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The parts of *only*: Effects of mereology in the semantics of *only*[*]

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Abstract Traditionally, *only* is thought to negate non-weaker alternatives. Kratzer's (1989) still life example, presented more than thirty years ago, challenges this purely logical approach to the semantics of *only*, appearing to show that the constitution of objects matters to what *only* negates. This paper reexamines Kratzer's example in the light of later developments in the literature on *only*. We discuss four types of responses: (i) uphold the traditional view of *only* supplemented by lexical postulates (van Rooij 2005), (ii) adopt an innocent exclusion semantics for *only* (Fox 2007), (iii) replace entailment in the meaning of *only* with 'lumping', a variant of entailment defined in terms of situation semantics (von Fintel 1997; Bonomi & Casalegno 1993; Kadmon 2001), (iv) following Kratzer's (1989) suggestion, appeal to a general no-overlap constraint on counting domains. We show that all approaches but (iv) face empirical challenges. Despite some loose ends, we favour (iv) in the comparison, as it faces no clear empirical challenges, though significant work remains to be done.

Keywords: *Only*, entailment, situation semantics, lumping, innocent exclusion, still life

> One might have thought that this is not much more than a simple homework assignment for a graduate course in natural language semantics. Instead, we get quickly entangled in a thicket of issues...
>
> (von Fintel 1997: 4)

1 Introduction

Ever since Horn (1969), linguists have puzzled over the meaning of *only*. It has some captivating properties: it is focus-sensitive (Rooth 1985), exhibits strong parallels with scalar implicatures (van Rooij & Schulz 2004; Fox & Spector 2018), and appears sensitive to logical relations such as entailment (Schwarzschild 1993).

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Some have suggested that *only* takes into account not simply which propositions are true or false in a given world, but also in which *parts* of the world they are true or false (Kratzer 1989, 2012). On this approach, the semantics of *only* calls for a more fine-grained semantic framework, representing not only whole possible worlds, but also their parts—called *situations*—and the parthood relations between them.

The impetus for this change comes from Kratzer's (1989) still life example. Suppose that yesterday evening, Paula painted a still life with apples and bananas. Naturally, she did other things besides: she made a cup of tea, ate a piece of bread, and so on. If asked what she did yesterday evening, she might reply:

(1) The *only* thing I did yesterday evening was paint this still life over there.

Kratzer considers two replies to what Paula said.

(2) a. *Pedant:* This cannot be true. You must have done something else like eat, drink, look out of the window.

b. *Lunatic:* That is not true. You *also* painted these apples and you *also* painted these bananas. Hence painting a still life was not the only thing you did yesterday evening.

The first is pedantic but strictly speaking correct. The second, however, is quite troubling. It seems to misunderstand what Paula said.

The goal of this paper is to evaluate four responses to Kratzer's example, as well as related examples, coming from later developments in the literature on only.

1. Entailment. Despite appearances, 'Paula painted this still life' in fact entails 'Paula painted these apples', for example in combination with meaning postulates (van Rooij 2005), and can therefore be handled by existing semantics of *only* in terms of entailment (Schwarzschild 1993).

2. Lumping *only*. Reformulate the semantics of *only* in terms of Kratzer's (1989) notion of lumping, defined in terms of situations (Bonomi & Casalegno 1993; von Fintel 1997; Kadmon 2001; Fox 2003).

3. Innocent exclusion. Adopt Fox's (2007) semantics of *only* in terms of innocent exclusion, together with the assumption that the alternatives exhaust the ways for Paula to paint a still life. Negating every way for Paula to paint a still life is inconsistent with her painting a still life, and since *only* cannot negate all of these alternatives, by symmetry, it negates none of them.

4. No overlap. Add a constraint on the set of alternatives stating that the alternatives do not 'overlap' in the relevant sense (Kratzer 1989), analogous to bans on overlap in counting domains (Casati & Varzi 1999; Chierchia 2010).

2 Entailment *only*

Researchers looking for a theory of *only* today are spoilt for choice.[1] While there is a wide variety of theories available, there is also widespread agreement on some basic points. *Only* negates alternatives, where these alternatives are determined by context together with the focus structure of *only*'s prejacent (Rooth 1985). For concreteness, here we will focus on one popular approach to the meaning of *only* going back to Schwarzschild (1993), according to which *only* negates non-weaker alternatives—those not entailed by the prejacent.

(3) **Entailment *only*.** Given a set of alternatives C, $only_C\ A$ presupposes A and asserts that every alternative in C that A does not entail is false.

This gets many cases right. When *only*'s prejacent doesn't entail the alternative, as in (4), the alternative is negated (assuming that *all* is an alternative to *some*, *three* to *two*, and *often* to *sometimes*).

(4) a. Zara only read $[\text{some}]_F$ of the books. $\Rightarrow$ She didn't read all of the books.
b. Zara only had $[\text{two}]_F$ slices. $\Rightarrow$ She didn't have three.
c. Zara only visits $[\text{sometimes}]_F$. $\Rightarrow$ She doesn't visit often.

Conversely, when the prejacent does entail the alternative, as in (5), the alternative is not negated (again assuming that *Lavinia* is an alternative to *Lavinia and Tehanu*, *vegetables* to *broccoli*, and *China* to *Beijing*).

(5) a. Zara only read [*Lavinia* and *Tehanu*]$_F$. $\not\Rightarrow$ She didn't read *Lavinia*.
b. Zara only ate $[\text{broccoli}]_F$. $\not\Rightarrow$ She didn't eat vegetables.
c. Zara only visited $[\text{Beijing}]_F$. $\not\Rightarrow$ She didn't visit China.

Kratzer's problem is interesting since one might argue that 'Paula painted this still life over there' does *not* entail that she painted apples. For the still life could have had different contents. In that case, we would expect entailment *only* to negate that she painted apples. This is the lunatic's reply, and not what we observe.

One might reply, however, that a painting's contents are essential to it, in the sense that part of what it means for an entity to be 'this still life' is to have the contents that it actually has. Or one might treat 'this still life' as a name, arguing that it rigidly designates the particular object that it does (see Marcus 1961; Kripke 1972).

