Minimizer negative polarity items in non-negative contexts

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Abstract

Minimizer strong NPIs such as *lift a finger* are known to be more restricted in their occurrence than weak NPIs like *ever*. Sedivy 1990 ('Against a unified analysis of negative polaritylicensing'. *Cahiers Lingistiques D'Ottawa* 18. 95–105) points to contexts with a "negative side message" in which *lift a finger* can occur but *ever* cannot. The paper provides a short overview over the relevant contexts and proposes an extension of a representational theory of NPI licensing with the following components: First, an *utterance content* is introduced that enriches the primary truth-conditional content by conventional implicatures and generalized conversational implicatures. Second, *ever*-type NPIs can be licensed by weak NPI licensors, but only in the primary truth-conditional meaning of an utterance. *Lift-finger*-type NPIs can only be licensed in the scope of negation, but the licensing can be checked at the representation of the enriched meaning of an utterance.

1 Introduction

In this paper, I will constrast the distributions of two types of negative polarity items (NPIs): NPIs such as *lift a finger* and *drink a drop*, which are often characterized as *strong NPIs*, *strict* NPIs, *minimizer NPIs* – or *lexical* NPIs in Sedivy (1990). To avoid any commitment to a characterization of this class, I will simply refer to such NPIs as *lift-finger*-type NPIs and I will mark them in bold small caps in my examples, see (1). The second type of NPIs are expressions such as *ever* and the NPI-uses of *any*, *anything*, ... These are often called *weak NPIs*. Sedivy (1990) chooses the term *regular NPIs* for them. I will refer to them as *ever*-type NPIs and mark them in small caps in my examples, see (2).

As shown in (1) and (2), NPIs of both types can occur if they are in the scope of sentential negation, as expressed with a negated auxiliary in the (a)-examples or a so-called neg-word like *noone* in the (b)-examples. These licensing expressions are called *strong licensors* and will be underlined with a solid line in this paper. They create an anti-additive context for the NPIs (van der Wouden, 1997). Similarly, both types of NPIs are excluded in affirmative sentences that lack a licensor, see the (d)-examples. While the two types of NPIs behave in the same way in these contexts, only *ever*-type NPIs can be used in the scope of simply downward-entailing expressions such as *few*, see the (c)-examples. I will mark such weak licensors with a wavy line.

(1) a. Alex didn't **LIFT A FINGER** to help.
b. Noone **LIFTED A FINGER** to help.
c. * Few students **LIFTED A FINGER** to help.

[†]I would like to thank the reviewers and the audience for their comments, in particular Jack Hoeksema, Jacob Maché, Frank Richter, Monica-Mihaela Rizea Casa, and Hedde Zeijlstra. All errors are mine.

d. * Alex **LIFTED A FINGER** to help.

(2) a. Alex didn't do ANYTHING to help.
b. Noone did ANYTHING to help.
c. Few students did ANYTHING to help.
d. * Alex did ANYTHING to help.

In general, the literature on NPIs gives the impression that *lift-finger*-type NPIs occur in a subset of the contexts in which *ever*-type NPIs can be found. However, Sedivy (1990) lists contexts such as (3), in which the occurrence pattern is reversed. With the stressed auxiliary, the *lift-finger*-type NPI is licensed even if there is no overt negative element or NPI-licensor in the clause. An *ever*-type NPI is, however, excluded in this context.

(3) a. But I DO **GIVE A DAMN**.
b. * But Bert DID EVER kiss Marilyn Monroe. (Sedivy, 1990, 98)

In this paper, I will maintain the traditional idea that *lift-finger*-type NPIs can only be licensed in the scope of negation, whereas *ever*-type NPIs are licensed in the scope of any NPI-licensing operator – in whichever way they are defined. To account for the contrast in (3), I will propose that the licensing of *ever*-type NPIs is checked in the primary, truth-conditional content of a clause. *Lift-finger*-type NPIs, on the other hand, can be licensed by conventionalized negative "side messages" as well. Such side messages can be conventional implicatures or even generalized conversational implicatures.

