Only wholes, but also their parts

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https://martinabreu.net/owlima.pdf

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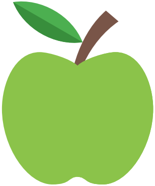
A



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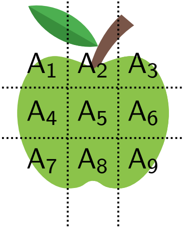

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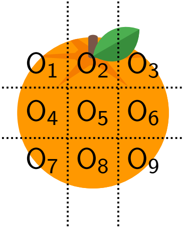
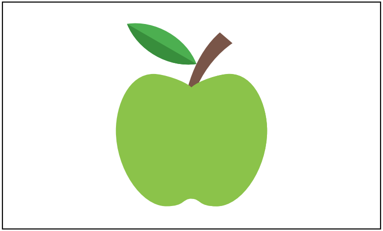


What's in the box?



What's in the box?

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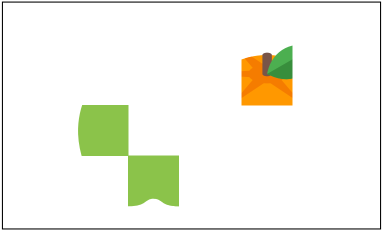
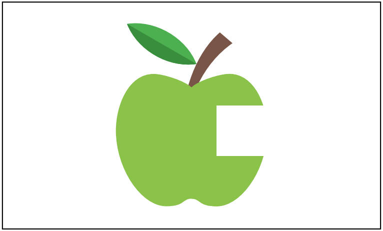


What's in the box?



What's in the box?

(1) Only A is in the box. [Assumption]

(2) So A is in the box. [From 1]

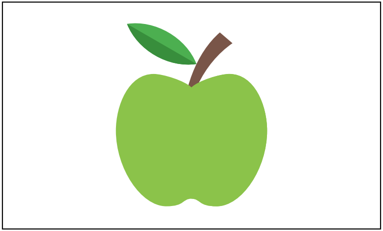
(3) If A is in the box, then at least one of $A_1, \ldots, A_9$ is in the box. [Assumption]

(4) So at least one of $A_1, \ldots, A_9$ is in the box. [From (2), (3)]

(5) $A_1, \ldots, A_9$ are numerically distinct from A. [By Lebiniz's Law]

(6) So there are at least two things in the box; i.e., A and at least one of $A_1, \ldots, A_9$. [From (2), (4), (5)]

(7) So not only A is in the box. [From (6)]



Plan

Against the inference from (6) to (7)

Domain shift

A scalar analysis

Against the inference from (6) to (7)

If the inference is valid, then (6) should be inconsistent with (1).

To show: (6) is consistent with (1).

Against the inference from (6) to (7)

Felicitous rejection: If S and S' are inconsistent, then it is felicitous to reject S with S'.

Against the inference from (6) to (7)

Examples:

(8) X: Grass is blue.
    Y: # No, grass is short.

Against the inference from (6) to (7)

Felicitous Rejection shows that (6) and (1) are consistent (inspired by Kratzer (2012)).

(1) Only A is in the box.

(9) # No, A's undetached parts are also in the box.

(10) # No, A's stem is also in the box.

(11) # No, both A and A_1 are in the box.

Against the inference from (6) to (7)

All of (9)–(11) entail that there are at least two things in the box (via Leibniz's Law).

So if (6) were inconsistent with (1), then (9)–(11) should be felicitous (by Felicitous Rejection).

Against the inference from (6) to (7)

More naturally:

(12) The apple is the only thing in the box.

(13) # No, the apple's undetached parts are also in the box.

(14) # No, the apple's stem is also in the box.

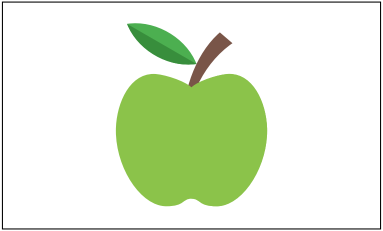
(15) # No, both the apple and one of its parts are in the box.

Against the inference from (6) to (7)

All of (13)–(15) entail that there are at least two things in the box (via Leibniz's Law).

So if (6) were inconsistent with (12), then (13)–(15) should be felicitous (by Felicitous Rejection).