However, it is easy to find variants of Kratzer's example where the entailment relation clearly does not hold. We may replace 'this still life' with 'a still life', as in (6a), or consider examples such as (6b), due to von Fintel (1997: example 31).

1 Examples include Horn 1969, Rooth 1985, Krifka 1992, Bonomi & Casalegno 1993, Spector 2003, 2007, van Rooij & Schulz 2004, von Fintel 1997, Fox 2007, and Del Pinal 2021.

(6) a. Paula only painted [a still life]$_F$. $\not\Rightarrow$ Paula didn't paint apples.
b. It only rained in [Medford]$_F$. $\not\Rightarrow$ It didn't rain on the Mayor's house.
c. I only painted the wall [red]$_F$. $\not\Rightarrow$ I didn't paint the wall crimson.
d. I only visited [China]$_F$ this summer. $\not\Rightarrow$ I didn't visit Beijing.

The sentences on the right are not negated, even though their negation is consistent with *only*'s prejacent. It is perfectly consistent to say 'I painted a still life but not apples'. Similarly, as von Fintel (1997) points out, 'It rained in Medford' does not logically entail that it rained on every single part of Medford: 'It rained in Medford but not on the Mayor of Medford's house' is consistent.[2] Likewise, *red* does not entail *crimson*, nor does visiting China entail visiting Beijing.

Entailment *only* generates incorrect predictions for (6) assuming that these sentences are bona fide alternatives to *only*'s prejacent; namely, that 'apples' is an alternative to 'a still life', 'on the Mayor's house' to 'in Medford', 'crimson' to 'red', and 'Beijing' to 'China'. How plausible is this assumption? On the structural approach to alternatives (Katzir 2007; Fox & Katzir 2011), alternatives must be no more complex than the original utterance, a constraint these alternatives satisfy, apart from von Fintel's example (6b). In addition, one may also require the alternatives to be contextually relevant. It is easy to imagine contexts where this constraint is met; for instance, contexts where we have a jar of crimson paint, or where the speaker visits Beijing often. It therefore seems plausible that these count as genuine alternatives to the utterances in question, at least in some contexts.

Contextual assumptions. Alternatively, one might propose that 'Paula painted a still life' entails that she painted an apple with the help of additional contextual assumptions. This strategy is pursued by van Rooij:

> To account for [Paula only painted [a still life]$_F$] we don't need Kratzer's world-dependent entailment relation she called 'lumping', but just limit the worlds under consideration to those that satisfy the *meaning postulate* saying that for every individual x if x paints something, x also paints all of its parts. (van Rooij 2005: 753)

The thought is that when the still life contains apples, 'Paula painted a still life', together with this meaning postulate, entails that she painted apples.

2 von Fintel's argument here could be controversial. The most natural understanding of 'It's raining in Europe' is not simply that 'It's raining somewhere in Europe', but raining over a significant portion of Europe. The quasi-universal truth conditions of this sentence are suggestive of homogeneity/non-maximality (Kriz 2015). On the other hand, Recanati (2007) explicitly argues for the existence of an extra existential reading for such sentences. von Fintel may be correct if we can ensure that this purely existential reading is indeed the one accessed in our examples. At any rate, this objection only applies to this particular example, and not to the others we have discussed.

Note, however, that this meaning postulate alone does not suffice. Even given this meaning postulate, 'Paula painted a still life' does not entail that she painted apples. One needs to add the information that the apples are part of the still life.

One might reply that 'Paula painted a still life' *contextually* entails that she painted apples, assuming that information that the apples are part of the still life is part of the common ground. If the notion of entailment relevant to *only* is contextual entailment, this appears to solve the issue. This requires that *only* be sensitive to contextual entailments and that in the still life case, the constitution of the still life painting be common ground. Both assumptions face challenges.

First, Magri (2009) argues that implicatures are blind to contextual information, on the basis of examples such as (7). (7a) is odd because it implies that John is sometimes *but not always* tall, implying that his height is variable, while (7b) is odd because it implies that some *but not all* Italians come from a warm country, implying that they don't all come from the same country.

(7) a. # John is sometimes tall.

b. # Some Italians come from a warm country.

The oddness remains with overt *only*—unsurprisingly so, in light of the deep connections between implicatures and *only* (Groenendijk & Stokhof 1984: 295, a.o.).

(8) a. # John is only $[\text{sometimes}]_F$ tall.

b. # Only $[\text{some}]_F$ Italians come from a warm country.

This suggests that *only* too is insensitive to contextual information. That being so, if 'Paula painted a still life' contextually entails 'Paula painted an apple', we would expect *only* to nonetheless negate this alternative.

Second, the assumption that there is contextual entailment in this case is problematic. Consider the following situation: Paula was working on her canvas. The speaker was in the room but didn't see the canvas. Paula truthfully reports to them that she's working on her still life. After she's done, both Paula and the speaker leave the studio. Later on, the speaker reports all that's happened to the hearer and draws the conclusion in (9). It is clear that the constitution of the painting is not known by either participant and thus not common ground. Thus, 'Paula painted apples' is not contextually entailed and thus should be negated by *only*. Then, one might legitimately form the objection in (9b): if she didn't paint apples, surely the still life contains no apples. But this objection, just like the objection in Kratzer's original case, is lunacy, showing that 'Paula painted apples' is not negated by *only* in this case.

(9) Paula only painted $[\text{a still life}]_F$ today.

a. *Pedant:* How do you know she didn't come back after you left the studio to do another painting?

b. *Lunatic:* How do you know she didn't paint an apple in the still life?

3 Lumping *only*

Kratzer uses her still life example to introduce a relationship between propositions she calls *lumping*. She defines the notion within situation semantics, where situations are parts of possible worlds at which propositions may be true, false, or undecided.

(10) **Definition of (non-maximal) lumping** (Kratzer 1989: 616).
A proposition p *lumps* a proposition q at world w just in case p is true at w, and every situation that is part of w where p is true, q is true.

Lumping is like entailment, but factive and local, restricted to situations that are part of a single world. Foreshadowing the developments in Section 3.1, we call this a 'non-maximal' notion of lumping.