To develop this idea, I will look at a number of constructions that are challenging for established theories of NPI licensing (Section 2). I will present my understanding of the central ideas of Levinson (2000), who proposes *enriched semantic representations* that comprise the above mentioned types of side messages in Section 3. I show how the critical contexts are represented in this architection (Section 4). In Section 5, I show how the traditional NPI-licensing data in (1)–(2) as well as the challenging contrast in (3) can be captured in a theory of NPI licensing that assumes (i) that NPI-licensing conditions are expressed as constraints on semantic representations, and (ii) such representations may include conventional implicatures and generalized conversational implicatures. The main results will be summarized in a conclusion, Section 6.

2 Challenging contrasts

In this section, I will look at three constructions that are potentially problematic for a "classical," entailment-based view of NPI licensing: the restrictor of a universal quantifier, denial-uses of auxiliaries, and irrealis uses of modals. While the data have been discussed in the literature – including Linebarger (1980),

Sedivy (1990), and Heim (1984) – they have not been integrated systematically into a theory of NPI licensing yet.

What I call the "classical," entailment-based view of NPI licensing is the theory of Ladusaw (1980) and its refinement in Zwarts (1981, 1986) and van der Wouden (1997).[1] According to this theory, NPIs can only occur in downward-entailing contexts, i.e. in contexts that allow inferences from supersets to subsets. For example, *Few guests smoked at the party* entails *Few guests smoked and drank at the party*. Strong NPIs are further restricted to so-called *anti-additive* contexts. The scope of *no N* is anti-additive, because *No guest* [*smoked or drank alcohol*] is equivalent to *No guest smoked and no guest drank alcohol*.

The scope of clausal negation and of neg-words (such as *nobody*, *never*), but also the restrictor of a universal quantifier constitute anti-additive contexts. The anti-additivity of the restrictor of a universal quantifier can be illustrated with the equivalence of *Everyone who smokes or drinks may have an addiction problem* and *Everyone who smokes may have an addiction problem and everyone who drinks may have an addiction problem*.

As this classical theory of NPI licensing is based on entailment, pragmatics should not have an influence on the basic conditions under which NPIs are licensed. However, there could be additional pragmatic restricting as to whether an NPI can occur or not. This seems to be the case for the restrictor of universal quantifiers. Linebarger (1980) and Heim (1984) note that *lift-finger*-type NPIs are possible there in principle, see (4a), though not generally, see (4b).

(4) [Every restaurant that charges SO MUCH AS a dime for iceberg lettuce]
   a. . . . ought to be closed down.
   b. ?? . . . actually has four stars in the handbook.

(Linebarger, 1980, 107)

According to Heim (1984, 104–105), *lift-finger*-type NPIs require that there be a causal or necessary relation between the restrictor and the scope, rather than a mere coincidence. For *ever*-type NPIs, no such additional, pragmatic constraint is needed, see (5).

(5) a. [Every restaurant that has EVER charged a dime for iceberg lettuce], ought to be closed down.
   b. [Every restaurant that I have EVER gone to], happens to have four stars in the handbook. (Heim, 1984, 105)

This suggests that the data on the restrictor of a universal quantifier are compatible with the classical theory: it is an anti-additive context and *lift-finger*-type NPIs occur in a subset of contexts of *ever*-type NPIs.

[1] I deliberately ignore other refinements, such as the inclusion of presuppositions (von Fintel, 1999), or the relaxation to non-veridicality (Zwarts, 1995; Giannakidou, 1999), as these do not relate directly to the data discussed in this paper.

Matters are different once we look at next two contexts, which have been pointed out by Sedivy (1990). They do not contain an overt NPI-licenser but still license *lift-finger*-type NPIs, though not *ever*-type NPIs.

Sedivy (1990, 98) provides the data in (3) above. She characterizes them as *contrastive* use of *do*, or as *denial*. In (6), I construct a suitable context sentence for example (3a) and provide Sedivy's negative side message.

(6) A: I am disappointed that you don't GIVE A DAMN about my problems.
B: But I DO GIVE A DAMN.
Side message: It is not true that [I don't GIVE A DAMN].

In (7), the same is done for an *ever*-type NPI. As shown, a denial context, even if it triggers a negative side message, cannot license the NPI *ever*.

(7) A: I don't think Bert EVER kissed Marilyn Monroe.
B: * Bert DID EVER kiss Marilyn Monroe.
Side message: It is not true that [Bert didn't EVER kiss Marilyn Monroe].

