Expletive negation and the decomposition of *only*[1]

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Abstract. This paper is focused on the seemingly superfluous sentential negation showing up in Hebrew *until*-clauses. I discuss a scalar implicature arising from *until*-clauses which surprisingly becomes uncancellable when this negation is present. I argue that this inference becomes obligatory due to the presence of an *only*-like exhaustivity operator, which gets (partially) spelled out as negation since it is composed of negation and an exceptive. Moreover, this negation is shown to share more properties with *only*.

Keywords: Expletive negation, exhaustification, scalar implicatures, *until*.

1. Introduction

A seemingly superfluous negation participates in a multitude of constructions, among which are certain temporal clauses. This paper is focused on the superfluous sentential negation showing up in Hebrew *until*-clauses.[2,3] I refer to sentential negation which does not make a straightforward contribution to meaning as EXPLETIVE NEGATION or EXN in short. The assumption that sentential negative morphemes are interpreted as negative operators is what makes EXN puzzling.[4]

In this paper I discuss a scalar implicature arising from *until*-clauses which surprisingly becomes uncancellable when EXN is present. I argue that this inference becomes obligatory due to the presence of an *only*-like exhaustivity operator, which gets (partially) spelled out as negation. According to the proposal put forward in the paper, negation is capable of realizing an *only*-like operator because such an operator is actually composed of negation and an exceptive, as has already been proposed for overt *only* in von Fintel and Iatridou (2007).

[2]The phenomenon is also attested at least in Bangla (Ishani Guha, p.c.), French (Sophie Moracchini, p.c.), German (Krifka, 2010), Italian (Tovena, 1996), and Russian (Abels, 2005).

[3]Other occurrences of puzzling negation which will not be discussed in this paper include negative concord (Zeijlstra, 2004, 2008: among many others), preposed negation in biased polar questions (Ladd, 1981; Büring and Gunlogson, 2000; Romero and Han, 2004; Han and Romero, 2004), rhetorical and tag questions, exclamatives (Portner and Zanuttini, 2000), complements of certain attitude predicates (Abels, 2005; Yoon, 2012; Makri, 2015), comparatives, and complements of *almost* (Kaufmann and Xu, 2013).

[4]The puzzle remains as long as one assumes a correspondence between the negative morpheme and an interpreted negative operator. In the simple case the negative morpheme itself carries the negative semantics. A sentential negative morpheme could also give rise to an interpreted negative operator when it is in a dependency with an abstract negation, as in Zeijlstra's (2004; 2008) work on negative concord. In both cases, a superfluous negative morpheme is perplexing.

Proceedings of *Sinn und Bedeutung 21*
Edited by Robert Truswell, Chris Cummins, Caroline Heycock, Brian Rabern, and Hannah Rohde

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Such an analysis predicts that ExN and *only* should share more properties. I show that this prediction is borne out: ExN is odd when there are no alternatives to exclude, it is incompatible with overt *only* and with downward entailing (DE) environments, it triggers optional stress and preposing of the *until*-clause, and cannot license negative concord.

The paper is structured as follows: §2 presents the data on ExN and its interpretive effect. §3 consists of the analysis in which *only* is decomposed into negation and an exceptive, and shows how it can capture the semantics and syntax of ExN. §4 discusses further predictions of the proposal and shows that they are borne out. §5 concludes and briefly mentions questions that are left open.

2. Data

2.1. ExN in *until*-clauses

A Hebrew *until*-clause can host the sentential negation *lo*, superficially without affecting interpretation, as demonstrated by the following examples.[5]

(1)   *adam hu xaf mi-peʃa   ad ʃe (lo) huxexa   aʃmat-o*
        man   he free from-crime until that NEG was proven guilt-his
        'A man is innocent until proven guilty.'

(2)   *ze lo   nigmar ad   ʃe   ze (lo) nigmar*
        it NEG finished until that it NEG finished
        'It ain't over till it's over.'

(3)   *joni jaʃan ad   ʃe ha-ʃxenim   (lo) hidliku muzika*
        Y.   slept until that the-neighbors NEG lit   music
        'Yoni was asleep until the neighbors turned some music on.'

(4)   *ha-ʃvita timaʃex   ad ʃe (lo) jeʔanu   driʃot   ha-ovdim*
        the-strike will continue until that NEG will be answered demands the-workers
        'The strike will continue until the workers' demands are met.'

(5)   *miri lo   nirdemet ad ʃe (lo) korʔim l-a   sipur*
        M.   NEG falls asleep until that NEG read.PL to-her story
        'Miri doesn't fall asleep until you read her a story.'

Note that (1)–(5) can in principle have an additional reading in which negation is interpreted as usual. For example, (1) can have the (odd) reading 'A man is innocent until *not* proven guilty'.[6]

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[5]Examples (1) and (3) are modified versions of Eilam's (2007) examples (3) and (5).

[6]As Eilam (2007) observed, this reading is the only one available if the negative morpheme *lo* is stressed.

2.2. The Interruption Implication

2.2.1. Optional interruption without ExN

In this subsection I discuss English examples, but it should be noted that the facts are the same for Hebrew *until*-clauses when they do not contain ExN. The next subsection contains discussion of Hebrew ExN cases.