In light of the failure of entailment *only* to deal with Kratzer's example, one might suggest incorporating lumping into the meaning of *only*. While Kratzer herself does not propose this, Bonomi & Casalegno (1993: 20, note 16), von Fintel (1997: 14), and Kadmon (2001: 306) do.[3] This gives us the following entry for *only*.

(11) **Lumping *only*.**
Given a set of alternatives C and world of evaluation w, $only_C\ A$ presupposes A and asserts that every alternative in C that A does not lump at w is false.

3.1 Motivating maximal lumping: Heim's problem

However, Heim (1990) noticed a problem for lumping *only*. The problem comes from atelic predicates such as *was painting a still life*, as in (12).[4]

(12) A. What were you doing today?
B. (Not much) I was only painting a still life.
A. # That's not true, you were also painting apples…

To determine which propositions are lumped by 'Paula was painting a still life', we have to ask in which actual situations it is true that Paula was painting a still life. The answer would seem to be *any* situation, even very small ones, of her engaged in painting the still life, such as a situation in which she painted an apple, a situation in which she painted a pear, a situation in which she retouched the background, and so on. Many of these will not contain a situation of Paula painting an apple. So the proposition expressed by 'Paula was painting a still life' does not lump the

3 von Fintel (1997: 14) proposes adding a lumping filter alongside the entailment filter: *only* negates alternatives that are neither entailed nor lumped by the prejacent.

4 Example (12) is taken from Fox's (2003) discussion of Heim's problem.

proposition expressed by 'Paula was painting apples'.[5] In contrast, for Kratzer's original example the sentence at issue was 'Paula painted a still life', with a telic predicate. Every situation in which Paula painted a still life—that is, completed the activity of painting a still life—is one where she painted an apple.

In response to Heim's problem, Fox (2003) considers an alternative definition of lumping, inspired by Kratzer's (2002) notion of *exemplification*. Kratzer defines that a situation s *exemplifies* a proposition p just in case p is true in s, and either p is true at every situation that is part of s, or p is false at every situation that is part of s. In other words, the subsituations of s are homogeneous with respect to verifying the proposition: all or none of them verify it.[6] Fox then proposes the alternative definition of lumping in (13), which we call *maximal lumping*. A situation is *maximal*, with respect to having some property, just in case it is not a proper part of any situation that also has that property.

(13) **Maximal lumping.** A proposition p lumps a proposition q in w just in case q is true at every maximal situation that is part of w and exemplifies p.

3.2 A dilemma for lumping *only*

In this section we pose a dilemma for lumping accounts of *only*, regardless of whether lumping is understood as non-maximal or maximal. Consider the minimal pair in (14). As we will see, *only* with maximal lumping accounts for (14a) but not (14b), while *only* with non-maximal lumping accounts for (14b) but not (14a).

(14) a. Paula only painted [some of the still lifes over there]$_{\text{F}}$.

b. Paula only painted [some]$_{\text{F}}$ of the still lifes over there.

Case I: broad focus. Let us first consider (14a). This example is minimally different from Kratzer's original example, but for the use of a plural indefinite. As with the original examples, the response by B in (15), uttered in a situation where Paula painted the still lifes depicted in Figure 1, is lunacy.

(15) A: Paula only painted [some of the still lifes over there]$_{\text{F}}$.
B: # Not true! She also painted some apples.

The two definitions of lumping used in *only* from Section 2, repeated below, diverge in their predictions on this case. In the case depicted in Figure 1, there is a single maximal situation exemplifying 'Paula painted some of the still lifes over

5 It is nonetheless true that, in Kratzer's original example, Paula painting apples lumps that she was painting a still life.

6 Fox formulates this in a slightly different, but equivalent way.

Figure 1 What Paula painted

there': the situation s_{max} containing all three paintings by Paula. This situation contains Paula painting apples and therefore, if lumping is defined as in (17b), the proposition expressed by *Paula painted some of the still lifes* will lump the proposition expressed by *Paula painted some of the apples* in the situation depicted. Being lumped, this proposition will not be excluded by the meaning of *only*. Using maximal lumping correctly predicts B's statement to be lunacy.

(16) $[\![\text{only}]\!](C)(p) = 1$ iff every alternative in C that p does not lump at w is false.

(17) a. **Non-Maximal Lumping:**
p lumps q in w iff every s in w that makes p true makes q true.

b. **Maximal Lumping:**
every maximal situation s in w exemplifying p makes q true.

If, on the other hand, the definition of lumping does not require maximality, 'Paula painted apples' will not be lumped by 'Paula painted some of the still lifes'. Indeed, not every situation of Paula painting some of the still lifes is a situation where she paints apples. The (non-maximal) situation s depicted in Figure 1 is one such situation: it contains a painting of some of the still lifes but not a painting of apples. Because of situations such as s, the proposition that Paula painted some of the still lifes over there does not lump the proposition that Paula painted some apples, according to the definition in (17a). Consequently, the proposition that Paula painted some apples will be excluded by *only*: B's reply should be perfectly coherent.

Case II: narrow focus. The previous example appears to vindicate an analysis of lumping in terms of maximal situations. However, that same analysis fails for cases where focus falls narrowly on *some* such as (18).

(18) A: Paula only painted [some]$_F$ of the still lifes over there.
B: Not true! Paula painted all of the still lifes.

Intuitively, B's reply is entirely coherent if it turns out that A painted all of the still lifes which are over there. However, in a world where Paula painted all of the still lifes over there, '*Paula painted some of the still lifes*' lumps '*Paula painted all of*

the still lifes', if lumping requires maximal situations. In such a world, the maximal situation of '*Paula painted some of the still lifes over there*' will be the situation s_{max} depicted in Figure 1. This situation makes true '*Paula painted all of the still lifes over there*' and so '*Paula painted some of the still lifes*' lumps '*Paula painted all of the still lifes*'. The semantics of *only* will therefore not exclude the alternative '*Paula painted all of the still lifes*'. B's reply in (18) should therefore be lunacy but intuitively isn't.