The denial context is problematic for the classical theory of NPI licensing. First, it does not satisfy the precondition of what is an NPI-licensing context, as it is not downward entailing. Second, it is surprising to find *lift-finger*-type NPIs in a context that does not license *ever*-type NPIs.

We can now look at the last context to be discussed in this paper. Sedivy (1990, 98-99) lists examples with irrealis uses of modals. Two of her examples are given in (8). They all have a negative side message, which is given below the example. However, only *lift-finger*-type NPIs are licensed in this environment.

(8) a. John should have LIFTED A FINGER to help Mary.
Side message: John didn't LIFT A FINGER to help Mary.
b. * John should have eaten ANY healthy tofu.
Side message: John didn't eat ANY healthy tofu.

Irrealis modals do not constitute a downward-entailing context and, consequently, should not license NPIs, let alone *lift-finger*-type NPIs.

So far, I have presented the challenging contexts in the light of what I called the classical theory of NPI licensing. Sedivy (1990) shows that they are equally problematic for the Binding Theoretical account of Progovac (1988, 1992), and for the approach in Linebarger (1980, 1987).

The scalar approach of Krifka (1994), Eckardt (2005) and others is more recent than Sedivy's paper. In scalar approaches, an NPI usually has a minimal lexical semantics and triggers larger, scalar alternatives. At the same time, the NPI is required to occur in a sentence that makes a stronger statement than had any of the alternatives been used. The combination of these conditions means that NPIs are licensed in scale-reversal contexts, which means downward-entailing

contexts relative to contextually given alternatives. Eckardt & Csipak (2013) try to capture the more restricted occurrence pattern of *lift-finger*-type NPIs by an additional *non-veridicality condition*: The statement containing a minimizer may not be true in the actual world. Eckardt & Csipak show how this accounts for the contrast in (4). However, the other two contexts remain problematic, as they should not license NPIs at all, and, furthermore, in the denial contexts the speaker commits to the truth of the statement.

Finally, there is the representational, collocational approach formulated for instance in Sailer & Richter (2002) and Richter & Soehn (2006). In this approach, NPIs are collocationally restricted to occur in a semantic representation in which they are in the scope of an NPI-licensing operator. As in the other approaches, *lift-finger*-type NPIs are assumed to be licensed in a subset of the licensing contexts of *ever*-type NPIs. Only Richter & Soehn (2006, 438–439) discuss the option of licensing some NPIs not just in the representation of the at-issue content of sentence, but also in the the representation of the non-at-issue content.

The core insight of Sedivy (1990) is that there is not a uniform mechanism of NPI licensing, but that *ever*-type NPIs require a direct licensing through the grammatical structure, whereas *lift-finger*-type NPIs can be licensed by pragmatically triggered side messages. In the next sections, I will show how such side messages can be integrated into the semantic representation of an utterance to make them accessible for NPI licensing.

3 Enriched semantic representations

In this section, I will propose to enrich the semantic representation of an utterance with conventional implicatures and generalized conversational implicatures (Grice, 1975). My proposal can be seen as synthesis of insights and techniques from the formal semantic and pragmatic literature.

Discourse Representation Theory (Kamp & Reyle, 1993; Kamp et al., 2011) distinguishes a *preliminary representation* that is expanded through anaphora resolution and presupposition accommodation – where the latter is treated as a case of anaphora resolution (van der Sandt, 1992). AnderBois et al. (2015) show that the non-at-issue content can interact with anaphora resolution and, therefore, should be part of the expanded representation as well.

Research on *conventional implicatures*, such as Potts (2005) and Gutzmann (2015), has shown that conventional implicatures need to be computed alongside the at-issue content of an utterance, but have to be kept apart as they have an independent truth value (Potts, 2005) which determines the felicity conditions of an utterance (Gutzmann, 2015).

I assume that the semantic representation of a sign consists of a truth-conditional part and a part for conventional implicatures or use-conditional semantics. I will use the notation in (9), where I separate the truth-conditional

semantics from a list of conventional implicatures by the symbol " ‡ ".