Sentences containing *until* generally give rise to an inference – which I call THE INTERRUPTION IMPLICATION – according to which the matrix eventuality came to an end upon the onset time of the *until*-phrase/clause. From (6) for example, one infers that Mary stopped playing the piano at five or at the time of John's opening the door.

(6)   Mary played the piano until five / until John opened the door.
        $\rightsquigarrow$ ¬[Mary played the piano after five / after John opened the door].

The interruption implication has two properties of a scalar implicature: (i) it is cancellable, and (ii) it does not arise when the *until*-clause is embedded in a downward-entailing environment. None of (7a)–(7d) gives rise to the interruption implication.

(7)   **In all the following $\not\rightsquigarrow$ ¬[Mary played the piano after John opened the door]:**
        a.   Mary played the piano until John opened the door. *Moreover*, she was still playing the piano (when and) after he opened it.
        b.   Mary played the piano until John opened the door *and perhaps even afterwards*.
        c.   Mary played the piano *at least* until John opened the door.
        d.   Q: Is Mary still playing the piano?
             A: *Well, I'm not sure but* (what I know is that) she definitely played the piano until John opened the door.

Scalar implicatures are known to disappear in downward-entailing environments. Compare (8a) to (8b), which embeds a minimally modified version of (8a) in the restrictor of a universal quantifier, a downward-entailing environment. If the *not all* inference in (8a) were part of the meaning of *some*, we should expect (8b) to quantify over students who did *only some* of the reading. However, it follows from (8b) that students who did all of the reading got an A just like those who did some but not all of it.

(8)   a.   Mary did some of the reading.
             $\leftrightsquigarrow$ Mary did **only** some of the reading.   (= M. did some but not all of it.)
        b.   Every student who did some of the reading got an A.
             $\not\leftrightsquigarrow$ Every student who did **only** some of the reading got an A.

Similarly, the interruption implication in (9a) is not preserved in (9b). Those students who played the piano not only until John opened the door, but even until some later time, are entitled to a prize to no lesser degree than those who played the piano only until John opened the door. This is a reason not take the interruption implication to be part of the lexical semantics of *until*.

(9)   a.   Mary played the piano until John opened the door.
             ⤳ Mary played the piano **only** until John opened the door (*and no later*).
       b.   Every student who played the piano until John opened the door will get a prize.
             ⤳̸ Every student who played the piano **only** until opened the door (*and no later*)
             will get a prize.

The cancellability of the interruption implication and its disappearance in downward entailing environments puts it in the same group of inferences as scalar implicatures. Now let us see how ExN affects the availability of the interruption implication.

2.2.2. Obligatory interruption with ExN

The facts are the same for Hebrew *until*-clauses, but only without ExN. ExN makes the interruption implication obligatory: it cannot be cancelled nor can an *until*-clause containing ExN be embedded in a downward-entailing environment.

(10)   *joni jaʃan le-faxot ad   ʃe azavti*
        Y.   slept to-less   until that 1.left
        'Yoni slept at least until I left.'

(11)   **joni jaʃan le-faxot ad   ʃe **lo**   azavti*
        Y.   slept to-less   until that NEG 1.left   (cf. (10) and (7c))

(12)   *joni jaʃan ad   ʃe **lo**   azavti, #ve-ulaj   afilu ad   zman meʔuxar joter*
        Y.   slept until that NEG 1.left, and-maybe even until time late   more
        'Yoni slept until I left #and perhaps even until some later time.'   (cf. (7b))

Example (13a), but not (13b), can be used in the exchange in (14), which requires at least partial ignorance regarding Yoni's awakening time (cf. (7d)).

(13)   a.   *joni jaʃan ad   ʃe azavti*   b.   *joni jaʃan ad   ʃe **lo**   azavti*
              Y.   slept until that 1.left   Y.   slept until that NEG 1.left
              'Yoni was asleep until I left.'   'Yoni was asleep until I left.'

(14)   Q: Is Yoni still asleep?
        A: Well, I'm not sure but (13a).
        A': #Well, I'm not sure but (13b).

In the previous section we have seen scalar implicatures disappear in downward-entailing (DE) environments. Later I will propose that ExN is related to a grammatical mechanism generally responsible for scalar implicatures. If they disappear in DE environments because this mechanism cannot take place in such environments, we expect a clash between DE environments and ExN.

Consistent with the obligatoriness of the interruption implication with ExN, an *until*-clause containing ExN cannot be embedded in a DE environment such as the restrictor of a universal quantifier (15b) or the antecedent of a conditional (16b). Examples (15c) and (16c) show that ExN is allowed in related upward-entailing environments: the restrictor of *one* and the consequent of a conditional.

(15)   a.   *kol   mitmoded ʃe jaʔatsor   et   ha-neʃima ad   ʃe ha-paamon*
            every contestant that 3.stop.FUT ACC the-breath until that the-bell

            jetsaltsel jekabel   pras
            3.ring.FUT 3.receive.FUT prize
            'Every contestant who holds their breath until the bell rings will get a prize.'

       b.   ??*kol   mitmoded ʃe jaʔatsor   et   ha-neʃima ad   ʃe ha-paamon lo*
            every contestant that 3.stop.FUT ACC the-breath until that the-bell   NEG

            jetsaltsel jekabel   pras (nixumim)
            3.ring.FUT 3.receive.FUT prize (consolations)
            'Every contestant who holds their breath until the bell rings will get a (consolation) prize.'

       c.   *mitmoded exad ʃe jaʔatsor   et   ha-neʃima ad   ʃe ha-paamon lo*
            contestant one   that 3.stop.FUT ACC the-breath until that the-bell   NEG

            jetsaltsel jekabel   pras
            3.ring.FUT 3.receive.FUT prize
            'One contestant who holds their breath until the bell rings will get a prize.'