A non-maximal definition of lumping, on the other hand, makes perfectly adequate predictions here. There are non-maximal situations which make 'Paula painted some of the still lifes over there' true but do not make 'Paula painted all of the still lifes over there' true (such as s in Figure 1). With this definition of lumping, the former proposition will not lump the latter, in a world where Paula painted all of the still lifes over there. And so, the proposition 'Paula painted all of the still lifes' can be excluded by *only*, correctly predicting B's rebuttal to be coherent.

In summary, there is no one-size-fits-all definition of lumping which can predict the readings of *only* with various sizes of focus: the maximal analysis of lumping which predicts broad focus cases fails on narrow focus cases; the non-maximal analysis fails on broad focus cases but is apt for narrow focus cases.

4 Innocent exclusion

Another approach to Kratzer's still life examples is to invoke Fox's (2007) notion of innocent exclusion. This proposal was introduced in the context of scalar implicatures, in particular to solve the problem of symmetric alternatives. As we'll see, these cases bear a resemblance to Kratzer's still life example.

Fox (2007) proposes that *only* negates 'innocently excludable' alternatives. Informally, an alternative is innocently excludable just in case it can be negated consistently with the prejacent and such that negating it does not preclude negating any other alternatives. The formal definition is given in (19).

(19) **Innocent exclusion *only*** (Fox 2007: 99).

a. $only_C(p)$ presupposes p and asserts that every innocently excludable alternative in C with respect to p and C is false.

b. An alternative is *innocently excludable* with respect to p and C just in case it is in every maximal set $C' \subseteq C$ such that $\{\neg r : r \in C'\} \cup \{p\}$ is consistent.

To illustrate, consider the paradigmatic example of disjunction *only*$(A$ *or* $B)$. We make the standard assumption, going back to Sauerland (2004), that the alternatives to a disjunction are the disjunction itself, the individual disjuncts, and the conjunctive alternative: $\{A \vee B, A, B, A \wedge B\}$. Then given the assertion A *or* B, negating A precludes negating B, and vice versa. A and B are 'symmetric alternatives'. The

innocent exclusion procedure then guarantees that neither A nor B is innocently excludable. By contrast, negating A *and* B is innocently excludable because it is compatible with either the negation of A or the negation of B.

If the set of alternatives is sufficiently expressive in a certain sense, Kratzer's still life example comes close to being a case of symmetry. Very loosely, by 'sufficiently expressive' we mean that the alternative set includes all of the 'ways' for the prejacent to hold. There are many ways to paint a still life: A still life may include apples, pears, pineapples, and so on. Similarly, there are many ways for a wall to be red (crimson, scarlet, ...) and many ways to visit China (visit Beijing, Shanghai, ...).

If every way that Paula could paint the still life (painting apples, bananas, and so on) counts as an alternative to *Paula painted a still life*, then there is symmetry: negating *Paula painted an apple* prevents the joint exclusion of all other ways of painting a still life. So *Paula painted an apple* will not be innocently excludable.

More formally, given a set of propositions C and a proposition p, let us say that C *covers* p just in case p entails $\bigcup C$. That is, C covers p just in case every world where p is true is a world where some proposition in C is true. Thus the set of ways for Paula to paint a still life $\{$*Paula paints an apple*, *Paula paints a pear*, ...$\}$ covers the proposition that she painted a still life, the set $\{$*The wall is crimson*, *the wall is scarlet*, ...$\}$ covers the proposition that it is red, and $\{$*Alice visited Beijing*, *Alice visited Shanghai*, ...$\}$ covers that she visited China.

We may rephrase innocent exclusion in terms of covers. An alternative q is not negated by *only* (that is, is not innocently excludable) just in case we can find a set of alternatives that does not cover the prejacent, but when we add q to this set, it does.

Fact. Given a set of propositions C and a proposition p, C *covers* p iff $p \subseteq \bigcup C$. Then a proposition q is not innocently excludable w.r.t. a set of alternatives C and proposition p iff some subset C' of C does not cover p, but $C' \cup \{q\}$ covers p.[7]

For example, if C' is all the ways for Paula to paint the still life without apples, this

7 *Proof*. Given a set of propositions C, let $\neg C = \{\neg p : p \in C\}$. ($\Rightarrow$) Suppose q is not innocently excludable. Then there is a maximal set of alternatives C' such that $\neg C' \cup \{p\}$ is consistent, and q is not in C'. Since $\neg C' \cup \{p\}$ is consistent, $\neg C'$ does not entail $\neg p$, so p does not entail $\bigcup C'$, that is, $\bigcup C'$ does not cover p. And since C' is maximal, adding q to C' would result in inconsistency with p: $\neg(C' \cup \{q\})$ entails $\neg p$. Hence p entails $\bigcup(C' \cup \{q\})$. So $\bigcup(C' \cup \{q\})$ covers p.

($\Leftarrow$) Suppose there is a set of alternatives C' that C' does not cover p, but $C' \cup \{q\}$ does cover p. Then p does not entail $\bigcup C'$ but does entail $\bigcup(C' \cup \{q\})$, so $\neg C'$ does not entail $\neg p$ but $\neg(C' \cup \{q\})$ does entail $\neg p$. That is, $\neg C'$ is consistent with p but $\neg(C' \cup \{q\})$ is not consistent with p. By Lindenbaum's lemma, $\neg C'$ can be extended to a maximal set $\neg C^*$ consistent with p (we may well-order the alternatives by Zorn's lemma, and then go through the alternatives one by one, adding each alternative to C^* if $\neg C^*$ is consistent with p, leaving it out otherwise). Since $\neg(C' \cup \{q\})$ is inconsistent with p and $C' \subseteq C^*$, $\neg(C^* \cup \{q\})$ is also inconsistent with p, so q is not in C^*.

set does not cover that she painted a still life (for she could paint one with apples), but adding the proposition that she painted apples does cover that she painted a still life. Assuming these alternatives to be available, a semantics of *only* based on innocent exclusion correctly predicts *Paula only painted a still life* to not imply that she didn't paint apples. This *prima facie* explains the oddness of the lunatic's response.

There is, however, a further problem for innocent exclusion. Consider a situation in which Paula painted a still life (containing an apple) and also painted an apple on a separate canvas. The discourse in (20) is intuitively fine.

(20) A: Paula only painted a still life.
B: No, she also painted an apple.