(9) Alex, who is a linguist, read the book.
$\exists x(\textbf{book}(x) \wedge \textbf{read}(\textbf{alex},\textbf{x}))$
$$\ddagger \left\langle \begin{array}{l} \exists!x(\textbf{book}(x)), \\ \exists!y(y = \textbf{alex} \wedge \forall y(y = \textbf{alex} \rightarrow \textbf{linguist}(y)) \end{array} \right\rangle$$

According to the analysis of definites in Sailer & Am-David (2016), the main clause, *Alex read the book*, has a preliminary content of the form $\textbf{read}(\textbf{alex}, x)$. The definite NP *the book* introduces an existence and a uniqueness condition. Sailer & Am-David (2016) follow Horn & Abbot (2013) and Coppock & Beaver (2015) in separating these two: The existence requirement is a presupposition, $\exists x(\textbf{book}(x) \wedge \ldots)$, which is accommodated into the truth-conditional content of the clause. The uniqueness condition, $\exists!x(\textbf{book}(x))$, is treated as a conventional implicature, and added after the " ‡ " symbol. The appositive relative clause is contributed as a conventional implicature. In its representation, the anaphoric relation between the relative pronoun and its antecedent is resolved.

I will refer to the strictly truth-conditional part of a semantic representation as the one in (9) as the *primary truth-conditional content*. The overall representation will be called the *conventional content*.

The next step is to include *generalized conversational implicatures*. Just like particularized conversational implicatures, Grice (1975) describes them as defeasible, non-detachable, calculable, and non-conventional. Levinson (2000, 15) adds to this list that they are reinforceable. Finally, they are not projective in the sense of Karttunen & Peters (1979) or Tonhauser et al. (2013). This means that they do not project over the scope of negation or in yes/no questions, nor do they project in belief contexts. Even though generalized conversational implicatures are non-conventional, they arise by default, whereas particularized conversational implicatures only arise when contextually required, see Grice (1975, 56–57) and Levinson (2000, 16–21).

Levinson (2000, Section 1.4) distinguishes three types of generalized conversational implicatures. First, the **Q(uantity)-heuristics** ("What isn't said, isn't") is based on the maxim of Quantity. It licenses scalar inferences. Second, the **I(nformativeness)-heuristics** ("What is expressed simply, is stereotypically exemplified") is the basis for strengthing a disjunction into an exclusive disjunction or a conditional into a bi-implication, for example. Third, the **M(anner)-heuristics** ("What is said in an abnormal way, isn't normal") captures effects of the maxim of Manner. There is a hierarchy among these heuristics, with the Q-heuristics as the strongest, and the I-heuristics as the weakest.

Evidence for the importance of generalized conversational implicatures for semantics comes from data such as (10), quoted here after Levinson (2000, 199). I indicate the material added by a generalized conversational implicature by a dotted underlining. As Levinson points out, the use of the comparative

in this example would be contradictory without the added inference on the temporal ordering of the drinking and the driving.

(10) Driving home and drinking three beers is better than drinking three beers and driving home.
I-heuristics: Driving home and then drinking three beers is better than drinking three beers and then driving home.

In the following, I will show how I will implement Levinson's ideas. I assume that generalized conversational implicatures are added *after* the computation of the conventional content. I will call the resulting semantic representation the *utterance content* – which is what Levinson (2000, 188) calls the *Semantic Interpretation*. The utterance content has the same form as the conventional content, i.e., it consists of a truth-conditional part and list of conventional implicatures.

I conceive of generalized conversational implicatures as *rewriting rules* on semantic representations of the following form:

(11) Given two formulæ α, β, a rewriting rule for a generalized conversational implicature has the form $\alpha \mapsto_{GCI} \beta$.
Such a rule means: If α occurs in the conventional content, it can optionally be replaced with $(\alpha \underset{\cdot\cdot\cdot}{\wedge} \beta)$ in the utterance content.

The relevant rewriting rule for (10) is given in (12), where "$\phi < \psi$" is true iff ϕ is temporally ordered before ψ. I illustrate the application of this rule with a simplified example in (13).