(16)   a.   *im miri taʔatsor   et   ha-neʃima ad   ʃe ha-paamon jetsaltsel, hi*
            if M. 3.stop.FUT ACC the-breath until that the-bell   3.ring.FUT she

            tekabel   pras
            3.receive.FUT prize
            'If Miri holds her breath until the bell rings, she will get a prize.'

       b.   ??*im miri taʔatsor   et   ha-neʃima ad   ʃe ha-paamon lo   jetsaltsel, hi*
            if M. 3.stop.FUT ACC the-breath until that the-bell   NEG 3.ring.FUT she

            tekabel   pras
            3.receive.FUT prize
            'If Miri holds her breath until the bell rings, she will get a prize.'

       c.   *im miri rotsa le-kabel   pras, hi taʔatsor   et   ha-neʃima ad   ʃe*
            if M. wants to-receive prize, she 3.stop.FUT ACC the-breath until that

            ha-paamon lo   jetsaltsel
            the-bell   NEG 3.ring.FUT
            'If Miri wants to get a prize, she will hold her breath until the bell rings.'

To summarize the data in this section, the interruption implication, an otherwise optional scalar implicature, becomes obligatory with ExN. Moreover, ExN cannot be embedded in DE environments.

3. Analysis

3.1. The core of the proposal: *only*

An intuition which can provide insight into the contribution of ExN is that adding ExN to an *until*-clause parallels the addition of *only*: *Mary played until John* **ExN** *opened the door* ≈ *Mary played **only** until John opened the door*. Fleshing out this intuition will get us closer to an LF and allow us to predict the obligatoriness of the interruption implication with ExN.

(17)   **Hypothesis**: *until*-clauses hosting ExN contain an *only*-like exclusive particle.

If an *only*-like exclusive particle is involved, we need to determine the set of alternatives it operates on. Suppose that φ *until t* has the set of alternatives in (18), for any t_-, t, t_+ such that $t_- < t < t_+$:

(18) $Alt(\varphi \text{ until } t) = \{\ldots, \varphi \text{ until } t_-, \varphi \text{ until } t, \varphi \text{ until } t_+, \ldots\}$

That is, the alternatives of φ *until t* differ from it only in the time until which φ holds. This way we can generate a set of alternatives that exhausts the entire (contextually restricted) temporal domain.[7] Crucially, this set of alternatives is ordered by entailment, as shown in (19). For example, φ *until five* asymmetrically (Strawson-)entails that φ *until four*.

(19) $(\lambda w. \varphi \text{ until } t_+ \text{ in } w) \subset (\lambda w. \varphi \text{ until } t \text{ in } w) \subset (\lambda w. \varphi \text{ until } t_- \text{ in } w)$

To see that the hypothesis in (17) makes the correct predictions, let us assume for now that (20) holds. In the next section I modify (20) and explicate the affinity between ExN and *only*.

(20)   **Assumption (to be modified)**: ExN is semantically vacuous but triggers obligatory strengthening in the sense of Fox (2007); Chierchia et al. (2012); Chierchia (2013).

That is, ExN requires the alternatives of the clause in which it occurs to not be ignored but be taken into consideration by an exhaustivity operator. Such an operator is a covert counterpart of *only*, a simplified version of which is defined in (21). EXHAUST asserts the truth of its prejacent and the falsity of any alternative which is not entailed by the prejacent.[8] Assuming for simplicity that the only alternatives are the ones in (18), strengthening results as in (22).

(21) $[\![\text{EXHAUST}]\!] = \lambda A_{st,t}. \lambda p_{st}. \lambda w_s. p(w) = 1 \wedge \forall q \in A [(p \not\subseteq q) \rightarrow q(w) = 0] \quad \approx [\![Only]\!]$

(22) $[\![\text{EXHAUST}(Alt)(\varphi \text{ until } t)]\!]^w = 1$ iff φ *until t in w* $\wedge$ for any $t_+ > t, \neg [\varphi$ *until* $t_+]$ *in w*

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[7] I am assuming that *until*'s complement has to denote a time, either inherently ('until five') or by definitizing a temporal property ('until John opened the door'). For more details see §3.3.1.

[8] The denotation in (21) omits Fox's (2007) qualification that the excluded alternatives be INNOCENTLY EXCLUDABLE. This is so since in the case of (18), the alternatives are already totally ordered, and in particular all non-weaker alternatives are innocently excludable.