Since *Paula painted an apple* is not innocently excludable, it is not negated by *only* and so there is no reason why B's reply would be appropriate in this state of affairs. Painting an apple (or that particular apple on the separate canvas) is a way for Paula to paint a still life.

The problem, in general, is this. For innocent exclusion to account for examples like Kratzer's, *only* should not negate any of the 'ways' for the prejacent to hold. However, since innocent exclusion is insensitive to mereological structure, it makes this prediction regardless of whether these ways for the prejacent to hold are part of what makes the prejacent true. But *only* is sensitive to the difference. B's response in (20) is acceptable when the mentioned apple is not part of the still life, but unacceptable when it is part of the still life.

We may evade the problem by extending our pool of alternatives to include e.g. *Paula painted an apple which is not part of a still life painted by Paula*. If the latter proposition isn't symmetric with any other, as might be expected, it can be negated. Negating it correctly precludes Paula painting any apple besides the still life and B's response is perfectly on point. But this complex set of alternatives is at odds with the proposal of Katzir (2007) and Fox & Katzir (2011) that the alternatives be no more structurally complex than the original statement.

In summary, it is not clear that innocent exclusion solves Kratzer's lumping case. While innocent exclusion may still be part of the semantics of *only*, some other mechanism is at play in Kratzer's example.

5 The no-overlap constraint on domain selection

We now turn to the fourth and final response to the still life example. While Kratzer (1989) does not propose a theory of *only*, she does discuss what she believes has gone wrong in the lunatic's reply, appealing to a principle governing counting.

> She didn't paint apples and bananas *apart* from painting a still life.

> Painting apples and painting bananas was part of her painting a still life [...]. If you count the entities in this room and you count me as one of them, you'd better forget about my ears. And if you count the facts of our world and you count Paula's painting a still life as one of them, you'd better overlook her painting apples. Quite generally, whenever we start counting, we have to make sure that the entities in our domain are truly distinct. (Kratzer 1989: 608–09)

Indeed, as Kratzer (2012: 168) notes, others have proposed that when we count entities, the domain of entities we count from should not contain distinct, overlapping entities (Casati & Varzi 1999: 112; Chierchia 2010).

Our goal here is to develop Kratzer's intuition into a formal account of *only*. Specifically, we first try to motivate these constraints by looking only at ordinary quantifiers. We then show how the same principles can be made to regiment the semantics of *only*, thereby offering yet another reply to the still life examples.

5.1 Analogy: context-dependent domains

Quantification over certain nouns like *area*, *part* or *bit*, as in (21), results in truth conditions that are difficult to intuit.[8] While informative, it is not clear, in a given situation, what it takes for each sentence to be true or not.

(21) a. How many *areas* of the wall contain a tag by Basquiat?

b. Most *parts* of the island are inhabited.

c. Every *bit* of this painting represents a different aspect of life.

What is lacking to establish truth conditions is a clear extension for each of the nouns: what counts as an area, a part or a bit in the circumstance in which these sentences were uttered. One fundamental property however seems constant: whatever hearers end up counting as *area*, *part* or *bit* in these statements, they should be non-overlapping areas, parts and bits respectively.

This is evidence for the counting principle in (22) (introduced in Casati & Varzi 1999: 112; Chierchia 2010). We propose that this principle guides domain selection.

(22) **Domain selection principle:** Preferentially, a domain of quantification C_w is chosen such that for all distinct $x, y \in C_w$, x does not overlap with y.[9]

8 Solt (2016) discusses similar examples, with a different aim. She observes that there are constraints on the kind of quantifiers that can occur with such nouns.

9 The original formulation from Casati & Varzi (1999: 112) states, "x is included in an inventory of a world w if and only if x does not overlap (at the time when the inventory is drawn up) any distinct y that is itself included in the inventory".

5.2 The no-overlap selection principle and overriding factors

This principle of domain selection is not always enforced and may sometimes be overridden. An observation important for our analysis of *only* later on is that the principle is systematically ignored when the domain is imposed by grammatical means. For instance, when the domain is set explicitly with *among* phrases, overlap between areas does not result in infelicity. Admittedly, contexts in which such sentences are uttered may be unnatural, but the sentences themselves are not infelicitous.

(23) **Context:** *The areas of the wall listed are the 50% upper half, the 50% left half, the 50% right half.*
Every area of the wall, among these 3 areas, contains a tag by Basquiat.

This dovetails with our earlier characterization of the counting principle as a 'guiding' principle for domain selection. Absent any overriding grammatical indications, the no-overlap principle is followed.

Tellingly, the lumping cases of *only* are also sensitive to explicitly listing alternatives. (24) is odd, implying that Alice did and did not visit China, while (25) seems to still imply that Alice didn't visit Beijing. These facts follow if the no-overlap constraint proposed in (22) is defeasible.

(24) a. # Out of China, Beijing, and Shanghai, Alice only visited $[\text{Beijing}]_F$.
b. $\Rightarrow$ Alice didn't visit China.

(25) a. Out of China, Beijing, and Shanghai, Alice only visited $[\text{China}]_F$.
b. $\Rightarrow$ Alice didn't visit Beijing.

6 Applying the no-overlap constraint to *only*

We apply the generalizations about domain selection seen in Section 5 to the case of *only*. Our claim is that *only*, like any regular quantifier, is subject to the principles of domain selection which we illustrated in the previous section.

6.1 Syntax and semantics of *only*

For the same constraints of domain selection that apply to quantifiers to be applicable to *only* without modifications, we need to bring the syntax and semantics of *only* in line with that of regular quantifiers. For that purpose, we adopt a 'two-place' analysis of *only* (Erlewine & Kotek 2018). In this analysis, *only* takes three arguments at LF: a covert contextually provided restriction, an associate and a scope. The associate must contain the focused phrase (and, in some cases, is identical to the focus). This syntactic division has been motivated by arguments from NPI licensing (Wagner

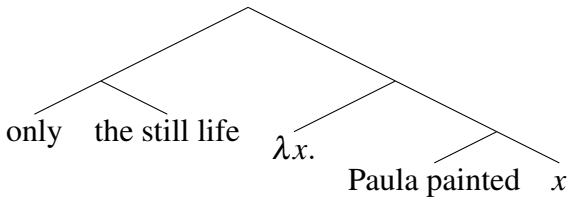

Figure 2 A LF for two-place analysis of *only*

2007) and movement (Erlewine & Kotek 2018, but see Bassi & Longenbaugh 2020 for a response). Figure 2 gives an example LF of this approach.