(12) $(\phi \wedge \psi) \mapsto_{GCI} (\underset{\cdot\cdot\cdot\cdot\cdot\cdot\cdot}{\phi < \psi})$

(13) Alex drove (home) and drank (three beer).
Conventional content: $\mathbf{drive}(\mathbf{alex}) \wedge \mathbf{drink}(\mathbf{alex}) \ddagger \langle\rangle$
Utterance content:
$\mathbf{drive}(\mathbf{alex}) \wedge \mathbf{drink}(\mathbf{alex}) \underset{\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot\cdot}{\wedge (\mathbf{drive}(\mathbf{alex}) < \mathbf{drink}(\mathbf{alex}))} \ddagger \langle\rangle$

The rule in (12) adds the temporal ordering. Note that the modification triggered by the generalized conversational implicature is included inside the truth-conditional part of the utterance content.

If the semantic representation that triggers the generalized conversational implicature is part of a conventional implicatures, the material added by the rewriting rule will also be part of that conventional implicature. Grice (1975, 56) argues that in sentence *I went to a house yesterday and found a tortoise inside the front door*, the indefinite description *a house* triggers the conversational implicature that it is not the speaker's house. In (14), this sentence occurs inside a non-restrictive relative clause, i.e., a semantic contribution that is considered a conventional implicature (Potts, 2005). The inference that it is not Kim's house is still valid.

(14) Kim, who went to a house yesterday and found a tortoise inside the front door, usually doesn't like reptiles.
Inference: it is not Kim's house

The presented encoding of generalized conversational implicatures captures the defining properties of this type of inference from Grice (1975). *Defeasibility:* The application of rules like the ones in (12) is optional. This means that in cases in which the inference does not arise or is cancelled, the rule has not been applied. *Non-detachablity:* The rules depend on semantic representations, not on a particular choice of words. *Calculability:* All proposed rules should be based on the Gricean maxims and/or Levinson's Q-, I-, or M-heuristics. *Non-conventionality:* The inference is not part of the conventional content.

We can also look at the two additional properties that I mentioned. *Reinforceability:* As the application of rewriting rules for generalized conversational implicatures is optional, they need not be included in the utterance content and the same conventional content could be mapped to distinct utterance contents. Consequently, reiterating explicitly a particular generalized conversational implicature is never really redundant as it excludes other potential utterance contents. *Non-projectivity:* The additional semantic contribution is added directly to the content triggering the inference. Consequently, it will be in the scope of all operators that have scope over the trigger.

The resulting semantics-pragmatics interface is sketched in Figure 1. The boxes represent levels of semantic representation. The non-boxed parts describe the semantic and pragmatic processes that lead to these representations. The model is heavily influenced by the representation in Levinson (2000, 188), but deviates from it in various respects. First, as I will work with various semantic representations (which can be seen as values of appropriate features in a potential HPSG rendering of this theory), I put the representations in boxes, rather than the processes. Second, I included conventional implicatures and use-conditional content, which are not considered in detail in Levinson (2000). Third, Levinson argues that generalized conversational implicatures play an important role in the process of fixing and narrowing reference. As I am not directly concerned with this aspect here, I preferred to stick to the architecture in Kamp et al. (2011) and previous work of my own, where anaphora resolution and presupposition accommodation are treated as part of the conventional content. Fourth, I am not using exactly Levinson's terminology. For example, he refers to the application of generalized conversational implicatures as *Gricean pragmatics 1* and to that of particularized conversational implicatures as *Gricean pragmatics 2*. Instead, I simply name the types of inferences at work.

The model presented in Figure 1 has been formulated with an integration into a constraint-based framework such as Head-driven Phrase Structure in mind. However, I will refrain from making a concrete proposal for reasons of space, but see Sailer & Am-David (2016) for an encoding of the parts needed for the conventional content. The utterance content will only be defined on