This is so because both φ *until t* and φ *until* t_- are entailed by φ *until t*, but φ *until* t_+ is not. Thus, φ *until t* ends up meaning φ *until t **and no later than t***, giving us the interruption implication.[9]

Moreover, the incompatibility of EXN with DE-environments (§2.2.2) is predicted by the analysis when taken together with any grammatical theory of scalar implicatures which explains their disappearance in such environments by lack of exhaustification. In other words, since I propose to relate EXN with EXHAUST, all that is needed to predict EXN's incompatibility with DE-environments is a reason for EXHAUST to be incompatible with such environments. Since such incompatibility is in fact attested, I submit that once we have an explanation for this phenomenon the incompatibility of EXN with DE-environments would be predicted without further stipulations.[10]

3.2. Decomposing *only*

Why should the assumption in (20) hold? It would be peculiar for a negative morpheme to be ambiguous between actual negation and EXN, especially across so many languages (see fn. 2). So how should one think of the association between EXN and *only*?

If one entertains the possibility that EXHAUST is syntactically complex, containing a negative piece, one could better understand EXN as a plain compositional negation.

(23)   **Revised hypothesis**
   a.   *Until*-clauses hosting EXN contain an *only*-like operator. (= (17))
   b.   The negative morpheme is a reflex of a negative component of that operator.

3.2.1. Sufficiency Modal Constructions

One decomposition of *only* is proposed by von Fintel and Iatridou (2007), who discuss SUFFICIENCY MODAL CONSTRUCTIONS such as in (24):

(24)   To get good cheese, you only have to go to the North End.

They observe that crosslinguistically, one also finds a second pattern: *To get good cheese, you*

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[9]For convenience I will continue referring to the interruption implication as a scalar implicature, even though under the grammatical view adopted here scalar implicatures are analysed as entailments.

[10]It should be noted that unlike EXHAUST and EXN, overt *only* is allowed in DE environments:

(i)   If the rhino eats only artichokes, it might be sick.
(ii)   Every rhino who ate only artichokes was examined by the vet.

Additionally, the prejacent is treated differently by the two operators: EXHAUST asserts it, while *only* presupposes it. An idea suggested to me by Danny Fox (p.c.) would be that while *only* and EXHAUST are built of the same parts, EXHAUST involves local accommodation, thus turning the presupposed prejacent into an asserted one.

*do **not** have **but** go to the North End.* The following are two examples adapted from von Fintel and Iatridou's (2)–(3):

(25)   … ***dhen*** *echis*   ***para***   *na pas*   *sto*   *North End*
           NEG   have.2SG EXCEPT NA go.2SG to.the North End
       '… you only have to go to the North End'   (Greek)

(26)   … *tu*   ***n'as***   ***qu'à***   *aller au*   *North End*
           you NE-have QUE-to go   to.the North End
       '… you only have to go to the North End'   (French)

Another observation made by von Fintel and Iatridou is that for a (goal-oriented necessity) modal to be able to participate in a sufficiency modal construction, it has to be a non-PPI modal. That is, it has to be able to scope under negation.

Von Fintel and Iatridou propose to treat *only* crosslinguistically – even in languages where there are no overt negation-and-exceptive sufficiency constructions – as composed of a negation and an exceptive. Together with the assumption that the exceptive is (or hosts) an NPI, they allow the modal to take scope between the two components:

(27)   To get good cheese, you do ***not*** have to do ***anything other than*** going to the N. End.
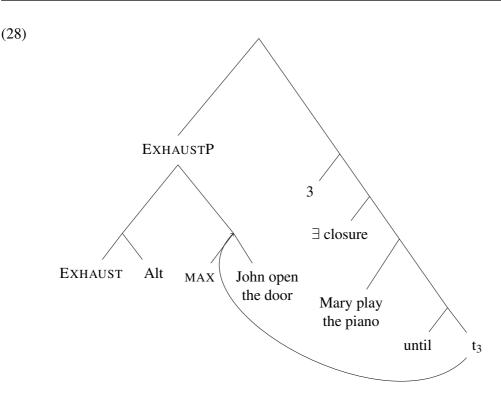
3.3. Proposal: ExN is an exponent of *only*

To briefly sum up, the data involves a negative morpheme along with an obligatory interruption implication, which I submit results from an *only*-like exhaustivity operator (§3.1). The decomposition of *only* into a negative part and an exceptive part as proposed by von Fintel and Iatridou (2007) paves the way to understanding ExN as a regular compositional negation: if ExN is the negative component of the exhaustivity operator, as I propose, we can predict the data while maintaining a single meaning for the negative morpheme. To achieve this I will assume that both pieces are syntactically present: negation is overt, while the exceptive is covert.

A sentence of the form *A until* ExN *B* is thus paraphrasable as *A until not anything other than B*. As before, assuming that what *anything other than* ranges over is times (18), we would not be able to exclude any earlier time due to entailment, but *would* be able (and required) to exclude later times, thus predicting the interruption implication. In the following two sections I go through the details of the proposal.

3.3.1. Assumptions

The following structure is what I take to be the LF for *Mary played the piano until John* ExN *opened the door*. I return to the decomposition of EXHAUSTP after discussing my assumptions below.

(28)

The movement step in (28) is a case of Focus-movement, a kind of sideways movement discussed in Wagner (2007) and Erlewine and Kotek (2017), among others. The associate of the focus-sensitive operator EXHAUST moves to it, as the associate of *only* would in Wagner's (2007) analysis.