The semantics of *only* that fits this argument structure is given in (26) below. It is polymorphic: *only* quantifies over entities of any type a, where a is the type of *only*'s associate.

(26) a. $[\![\text{only XP YP}]\!]$ is defined iff $C_w \subseteq [\![\text{XP}]\!]^f$, $[\![\text{XP}]\!] \in C_w$ and $C_w \neq \{s\}$;
b. $[\![\text{only}]\!](C_{sat})(p_a)q_{sat}$ is true in w iff for all a, $(C_w(a) \wedge p \neq a) \rightarrow \neg q_w(a)$.

This mirrors the semantics of an exceptive phrase like *nothing but XP YP*. The covert restriction of *only* is comparable to the restriction on *thing* in the exceptive: the associate of *only* corresponds to XP, the scope of *only* to YP. On this semantics for *only*, C thus corresponds to the restrictor of an ordinary quantifier, and is therefore—as with quantifiers generally—subject to the no-overlap principle of domain selection.

6.2 Application to referential expressions

We first deploy our analysis on (27), a variant of example (14a) from Section 3.2, with a plural definite in place of a plural indefinite. We switch to the plural definite due to an independent complication facing indefinites, discussed in Section 6.3.

(27) **Context:** *one of the still lifes Paula painted contains an apple.*
A: Paula only painted [these still lifes]$_F$ today.
B: # No! Paula also painted the apple.

Because of the broad placement of focus, A's utterance would receive the LF in (28), where the whole object serves as *only*'s associate. The associate is therefore of type e and *only* will therefore be a quantifier over entities.

(28) only$_C$ [these still lifes][λx. Paula painted x]

Given the structure in (28), we expect the meaning of A's utterance to be closely paraphrased by 'Paula painted nothing but the still life'. The next step is to determine the domain of quantification for *only*, i.e. what may refer to 'thing' in this paraphrase. To test this, consider a world of evaluation w_0, where the following facts hold: the

apple a is part of the still life s, the banana b and the coconut c are part of the landscape l. (29) lists candidate domains for C_{w_0}.

(29) Candidates for C_{w_0}

a. $C_{w_0} = \{s, b, c\}$ c. $C_{w_0} = \{s, a, b, c\}$ e. $C_{w_0} = \{l\}$

b. $C_{w_0} = \{s, l\}$ d. $C_{w_0} = \{l, a\}$

Only some of these candidate domains meet the definedness conditions of *only* and the No Overlap constraint. (29d) and (29e), for one, violate the definedness conditions of *only* because they do not contain the denotation of the associate of *only*, i.e. the still life s. Among the remaining domains, the No Overlap principle rules out (29c), since the apple a overlaps with the still life s (and in fact is contained in it). The remaining domains, (29b) and (29a), meet both the definedness conditions of *only* and the domain selection principle. Now, let's suppose further that, in w_0, Paula painted the still life s and therefore the apple a, but didn't paint the landscape l (and not that banana b and the coconut c). *only* asserts that Paula painted no element in the domain C_{w_0} that is not s. Whether we choose (29b) or (29a) as C_{w_0}, the sentence comes out true and the lunatic has no grounds to object.

More generally, the combined effect of the definedness condition of *only* and the domain selection principle prevents any part of the still life from entering the domain: s must be in the domain, as per the definedness conditions of *only*, and therefore, by the domain selection principle, no part of s can be part of the domain. The fact that Paula painted any part of the painting she did paint can never affect the truth value of the sentence in a world where the apple is part of the still life.

6.3 The case of indefinites

An independent problem prevents the solution in the previous section from being adapted wholesale to Kratzer's example, which used an indefinite rather than a definite. In a nutshell, cases where *only* associates with a full indefinite, as in (31), are difficult to explain, quite independently of Kratzer's still life case.

(30) A: Paula only painted [some of the still lifes over there]$_{\mathrm{F}}$.
B: # Not true! Paula also painted some apples.

The problem, initially pointed out by van Rooij & Schulz (2007), is most readily illustrated with the one-place analysis of *only*. Consider (31). Under the traditional analysis of *only*, all the alternatives listed in (31) would be negated. This results in a contradiction, as the sentence would assert that Paula saw a linguist and concomitantly assert that Paula didn't see x for any x. As argued in Chatain (2025a), the challenge is quite general and immune to (i) changes to the set of alternatives, (ii) switching to a contradiction-avoiding meaning for *only* (such as Fox's (2007) innocent exclusion procedure).

(31) Paula only saw [a linguist]$_{\mathrm{F}}$.
Alternatives: Paula saw Amy, Paula saw Bill, Paula saw Conor, ...

Our purpose here is not to provide a detailed explanation of this problem, nor to argue for one solution over another (interested readers may refer to Chatain 2025b). We adopt Krifka's (1993) solution, arguably the simplest. He proposes that in these constructions, the indefinite in (31) simply raises out of *only*'s scope. In the resulting structure, *only* associates with the trace left by this scoping operation, of type e.

(32) [a linguist] λx. Paula only saw $[x]_{\mathrm{F}}$

While Chatain (2025a) argues that this solution in terms of wide-scope indefinites is ultimately inadequate, it is good enough for our local purposes here. We simply need to adapt this analysis to the two-place analysis for *only*: when the associate of *only* is an indefinite, we assume that the associate scopes out; it leaves a variable in its position, which serves as argument of *only*, as in (33).

(33) [a still life] λx. [only$_{\mathrm{C}}$ [$[x]_{\mathrm{F}}$][λy. Paula painted y]]$_\alpha$

The constraints on the domain C that arise from *only* and the domain selection principle are given in (34). They are similar to those that arise with a definite associate, as seen in Section 6.2. The only difference is that the associate is now a variable x and so these definedness conditions depend on x.