Against the inference from (6) to (7)



Domain shift

Domain shift:

(6) and (1) are interpreted relative to different domains, and this makes the two consistent. The inference from (6) to (7) is like a fallacy of equivocation. (Casati and Varzi 1999; Fine 2006; Miller 2021; Heller p.c.)

Domain shift

A toy semantic value for (1), based on Horn (1969):

$[\![\text{Only A is in the box}]\!]^D$ presupposes that A is in the box.

$[\![\text{Only A is in the box}]\!]^D = 1$ iff $\forall x \in D(x \neq \text{A} \rightarrow \neg x \text{ is in the box})$

Domain shift

$D_1 = \{\text{A}, \text{A}_1, \ldots, \text{A}_9, \text{O}, \text{O}_1, \ldots, \text{O}_9\}$

$D_2 = \{\text{A}, \text{O}\}$

Domain shift

$[\![\text{There are at least two things in the box}]\!]^{D_1}$ is true iff at least A and A_1 are in the box, or at least A and A_2 are in the box, or ...

$[\![\text{Only A is in the box}]\!]^{D_2}$ is true iff O is not in the box.

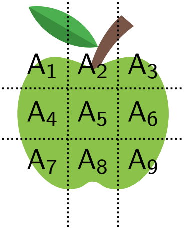
The two are consistent.

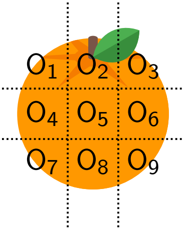
Domain shift

To show: $[\![\text{Only A is in the box}]\!]^{D_2}$ is not the preferred interpretation in this context (it might not even be available).

A

O





Domain shift

What's in the box?

(16) Only A is in the box, so $O_1/\ldots/O_9$ is not in the box.

(17) The apple is the only thing in the box, so the orange's stem is not in the box.

Against the domain-shift analysis

If (1) is interpreted relative to D_2, then (16) and (17) should express invalid inferences. Compare with:

(18) # Of A and O, only A is in the box; so $O_1/\ldots/O_9$ is not in the box.

(19) # O is not in the box, so $O_1/\ldots/O_9$ is not in the box.

(20) # The orange is not in the box, so none of its parts is in the box.

Domain shift

Domain shift analysis for (7):

$[\![\text{Not only A is in the box}]\!]^{D_2}$ presupposes that A is in the box.

$[\![\text{Not only A is in the box}]\!]^{D_2}$ asserts that O is in the box.

Against the domain-shift analysis

If (7) is interpreted relative to D_2, then (21) should express a valid inference.

(21) #Not only A is in the box, so everything is in the box.

(22) #The apple is not the only thing in the box, so everything is in the box.

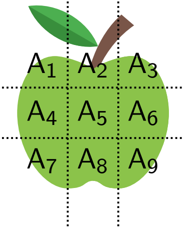
But these inferences seem invalid in the present context. Evidence for this is that the following rejection of (21) is reasonable:

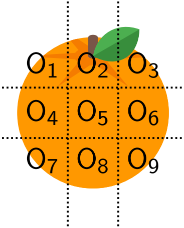
(23) That doesn't follow; $O_1/\ldots/O_9$ might not be in the box.

(24) That doesn't follow; at least one of the orange's parts might not be in the box.

A

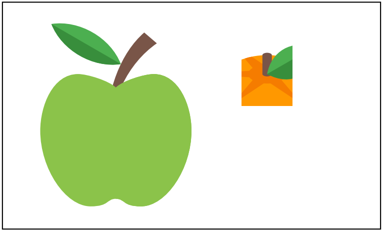
O





Domain shift

What's in the box?

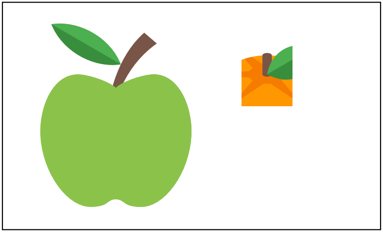


Domain shift

What's in the box?

(1) ✗ Only A is in the box

(12) ✗ The apple is the only thing in the box

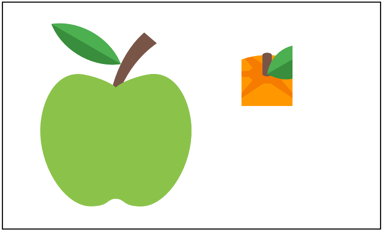


Domain shift

What's in the box?