I will assume that clauses denote temporal properties (i.e., characteristic functions of sets of time intervals).[11] I follow Condoravdi (2010) in: (i) taking *until* to uniformly compose with a time, even when its surface complement is a clause, and (ii) assuming that a maximality operator MAX (i.e., a definite determiner of type $\langle it, i \rangle$) applies to *until*'s clausal complement to yield the desired time argument: the (smallest) maximal interval instantiating the complement.

Until will be analyzed as denoting a relation between times: $[\![until]\!] \in D_{\langle i, it \rangle}$. It composes with its first argument, be it a time-denoting DP or a clause, resulting in a temporal property (i.e., of type $\langle i, t \rangle$). This temporal property then composes intersectively (i.e., by Predicate Modification) with the matrix clause.

To capture the entailment that the main clause was true at *all* times up to the time of the *until*-phrase, I take it that *until*'s quantificational force is universal. Just like other quantifiers, *until* has a contextually restricted domain (von Fintel, 1994). The domain of time intervals D_i is contextually restricted to its subset C_i. This would prevent *Mary played the piano until five* from entailing that she played the piano since the beginning of time.
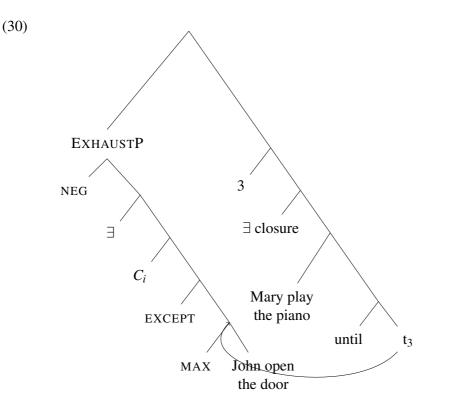
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[11]These functions of type $\langle i, t \rangle$ could in principle be extended to other kinds of intensions in various ways (e.g., by assuming that type s is of world-time pairs and that clauses are of type $\langle s, t \rangle$, or that clauses are of type $\langle i, st \rangle$ or $\langle s, it \rangle$). Since this extension is immaterial to the analysis, I ignore worlds altogether.

Alternatives are derived by substituting *until*'s complement with other times in C_i. Thanks to keeping C_i constant, *until 5* ends up asymmetrically (Strawson-)entailing *until 4* (as far as Strawson-entailment is concerned, this is a variant of Condoravdi, 2010).

I implement von Fintel and Iatridou's (2007) view of the exceptive phrase as being an NPI and having existential force by taking the exceptive phrase to contain, in addition to the exceptive head, an existential quantifier restricted to a contextually salient domain. In the relevant cases the domain is the contextually restricted temporal domain C_i. Given these assumptions, the decomposition of EXHAUSTP in (28) is as follows:

(29)   NEG [∃ [C_i [EXCEPT [MAX [John open the door]]]]]

Note that there is a tension between the semantics and the surface syntax regarding the position of negation. For interpretation, we need it scoping as high as possible to negate not only the *until*-clause but also the matrix clause. On the other hand, negation shows up inside the *until*-clause in the surface string (see more on this in §3.3.3). To allow a suitable configuration, I will assume the following structure, with a negation of type $\langle itt, itt \rangle$.[12],[13]

(30)

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[12]Other cases of high-type negation include determiner negation such as *no NP*, *not every NP*, as well as the ones in *impossible* and *unhappy*.

[13]The semantics is compatible with negation occupying a lower position, adjoined to the the existential quantifier in (29), or a higher position, c-commanding both the matrix clause and the *until*-clause. The former would be similar to determiner negation in fn. 12, while the latter would be plain propositional negation. The proposal ends up not taking either of these paths due to the surface position of negation, as discussed in §3.3.3.

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Edited by Robert Truswell, Chris Cummins, Caroline Heycock, Brian Rabern, and Hannah Rohde

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3.3.2. Denotations and calculations

Below I specify the denotations of the components and their composition. The discussion considers nominal complements as well as clausal complements of *until*.

(31) $[\![P]\!] := [\![\text{Mary played the piano}]\!] = \lambda t_i. \text{Mary play the piano at } t$

(32)   a. $[\![\text{until}]\!] = \lambda t'_i.\lambda t''_i. \forall t \in C_i [(t < t') \rightarrow (t \subseteq t'')]$. In words, *until* relates two times, returning truth iff all times preceding the first are contained within the second.

         b. $[\![\text{until five}]\!] = \lambda t''_i. \forall t \in C_i [(t < 5pm) \rightarrow (t \subseteq t'')]$. That is, the (characteristic function of the) set in C_i of all times which contain all times preceding *5pm*.

(33)   Entailment between alternatives (cf. (19)):
$\lambda t''_i. \forall t \in C_i [(t < 5pm) \rightarrow (t \subseteq t'')] \quad \subset \quad \lambda t''_i. \forall t \in C_i [(t < 4pm) \rightarrow (t \subseteq t'')]$
That is, the set of times containing everything in C_i which precedes *5pm* is a proper subset of the set containing everything in C_i preceding *4pm*. This is so because if all times up to five are in an interval, then all times up to four are also in that interval, so any interval in the former set will be in the latter set. The latter set additionally contains at least an interval whose right edge is four, which is not a member of the former set. Thus we have captured the downward entailment property of *until*.