(34) Definedness conditions for α

a. $x \in C_w$ and $C_w \neq \{x\}$ (definedness conditions of *only*)

b. $\forall y, y' \in C_w, y \not\subset y'$ (no-overlap domain restriction)

We assume that these conditions project universally across the indefinite quantifier. The sentence will therefore be defined and true just in case:

(35) a. For every still life s, $s \in C_w$ and $C_w \neq \{s\}$.

b. For every distinct y, $y' \in C_w$, $y \not\subset y'$.

c. There is a still life x such that Paula painted x and didn't paint any $y \in C_w$ different from x.

With these truth conditions, consider the response in (36) in the two worlds in (37).

(36) Not true! You also painted an apple.

(37) a. w_0: Paula painted still life s, landscape l and apple a is part of l.

b. w_1: Paula painted still life s_1, apple a is part of s, there is a landscape l that Paula didn't paint.

Let us consider the validity of the objection (36) at each world in (37). In w_0, where the apple painted by Paula is part of a different painting, (36) is a valid objection. This is what we predict. Indeed, the truth conditions in (35) cannot be met in w_0 for any choice of C_{w_0}. By (35a), C_{w_0} should contain s and at least one other entity. Whether this additional entity is l or a, (35) won't be met and the sentence will come out false. If the actual world is w_1, (36) is lunacy. This too is predicted: by (35a), C_{w_1} must contain s_1 and at least one other element. Because of the No Overlap in (35b), this other element cannot be the apple a but must be the landscape l. And thus, (35) comes out true there. (36) is therefore predicted to be lunacy.

6.4 The case of narrow focus *only*

We finally turn to the case of narrow focus *only*. We assume that, in this case, the associate of *only* is the whole quantifier *some of the still lifes over there*, with the structure in (39).

(38) I only painted [some]$_{\mathrm{F}}$ of the still lifes over there

(39) only [[some]$_{\mathrm{F}}$ of the still lifes][λQ. Paula painted Q]

In other words, *only* in this case quantifies over $(et)t$ quantifiers. The placement of accent (narrow on *some*) in (39) indicates that the domain of quantification C_w is restricted to quantifiers of the form 'Q of the still lifes'. The definedness conditions of *only* also impose that *some of the still lifes* may also be part of the domain. Several domains meet these two requirements, such as those in (40).

(40) a. $C_w = \{$some of the still lifes, all of the still lifes$\}$

b. $C_w = \{$some of the still lifes, many of the still lifes$\}$

c. $C_w = \{$some of the still lifes, most of the still lifes$\}$

The observed reading of *some but not all* is obtained when C_w is as in (40a). The question is: does the no-overlap condition rule out such a domain C_w? It is not clear whether the domain of quantifiers can be meaningfully equipped with a mereology. If it isn't, then the no-overlap condition is not operative and there is no reason why (40a) cannot be used as a domain of quantification.

To be complete, let us entertain the possibility that quantificational domains are equipped with a mereological structure subject to the no-overlap condition. One plausible implementation of quantifier mereology is that Q is a part of Q' if $Q(P)$ implies $Q'(P)$ for every P. This has intuitive consequences. For example, *some apple* will be a part of *every apple*, and *every apple* will be a part of *every fruit*. Given this mereology, *some apple* is indeed a part of *every apple* and so the domain C_w in (40a) does not meet the no-overlap condition. But all domains C_w listed in (40) also overlap in this way. It isn't possible to both meet the grammatical

requirements of *only* and the requirements of no-overlap. In this case, we assume the grammatical requirements take precedence, an assumption we independently evidenced in Section 5.2. In summary, whether or not the domain of quantifiers is equipped with a mereology, the domain $\{\text{some of the still lifes}, \text{all of the still lifes}\}$ is available for *only*, deriving the attested meaning.

7 Conclusion and open issues

Presented more than thirty years ago, Kratzer's still life example still presents a challenge to standard theories of *only*. Against these theories, the example suggests that the meaning of *only* is sensitive to mereological information, such as the fact that the apple is part of the still life. We investigated four possible responses to the challenge. The first response maintains a standard semantics for *only* and argues that lexical postulates—say, on the meaning of *paint*—ensure that 'Paula painted a still life' entails that she painted an apple. This, however, only guarantees the entailment in worlds where the apples are part of the still life, a fact of the world rather than meaning postulates.

The second response incorporates a later development in the semantics of exhaustivity: Fox's (2007) notion of innocent exclusion. While innocent exclusion correctly predicts every way for Paula to paint a still life (such as painting apples) will not be negated, it incorrectly makes the same prediction even for ways that are not part of the still life (such as apples outside the mentioned still life).

The third response is the traditional approach to the still life case, proposed in the wake of Kratzer's original work. Using the resources of situation semantics, it replaces in the semantics of *only* the notion of *entailment* with a world-bound mereology-sensitive notion of *lumping*. However, we showed that no definition of lumping can simultaneously account for cases similar to the ones studied by Kratzer and standard logical cases of *only*.

The fourth response, originally suggested by Kratzer herself and which we take to be the more promising one, accounts for the still life example via a general constraint on quantifier domains, the no-overlap constraint. To develop this suggestion into a meaning of *only*, we proposed that *only* has the syntax of ordinary quantifiers, adopting a two-place entry for *only*. While this approach does not have any immediate empirical issues on any example considered, its explanation of the quantified case leaves many issues to be worked out. For instance, it is unclear what the no-overlap constraint amounts to for quantificational domains in general.

References

Bassi, Itai & Nicholas Longenbaugh. 2020. Against Tanglewood by focus movement: A reply to Erlewine and Kotek 2018. *Linguistic Inquiry* 51(3). 579–596. doi:10.1162/ling_a_00348.

Bonomi, Andrea & Paolo Casalegno. 1993. *Only*: Association with focus in event semantics. *Natural Language Semantics* 2(1). 1–45. doi:10.1007/BF01255430.

Casati, Roberto & Achille C. Varzi. 1999. *Parts and Places: The Structures of Spatial Representation*. MIT Press. doi:10.7551/mitpress/5253.001.0001.

Chatain, Keny. 2025a. Exhaustive readings of indefinites require rich content. *Manuscript.*

Chatain, Keny. 2025b. Reducing pronoun accessibility to presupposition satisfaction. *Journal of Semantics* ffaf006. doi:10.1093/jos/ffaf006.