(25) ✓ Not only A is in the box

(26) ✓ The apple is not the only thing in the box



Domain shift

Conclusion: $[\![\text{Only A is in the box}]\!]^{D_2}$ is not the preferred interpretation in this context.

A scalar analysis

S = a state of the conversation

$\mathsf{I_S}$ = the conversation's common ground

$\mathsf{QUD_S}$ = the question under discussion in the conversation

$\geq_S$ = a contextually determined strength ranking on $\mathsf{QUD_S}$

A scalar analysis

Coppock and Beaver's (2013) entry for "only":

(27) $\text{min}_S(p) = \lambda w.\exists p' \in \text{QUD}_S.p'(w) \wedge p' \geq_S p$

(28) $\text{max}_S(p) = \lambda w.\forall p' \in \text{QUD}_S.p'(w) \rightarrow p \geq_S p'$

(29) $[\![\text{only}]\!]^S = \lambda p.\lambda w : \text{min}_S(p)(w).\, \text{max}_S(p)(w)$

A scalar analysis

$\min_S(p)$ says that some answer to QUD at least as strong as p is true.

$\max_S(p)$ says that no answer to QUD stronger than or incomparable to p is true.

$\ulcorner$only $\phi\urcorner$ presupposes that an answer to QUD at least as strong as $[\![\phi]\!]^S$ is true, and asserts that nothing stronger than $[\![\phi]\!]^S$ or incomparable with it is true.

A scalar analysis

a = A is in the box
a_1 = A_1 is in the box
$\vdots$

A scalar analysis

QUD_S = all combinations of $a, a_1, \ldots, a_9, o, o_1, \ldots, o_9$

A scalar analysis

$$
\begin{tikzcd}
 & ao \arrow[ddr] & & & & \\
 & ao_1 \arrow[dr] & & & a_1 \ldots a_8 \arrow[r] \arrow[dr] & a_1 \\
\cdots & & a \arrow[r] & a_1 \ldots a_9 \arrow[ur] \arrow[r] \arrow[dr] & a_1 \ldots a_7, a_9 \arrow[ur] \arrow[dr] & a_2 \\
 & ao_2 \arrow[ur] & & & a_1 \ldots a_7 a_8 a_9 \arrow[ur] \arrow[r] & a_3 \\
 & ao_3 \arrow[uur] & & & \vdots & \vdots \\
 & \vdots & & & &
\end{tikzcd}
$$

A scalar analysis

Predictions using this choice of $\geq_S$:

(30) $[\![$Only A is in the box$]\!]^S$ presupposes that at least A is in the box.

(31) $[\![$Only A is in the box$]\!]^S$ asserts that nothing stronger than *a* is true.

A scalar analysis

(1) is consistent with "$A_1/\ldots/A_9$ is in the box"

(1) is consistent with (6)—"there are at least two things in the box [A and A_1, ..., A_9]".

(1) is inconsistent with "$O/O_1/\ldots/O_9$ is in the box"

A scalar analysis

Is there a natural relation between propositions corresponding to this choice of $\geq_S$?

A scalar analysis

First stab: $\geq_S$ is local entailment (Yablo, 2006).

A scalar analysis

P **locally entails** Q in *w* iff Q is true in every situation in *w* in which P is true.

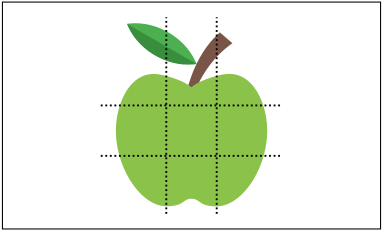
A scalar analysis

Roughly, situations are parts of worlds, and worlds are maximal consistent situations.

A scalar analysis

Assumption: if x is part of y, and y is fullly in a certain region of space at w, then every situation in w in which y is fully in that region is a situation in which x is fully in that region.

A scalar analysis



A scalar analysis

Every situation in w_0 in which A is in the box is a situation in which its parts are in the box. None of O or its parts are in the box. Then:

> At w_0: a locally entails $a_1, \ldots, a_9$ and their conjunctions.
>
> At w_0: $o, o_1, \ldots, o_9$ and anything that has them as conjuncts locally entail everything.