(34)   Without interruption: $[\![P \text{ until five}]\!] = \lambda t_i. [\![P]\!](t) = 1 \wedge \forall t' \in C_i [(t' < 5pm) \rightarrow (t' \subseteq t)]$
That is, the (characteristic function of the) set in C_i of all times at which Mary played the piano and which also contain all times prior to five.[14]

(35)   a. $[\![O]\!] := [\![\text{John opened the door}]\!] = \lambda t_i. \text{John open the door at } t$

         b. $[\![\text{Mary played the piano until John opened the door}]\!] = [\![P [\text{until} [\text{MAX} [O]]]]\!]$

         c. $t_{O_j} := [\![\text{MAX}[O]]\!] = $ the smallest t s.t. $\forall t' [[\![O]\!](t') = 1 \rightarrow t' \subseteq t]$, if defined

         d. $[\![until [\text{MAX}(O)]]\!] = \lambda t''_i. \forall t \in C_i [(t < t_{O_j} \rightarrow (t \subseteq t'')]$
That is, the (characteristic function of the) set of all times which contain all times in C_i preceding John's door-opening.

(36)   **Without interruption**:
$[\![P \text{ until MAX } O]\!] = \lambda t''_i. [\![P]\!](t'') = 1 \wedge \forall t \in C_i \left[t < t_{O_j} \rightarrow (t \subseteq t'') \right]$
That is, the (characteristic function of the) set in C_i of all times at which Mary played the piano and which also contain all times prior to John's door-opening.

(37)   **With interruption**:
$[\![(30)]\!] = 1$ iff $\neg \exists t'' \in C_i [t'' \neq t_{O_j} \wedge \exists t' [[\![P]\!](t') = 1 \wedge \forall t \in C_i [t < t'' \rightarrow t \subseteq t']]]$
That is, (30) is true iff there doesn't exist a time other than John's door-opening time until which Mary plays the piano.

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[14]I am assuming that existential closure applies later and eliminates the final lambda-binder.

3.3.3. Linearization

In the Hebrew examples in §2, ExN appears on T(ense) of the embedded *until*-clause, whereas the analysis locates the negation responsible for it in the main clause. What can explain this?

It is important to note that even non-expletive occurrences of *lo* raise a linearization question, if we follow Zeijlstra (2004, 2008) in assuming that abstract negation is the semantic negation in strict negative concord languages such as Hebrew. I propose a PF rule for Hebrew negation which captures both ExN and other ('ordinary') occurrences of Hebrew negation:

(38)   An (abstract) negation NEG is spelled out as *lo* on the closest T it c-commands.

This predicts both the distribution of ordinary negation and that of ExN, if we take NEG, as part of EXHAUST, to be locally above the *until*-clause. This will put it high enough for the embedded T to bear agreement, but too low for the matrix T. Exactly this kind of configuration is predicted by the LF in (30) because the complement of *until*, including its T head, moves to EXHAUST.[15]

4. Predictions

We have seen how the idea that ExN is an exponent of *only* predicts the obligatoriness of the interruption implication and the incompatibility of ExN with DE-environments. Furthermore, the current analysis predicts ExN to share more properties with *only*. This prediction is borne out in (i) ExN's oddness when there are no alternatives to exclude, (ii) its incompatibility with overt *only*, (iii) its ability to trigger stressing and preposing of the *until*-clause, and (iv) the lack of negative concord licensing by ExN. I examine these predictions below.

4.1. #ExN when there are no alternatives to exclude

World knowledge makes (39b) odd, while felicitous without ExN. This is so because the prejacent is stronger than all other alternatives, rendering ExN – and *only* in the English translation – vacuous.[16]

(39)   a.   *ani ohav   ot-ax   ad   ʃe jigamer ha-zman / jitpotsets   ha-olam*
             I   love.FUT ACC-you until that end.FUT the-time / explode.FUT the-world
             'I will love you until the end of time / until the world explodes.'
        b.   #*ani ohav   ot-ax   ad   ʃe **lo** jigamer ha-zman / jitpotsets   ha-olam*
             I   love.FUT ACC-you until that NEG end.FUT the-time / explode.FUT the-world
             '#I will love you **only** until the end of time / **only** until the world explodes.'

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[15]Michel DeGraff (p.c.) suggests another way to capture the surface position of negation while allowing it to take wide scope: movement. Negation would have to start inside the *until*-clause, where it is pronounced, and move out of it at LF to take matrix scope. This seems to be in line with the observation that ExN tends to be accompanied by subjunctive mood in the *until*-clause in various languages.

[16]Just as in the English translation, (39b)'s oddness can be ameliorated by taking the speaker to have some alternatives (i.e., later times) in mind. This supports the claim that there must be some alternatives to exclude.

4.2. EXN is incompatible with overt *only*

Just like adding *only* to an existing *only* is ungrammatical, arguably because the second *only* would be vacuous, EXN cannot be accompanied by an overt *only* with the same associate:[17,18]

(40)   a.   *joni jaʃan rak   ad   ʃe ha-ʃxenim   **lo**   hidliku muzika
             Y.   slept only until that the-neighbors NEG lit   music
       b.   joni jaʃan rak   ad   ʃe ha-ʃxenim   hidliku muzika
             Y.   slept only until that the-neighbors lit   music
             'Yoni was asleep only until the neighbors turned some music on.'

