit{a peanut}]\!]^{\mathcal{H}} \subseteq [\![\textit{an apple}]\!]^{\mathcal{H}} \subseteq [\![\textit{a kiwi}]\!]^{\mathcal{H}}$

If we now take the unions of the elements in $B(w_i)$ as prescribed by (21) and (22) we obtain the following results. If there is at least one health property P which is an element of $[\![a\ kiwi]\!]^{\mathcal{H}}$ but not of $[\![an\ apple]\!]^{\mathcal{H}}$ we get that $\mathbf{Y}_{w_1} \subset \mathbf{Y}_{w_2}$; in other words, world w_2 is going to be excluded.

On the other hand, as for every health property $P' \in [\![a\ peanut]\!]^{\mathcal{H}}$ it also holds that $P' \in [\![an\ apple]\!]^{\mathcal{H}}$, we get $\mathbf{Y}_{w_1} = \mathbf{Y}_{w_3}$ which includes world w_3.

Our reading (23) would thus be compatible with (25a) but not (25b) which is the desired outcome for the scalar interpretation of "John only ate an apple".

(25) a. John ate a peanut.
b. John ate a kiwi.

4 Summary

I presented an approach for a unified meaning definition for *only* accounting for both the "quantificational" and the "scalar" reading. In order to do this certain deliberations were necessary concerning quantifiers and possibilities of how to rank them. If no further information is given, it is possible to rank quantifiers and their sums according to their mereological order. If a certain aspect is known according to which quantifiers shall be compared, i.e. a certain class of properties highlighting the desired mode of comparison, this can be spelled out in terms of intersections between the quantifiers. In both cases *only* operates on the available scales. In order to make things work and to avoid problems with disjunctions and indefinites a framework based on background alternatives, taken from von Stechow (1991) and van Rooij and Schulz (2005), is being used.

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