A scalar analysis

Where $\geq_S$ is local entailment at w_0:

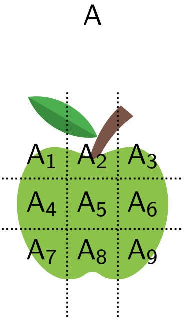
A scalar analysis

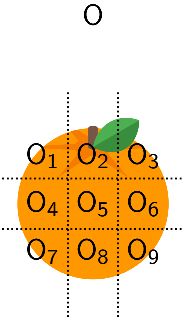
$$
\begin{tikzcd}
 & ao \arrow[ddr] & & & & \\
 & ao_1 \arrow[dr] & & & a_1 \ldots a_8 \arrow[r] \arrow[dr] & a_1 \\
\cdots & & a \arrow[r] & a_1 \ldots a_9 \arrow[ur] \arrow[r] \arrow[dr] & a_1 \ldots a_7, a_9 \arrow[uur, start anchor=east] \arrow[dr] & a_2 \\
 & ao_2 \arrow[ur] & & & a_1 \ldots a_7 a_8 a_9 \arrow[r] \arrow[ur] & a_3 \\
 & ao_3 \arrow[uur] & & & \vdots & \vdots \\
 & \vdots & & & &
\end{tikzcd}
$$

A scalar analysis

What's so special about w_0 or relevantly similar worlds?

What's in the box?





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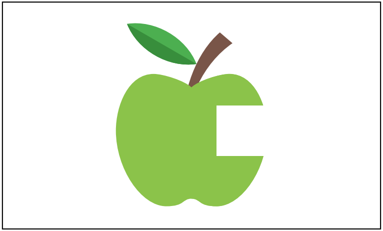

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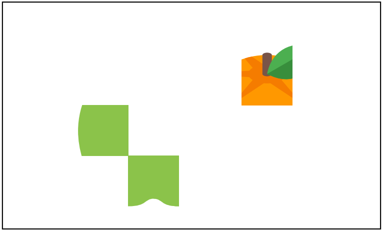

A scalar analysis

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A scalar analysis

Coppock and Beaver's (2013) entry for "only":

(27) $\text{min}_S(p) = \lambda w.\exists p' \in \text{QUD}_S.p'(w) \wedge p' \geq_S p$

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(29) $[\![\text{only}]\!]^S = \lambda p.\lambda w : \text{min}_S(p)(w).\, \text{max}_S(p)(w)$

A scalar analysis

Amendment: $\leq_S$ is world-sensitive, so min and max should be world-sensitive too.

A scalar analysis

(32) $\min_S(p) = \lambda w.\exists p' \in \text{QUD}_S.p'(w) \wedge \forall w' \in I_S.p' \geq_{S,w'} p$

(33) $\max_S(p) = \lambda w.\forall p' \in \text{QUD}_S.\forall w' \in I_S(p \not\geq_{S,w'} p') \rightarrow \neg p'(w)$

(29) $[\![\text{only}]\!]^S = \lambda p.\lambda w : \min_S(p)(w). \max_S(p)(w)$

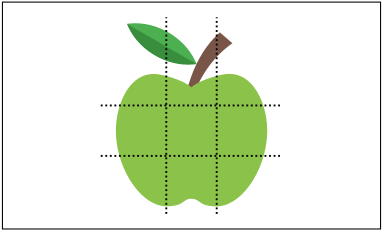
A scalar analysis

$[\![\text{Only A is in the box}]\!]$ presupposes that an answer to QUD at least as strong as a relative to each $w \in I_S$ is true.

$[\![\text{Only A is in the box}]\!]$ asserts that no answer to QUD stronger than or incomparable to a relative to every $w \in I_S$ is true.