4.3. Preposing and stress

The relevant background on Hebrew is that contrastive focus can cause preposing of the focused phrase, as illustrated below. Both (42a) and (42b) are licit corrections to (41).[19]

(41)   *hu axal tapuax-adama*
       he ate   apple-earth
       'He ate a potato.'

(42)   a.   ARTIʃOK *hu axal*   b.   *hu axal* ARTIʃOK
             artichoke he ate   he ate   artichoke
             'He ate an ARTICHOKE.'   'He ate an ARTICHOKE.'

Many of the speakers I have consulted prefer (some require) preposing the *until*-clause when it contains EXN and stressing *ad* 'until'.[20] For example, take (4), repeated here as (43a). Its version (43b), with preposing of the *until*-clause and stress on *until* is judged by the informants I have consulted as preferable compared to (43a) if EXN is present.

(43)   a.   *ha-ʃvita timaʃex   ad   ʃe (lo) jeanu   driʃot   ha-ovdim*
             the-strike will continue until that NEG will be answered demands the-workers
             'The strike will continue until the workers' demands are met.'
       b.   AːD *ʃe (lo) jeanu   driʃot   ha-ovdim   ha-ʃvita timaʃex*
             until that NEG will be answered demands the-workers the-strike will continue
             'UNTIL the workers' demands are met the strike will continue.'

---

[17]As long as EXN has sentential scope, an overt *only* with narrow focus is allowed, for example, associating with a DP.

[18](40a) is grammatical – though odd – under a non-expletive interpretation of negation.

[19]Cf. English negative inversion, where association with focus causes optional overt movement:

(i)   Only in the living room did Kim agree to hang the photo.

[20]Rubinstein and Doron (2015) make a similar observation regarding EXN and stress in constituent unconditionals, which is placed on a *wh*-item.

Stress and preposing, two hallmarks of association with focus, would be better understood if ExN were, as I propose here, a component of a focus-sensitive operator. Those speakers who require stress and preposing must have obligatory overt focus-movement.

4.4. No negative concord with ExN

As noted in §2, negation in *until*-clauses can in principle also have an 'ordinary' negative interpretation. When a Negative Concord Item (NCI, a.k.a. *n-word*) is c-commanded by the negation *lo*, this becomes the only available interpretation. In other words, ExN cannot license negative concord.[21] In both (44) and (45) the first example contains the negation *lo* and has both interpretations available, whereas the second example contains a NCI replacing the embedded subject and causing *lo* to not be expletive.

(44)   a.   *ha-saxkan himʃix   b-a-stsena ad ʃe joni (**lo**) baxa*
              the-actor   continued in-the-scene until that Y.   NEG cried
              –'The actor continued with the scene until Yoni cried.'
              –'The actor continued with the scene until Yoni was no longer crying.'
      b.   *ha-saxkan himʃix   b-a-stsena ad Se **af** exad **lo**   baxa (joter)*
              the-actor   continued in-the-scene until that no one NEG cried (more)
              Only: 'The actor continued with the scene until nobody was crying (anymore).'
              (Not: 'The actor continued with the scene until somebody cried.')

(45)   a.   *miri amda al ha-bama ad   ʃe joni (**lo**) maxa   kapaim*
              M.   stood on the-stage until that Y.   NEG clapped palms
              –'Miri stood on the stage until Yoni applauded.'
              –'Miri stood on the stage until Yoni did not applaud (anymore).'
      b.   *miri amda al ha-bama ad   ʃe **af** exad **lo**   maxa   kapaim (joter)*
              M.   stood on the-stage until that no one NEG clapped palms   (more)
              Only: 'Miri stood on the stage until nobody was applauding (anymore).'
              (Not: 'Miri stood on the stage until somebody applauded.')

Lack of negative concord under ExN follows from the independent generalization that exceptives are intervenors for negative concord, as (46) demonstrates. If ExN comes with a covert excpetive, as proposed here, negative concord is predicted not to be licensed. The only available reading in (44b) and (45b) arises from the need to parse these sentences without an exceptive, which would otherwise block negative concord.

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[21]One might wonder whether NPIs are licensed by ExN. Modulo the archaic flavor of NPIs in Modern Hebrew, (i) in fact shows that the NPI *davar* 'a thing' cannot be licensed by ExN, similarly to NCIs in (44) and (45) above. I thank Luka Crnič for raising this question.

(i)   *servu   le-ʃaxrer-o   mi-maʔatsar-minhali   ad ʃe **lo**   axal   davar*
         3.refused.PL to-release-him from-arrest-administrative until that NEG 3.ate.SG thing
         Only: 'They refused to release him from administrative detention until he did not eat anything (=until he went on a hunger strike).'
         (Not: 'They refused to release him from administrative detention until he ate something.')