Chierchia, Gennaro. 2010. Mass nouns, vagueness and semantic variation. *Synthese* 174(1). 99–149. doi:10.1007/s11229-009-9686-6.

Del Pinal, Guillermo. 2021. Oddness, modularity, and exhaustification. *Natural Language Semantics* 29(1). 115–158. doi:10.1007/s11050-020-09172-w.

Erlewine, Michael Yoshitaka & Hadas Kotek. 2018. Focus association by movement: Evidence from Tanglewood. *Linguistic Inquiry* 49(3). 441–463. doi:10.1162/ling_a_00263.

von Fintel, Kai. 1997. Bare plurals, bare conditionals, and *only*. *Journal of Semantics* 14(1). 1–56. doi:10.1093/jos/14.1.1.

Fox, Danny. 2003. Implicature calculation, *only*, and lumping: Another look at the puzzle of disjunction. http://lingphil.mit.edu/papers/fox/Yale.pdf.

Fox, Danny. 2007. Free choice and the theory of scalar implicatures. In *Presupposition and Implicature in Compositional Semantics*, 71–120. Springer. doi:10.1057/9780230210752_4.

Fox, Danny & Roni Katzir. 2011. On the characterization of alternatives. *Natural Language Semantics* 19(1). 87–107. doi:10.1007/s11050-010-9065-3.

Fox, Danny & Benjamin Spector. 2018. Economy and embedded exhaustification. *Natural Language Semantics* 26(1). 1–50. doi:10.1007/s11050-017-9139-6.

Groenendijk, J.A.G. & M.J.B. Stokhof. 1984. *Studies on the Semantics of Questions and the Pragmatics of Answers*: University of Amsterdam PhD dissertation. https://hdl.handle.net/11245/1.392528.

Heim, Irene. 1990. *Only* and lumping. *UCLA and Universität Konstanz Handout.*

Horn, Laurence R. 1969. A presuppositional analysis of *only* and *even*. *Proceedings from the annual meeting of the Chicago Linguistic Society* 5(1). 98–107.

Kadmon, Nirit. 2001. *Formal Pragmatics: Semantics, Pragmatics, Presupposition, and Focus*. Blackwell.

Katzir, Roni. 2007. Structurally-defined alternatives. *Linguistics and Philosophy*

30(6). 669–690. doi:10.1007/s10988-008-9029-y.
Kratzer, Angelika. 1989. An investigation of the lumps of thought. *Linguistics and Philosophy* 12(5). 607–653. doi:10.1007/BF00627775.
Kratzer, Angelika. 2002. Facts: Particulars or information units? *Linguistics and Philosophy* 25(5/6). 655–670. doi:10.1023/A:1020807615085.
Kratzer, Angelika. 2012. *Modals and Conditionals: New and Revised Perspectives*. Oxford University Press. doi:10.1093/acprof:oso/9780199234684.001.0001.
Krifka, Manfred. 1992. A compositional semantics for multiple focus constructions. In Joachim Jacobs (ed.), *Informationsstruktur und Grammatik*, 17–53. Springer. doi:10.1007/978-3-663-12176-3_2.
Krifka, Manfred. 1993. Focus and Presupposition in Dynamic Interpretation. *Journal of Semantics* 10(4). 269–300. doi:10.1093/jos/10.4.269.
Kripke, Saul. 1972. Naming and necessity. In Donald Davidson & Gilbert Harman (eds.), *Semantics of Natural Language*, 253–355. Springer. doi:10.1007/978-94-010-2557-7_9.
Kriz, Manuel. 2015. *Aspects of Homogeneity in the Semantics of Natural Language*: University of Vienna PhD dissertation.
Magri, Giorgio. 2009. A theory of individual-level predicates based on blind mandatory scalar implicatures. *Natural Language Semantics* 17(3). 245–297. doi:10.1007/s11050-009-9042-x.
Marcus, Ruth Barcan. 1961. Modalities and intensional languages. *Synthese* 13(4). 303–322. doi:10.1007/BF00486629.
Recanati, François. 2007. It is raining (somewhere). *Linguistics and Philosophy* 30(1). 123–146. doi:10.1007/s10988-006-9007-1.
van Rooij, Robert. 2005. Review of *Formal Pragmatics: Semantics, Pragmatics, Presupposition, and Focus* by N. Kadmon. *Journal of Pragmatics* 37(5). 749–755. doi:10.1016/j.pragma.2004.04.009.
van Rooij, Robert & Katrin Schulz. 2004. Exhaustive Interpretation of Complex Sentences. *Journal of Logic, Language and Information* 13(4). 491–519. doi:10.1007/s10849-004-2118-6.
van Rooij, Robert & Katrin Schulz. 2007. *Only*: Meaning and implicatures. *Questions in dynamic semantics* 193–223. doi:10.1163/9780080470993_010.
Rooth, Mats. 1985. *Association with Focus*: University of Massachusetts Amherst PhD dissertation. https://hdl.handle.net/1813/28568.
Sauerland, Uli. 2004. Scalar implicatures in complex sentences. *Linguistics and Philosophy* 27(3). 367–391. doi:10.1023/B:LING.0000023378.71748.db.
Schwarzschild, Roger. 1993. The contrastiveness of associated foci. *Manuscript, Hebrew University of Jerusalem*.
Solt, Stephanie. 2016. On measurement and quantification: The case of *most* and *more than half*. *Language* 92(1). 65–100. doi:10.1353/lan.2016.0016.

Spector, Benjamin. 2003. Scalar implicatures: Exhaustivity and Gricean reasoning. *Proceedings of the Eighth ESSLLI Student Session* 277–288.

Spector, Benjamin. 2007. Aspects of the pragmatics of plural morphology: On higher-order implicatures. In *Presupposition and Implicature in Compositional Semantics*, 243–281. Springer. doi:10.1057/9780230210752_9.

Wagner, Michael. 2007. Association by movement: Evidence from NPI-licensing. *Natural Language Semantics* 14(4). 297–324. doi:10.1007/s11050-007-9005-z.

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