A scalar analysis

$a \geq_{s,w} a_1, \ldots, a_9$ in worlds in which A_1, ... and A_9 are undetached from A,

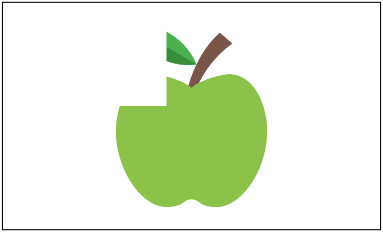


A scalar analysis

$$
\begin{tikzcd}
 & ao \arrow[ddr] & & & & \\
 & ao_1 \arrow[dr] & & & a_1 \ldots a_8 \arrow[r] \arrow[dr] & a_1 \\
\cdots & & a \arrow[r] & a_1 \ldots a_9 \arrow[ur] \arrow[r] \arrow[dr] & a_1 \ldots a_7, a_9 \arrow[ur] \arrow[dr] & a_2 \\
 & ao_2 \arrow[ur] & & & a_1 \ldots a_7 a_8 a_9 \arrow[ur] \arrow[r] & a_3 \\
 & ao_3 \arrow[uur] & & & \vdots & \vdots \\
 & \vdots & & & &
\end{tikzcd}
$$

A scalar analysis

$a \not\geq_{s,w} a_i$ in worlds in which $\mathsf{A_i}$ is detached from A.



A scalar analysis

$$
\begin{tikzcd}[row sep=small]
 & & & a_1 & & \\
 & ao \arrow[ddr] & & & & \\
 & ao_1 \arrow[dr] & & & a_2 \ldots a_8 \arrow[r] \arrow[dr] & a_2 \\
\ldots & & a \arrow[r] & a_2 \ldots a_9 \arrow[ur] \arrow[r] \arrow[dr] & a_2 \ldots a_7, a_9 \arrow[ur] \arrow[dr] & a_3 \\
 & ao_2 \arrow[ur] & & & a_2 \ldots a_7 a_8 a_9 \arrow[ur] \arrow[r] & a_4 \\
 & ao_3 \arrow[uur] & & & \vdots & \vdots \\
 & \vdots & & & &
\end{tikzcd}
$$

A scalar analysis

$[\![$Only A is in the box$]\!]$ presupposes that at least A is in the box.

$[\![$Only A is in the box$]\!]$ asserts that none of $ao, ao_1, ao_2, \ldots$ are true.

Conclusion

Diagnosed the problem with the initial argument.

Argued that the domain-shift view is not successful.

Presented a scalar analysis using the notion of local entailment.

Conclusion

Bad news for some restrictions on quantificational domains

Casati and Varzi on inventories (1999, p. 112):

> *[E]very admissible way of drawing up an inventory must satisfy a non-redundancy condition: If x properly overlaps y and y is included in the inventory, then x is not itself to be included. This avoids double counting.*

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Appendix A

More against the domain restriction view:

(34) # A piece of the orange is in the box, but the apple is the only thing in the box.

(35) A piece of the orange is in the box, but the orange is not in the box.

(36) # The apple is the only thing in the box, but a piece of the orange is in the box.

(37) The orange is not in the box, but a piece of the orange is in the box.

Appendix A

Other relevant inferences:

(38) # Only A is in the box, so A has no proper parts.

(39) # The apple is the only thing in the box, so the apple has no proper parts.

(40) Only A's parts are in the box, so only A is in the box.

(41) Only the apple's parts are in the box, so only the apple is in the box.

Appendix A

Compare with:

(42) Everyone I've met likes apples, but not everyone likes apples.

(43) #Everyone likes apples, but not everyone I've met likes apples.

Appendix B

Following Fine (2017) let a modalized state space be a triple $\langle S, S^{\Diamond}, \sqsubseteq \rangle$ such that:

$S \neq \varnothing$ and each subset of S has a least upper bound in S.

$S^{\Diamond} \subseteq S$ such that if $s \in S^{\Diamond}$ and $t \sqsubseteq s$, then $t \in S^{\Diamond}$.

$\sqsubseteq$ is a partial order on S.

Appendix B

Intuitively,

S is a set of situations.

$S^\Diamond$ is the set of *possible*/*consistent* situations.

$\sqsubseteq$ is a parthood relation on S.

Appendix B

Where $X \subseteq S$ with members $x_1, x_2, \ldots$, we let $x_1 \sqcup x_2 \sqcup \ldots$ be their least upper bound, i.e., their **fusion**.

Appendix B

Possible worlds are maximal consistent fusions of situations.

I.e., $w \in S$ is a possible world iff $w \in S^{\Diamond}$ and any state in $S^{\Diamond}$ is either part of w or incompatible with w.

Appendix B

Propositions are ordered pairs of sets of situations.