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(46)   a.   *miri **lo**   ra'ata **af** exad*
              M.   NEG saw   no one
              'Miri didn't see anybody.'
    b.   **miri **lo**   ra'ata **ela af** exad*
              M.   NEG saw   but no one
    c.   **miri **lo**   ra'ata **milvad af** exad*
              M.   NEG saw   except no one

5. Conclusion

5.1. Summary

We have seen that expletive negation suspiciously mimics *only* and its covert counterpart EXHAUST: (i) It renders the interruption implication, which is an otherwise optional scalar implicature, uncancellable; (ii) ExN is incompatible with DE environments just like EXHAUST is; (iii) ExN is odd if there are no alternatives to exclude; (iv) It is incompatible with overt *only*; (v) It triggers optional stress on *until* and preposing of the *until*-clause, both of which are hallmarks of association with focus, and (vi) ExN cannot license negative concord.

I have proposed that ExN is in fact an ordinary compositional negation, being part of a negation-and-exceptive construction responsible for all the *only*-like phenomena, whereas the exceptive is covert. This follows von Fintel and Iatridou's (2007) proposal to decompose overt *only* into a negation and an exceptive.

The analysis predicts the obligatoriness of the interruption implication as an entailment of the decomposed *only*. ExN's incompatibility with DE environments results from an independent property of covert *only*, observable when scalar implicatures disappear in such environments. The vacuity of ExN when there are no alternatives to exclude or when there is a distinct, overt *only* explains why ExN is odd in such cases. Preposing and stress associated with ExN are compatible with ExN being part of a focus-sensitive operator, and ExN's incapability to license negative concord is expected since exceptives block negative concord.

The crosslinguistic picture arising from this proposal is one where a negation-and-exceptive construction can be pronounced as a single item (e.g., English *only*), as two items (e.g., French *ne. . . que*), as an overt negation with a covert exceptive (ExN), as an overt exceptive with a covert negation (e.g., archaic English *but* as in *the building had but a single window*), or not pronounced at all (EXHAUST).

5.2. Next steps

There are multiple questions pertaining to ExN and to the specific proposal advanced in this paper which are left unanswered:

1. **Covert exceptives**   What governs the pronunciation of exceptive heads? That is, when can an exceptive be covert? This is needed to prevent all occurrences of *only* and of EXHAUST from being expressible as negation.

2. **Punctual *until***   Can the analysis be extended to punctual *until* in examples like (47), where an interruption-like inference is obligatory?[22]

   (47)   The dog didn't bark until Kim sneezed. ($\leadsto$ The dog barked when Kim sneezed)

3. **Causality**   ExN has an interpretive effect which is additional to the interruption implication and is not predicted by what I have proposed in this paper. *Until*-clauses containing ExN are felt to convey causality of sorts, as though the eventuality described by the *until*-clause *leads to* the interruption of the eventuality described by the main clause in a non-coincidental way.[23]

4. **Free Relatives**   A question related to questions 1 and 3 above pertains to ExN in Free Relative clauses, as attested in Hebrew, Yiddish, Russian, Polish, Udmurt, Georgian (Eilam, 2007; Rubinstein and Doron, 2015; Rubinstein et al., 2015; Haspelmath and König, 1998), and Bangla (Ishani Guha, p.c.). As Eilam (2007) shows, the contribution of ExN in such cases is reminiscent of that of *-ever* in English Free Relatives, along with ignorance and indifference inferences. It is not clear that an exclusive inference parallel to the interruption implication is present in such cases. At the same time, a source of hope for a unified account comes from the observation that some Free Relatives can host an overt *only*, as illustrated in (48).[24]

   (48)   a.   *ha-kelev jaʔakov   axarej-xa le-ʔan   ʃe-**rak**   telex*
               the-dog 3MSG.follow.FUT after-2MSG to-where that-only go.2MSG
               'The dog will follow you wherever you go.'

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[22]I thank Maribel Romero for raising this question.

[23] A related phenomenon, which to the best of my knowledge was not mentioned before, is the unavailability of *de re* readings with ExN. The ExN-less sentence in (i) can be true even if Miri is willing to be here until some time, say noon, and unbeknownst to her, Yoni is going to return at noon. When ExN is added in (ii) it can only be the case that Miri is willingly waiting for Yoni. In other words, in (i) she is willing to be here until some time that the *speaker* describes as Yoni's return time, but in (ii) she is willing to be here until some time that *she* describes as Yoni's return time.

(i)   *miri muxana li-hiyot po ad ʃe yoni yaxzor*
       M.   ready   to-be here until that Y. return.FUT
       'Miri is willing to be here until Yoni returns.'   ($\checkmark$ *de re*; $\checkmark$ *de dicto*)

(ii)   *miri muxana li-hiyot po ad ʃe yoni **lo** yaxzor*
       M.   ready   to-be here until that Y. NEG return.FUT
       'Miri is willing to be here until Yoni returns.'   (*de re; $\checkmark$ *de dicto*)

[24]Another telling observation is that similarly to the facts on *until* in fn. 23, Free Relatives hosting ExN are obligatorily read *de dicto*. That is, they are of the *wh-ever* kind, with ignorance and indifference inferences, and not plain extensional definite descriptions.

    b.   *ha-kelev jaʔakov*   *axarej-xa le-ʔan ʃe-**lo**   telex*
           the-dog 3MSG.follow.FUT after-2MSG to-where that-NEG go.2MSG
           'The dog will follow you wherever you go.'

   5. **Negative concord**   Why are exceptives intervenors for negative concord?

I hope that future research will shed light on these issues.

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