Appendix B

$$P = \langle P^+, P^- \rangle$$

P^+ is the set of P's verifiers/truthmakers.

P^- is the set of P's falsifiers/falsemakers.

Appendix B

$[\![\cdot]\!]$ is an interpretation function from sentences of a given language to propositions, such that:

If ϕ is atomic, then $[\![\phi]\!] = \langle X, Y \rangle$ for $X, Y \subseteq S$.

$[\![\neg\phi]\!] = \langle X, Y \rangle$ such that $[\![\phi]\!] = \langle Y, X \rangle$.

$[\![\phi \wedge \psi]\!] = \langle X, Y \rangle$ such that:

(i) $X = \{s \sqcup t : s \in [\![\phi]\!]^+ \text{ and } t \in [\![\psi]\!]^+\}$
(ii) $Y = [\![\phi]\!]^- \cup [\![\psi]\!]^-$

$[\![\phi \vee \psi]\!] = \langle X, Y \rangle$ such that:

(i) $X = [\![\phi]\!]^+ \cup [\![\psi]\!]^+$
(ii) $Y = \{s \sqcup t : s \in [\![\phi]\!]^- \text{ and } t \in [\![\psi]\!]^-\}$

Appendix B

$$P^+(w) = \{s \in P^+ : s \sqsubseteq w\}$$

$$P^-(w) = \{s \in P^- : s \sqsubseteq w\}$$

Appendix C

Contextual entailment: P contextually entails Q in context S iff Q is true in every world in I_S in which P is true.

Beaver and Clark (2009); Coppock and Beaver (2013); Liu (2017); Schwarzschild (ript). Motivated by a similar problem raised by Bonomi and Casalegno (1993).

Appendix C

Common ground: $A_1, \ldots, A_9$ are attached to A.

Prediction: (1) presupposes that A, $A_1, \ldots, A_9$ are in the box. Insofar as sentences are consistent with their presuppositions, (1) is consistent with (6).

Appendix C

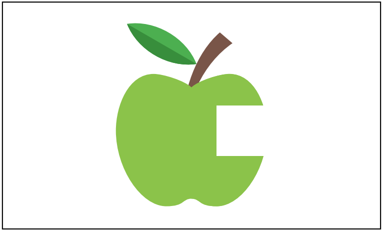
This choice of $\geq_S$ also predicts that (44) and (45) should be false in the present context, but they seem true in the present context.

(44) It might be that only A without $A_1/\ldots/A_9$ is in the box.

(45) It might be that the apple is the only thing in the box, but it's missing one of its parts.

Remember: we don't know what's in the box.

Appendix C



Appendix C

The problem: in the present context, we're simply not assuming that $A_1, \ldots, A_9$ are undetached from A.

Appendix C

More generally, "only" doesn't seem to interact with background information, on pain of weird predictions.

Appendix C

Add a third fruit B and its parts. We still want to know what's in the box.

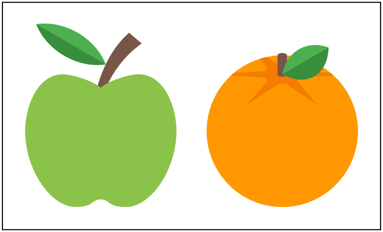
Common ground: if A is in the box, so is O.

$[\![\text{Only A is in the box}]\!]^S$ presupposes that A and O are in the box.

$[\![\text{Only A is in the box}]\!]^S$ asserts that B is not in the box.

Appendix C

The view predicts that, against this background information, (1) should be true in the following situation:



Appendix C

Assuming that $\geq_S$ is contextual entailment leads to further weird predictions (assuming there is a third fruit B):

(46) # Suppose that if A is in the box then O is in the box, and only A is in the box.

(47) # Suppose that A and O are in the box, and only A is in the box.

(48) # If A and O are in the box but B isn't, then only A is in the box.

Appendix C

If $\geq_S$ were contextual entailment, then $a \geq_S o$ in those contexts, so "only A is in the box" should presuppose that at least A and O are in the box, and thus be compatible with the information in the supposition context. So (46)-(48) should be felicitous.

Appendix C

Compare with:

(49) Suppose that Clara used to smoke but she stopped.

(50) If Clara used to smoke, then she stopped.