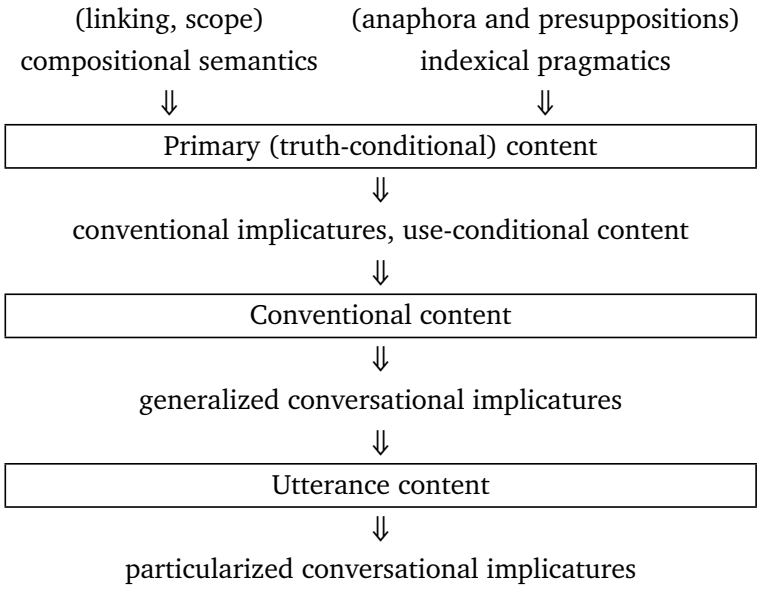

Figure 1: Model of the semantics-pragmatics interaction

independent utterances and will be the result of applying rules for generalized conversational implicatures as the one in (12) to the conventional content.[2]

4 Utterance content of the relevant contexts

In this section, I will present the semantic representation required for the three critical NPI-licensing contexts discussed in Section 2. I will start with denial, then turn to irrealis modals and, finally, to the restrictor of universal quantifiers.

In a recent paper, Gutzmann et al. (2020) present an analysis of so-called *Verum focus* (Höhle, 2019b). The authors argue, that there is a propositional operator, **VERUM**, that only has a use-conditional meaning, i.e., whose meaning contribution only has an effect on the felicity condition of the sentence.

Let me illustrate this with the example in (15) from Gutzmann et al. (2020, 3). The truth-conditional meaning of B's utterance is just that 'Peter kicked the dog'. There is, however, a use-conditional component: The sentence is only felicitous if B wants to prevent the current question under discussion (here: "Who kicked the dog?") to be settled to "Peter didn't kick the dog."

(15) A: I cannot imagine that Peter kicked the dog.
B: Peter DID kick the dog. (Gutzmann et al., 2020, 3)

To achieve this, Gutzmann et al. (2020, 39) define the meaning of the operator **VERUM** as in (16). As indicated with $[\![\ldots]\!]^{u,c}$, it is a definition of the

[2] See Höhle (2019a) for an analogous treatment of so called postlexical morphophonology.

use-conditional meaning in a context c. Instead of being true of false in the "use-conditional dimension," the expression is checked for felicity. The value "✓" indicates felicity.

(16) $[\![\textbf{VERUM}]\!]^{u,c}(p) = \checkmark$ iff speaker c_s wants to prevent that QUD(c) [MS: the question under discussion in context c] is downdated with $\neg p$.

For the purpose of this paper, I propose to decompose the representation of **VERUM** into a predicate **prevent-down-dating** (short: **pdd**) and a negation. The predicate **pdd** seems to be more general and can be of use also in an analysis of other operations on the background, such as some uses of rising declaratives (Gunlogson, 2003).

The fact that Verum is analyzed as a use-conditional operator indicates that it is part of the conventional content as defined in Section 3. In (17), I provide the conventional content of B's utterance in (15). I simplify the semantic representation of the NP *the dog* as **the-dog**.

(17) $\textbf{kick}(\textbf{peter}, \textbf{the-dog}) \ddagger \langle \textbf{pdd}(\neg \textbf{kick}(\textbf{peter}, \textbf{the-dog}))\rangle$

For the remaining two context, we will need to invoke generalized conversational implicatures. I will first look at irrealis modals as used in (8) above. The idea I will pursue here is that the use of the expression *should have VP* triggers the inference *didn't VP*. I will show with an example that this inference has the properties of a generalized conversational implicature, using the following criteria: defeasibility (to separate the inference from entailment), and reinforceability (to separate it from explicitly encoded content and presuppositions). Finally, I will show that it is calculable on the basis of Gricean maxims and/or any of the Q-, M-, or I-hypothesis. Consider the example in (18).

(18) Alex should have helped Kim.
Inference: Alex didn't help Kim.
   a. Alex should have helped Kim, and helped, indeed.
   b. Alex should have helped Kim, but didn't.

In (18a), the continuation cancels the default inference. In (18b) the continuation reinforces it. The inference can be seen as a scalar implicature, assuming a scale of factuality of the form "in some world" > "in the actual world". Using the modal expression, then triggers the negation of the stronger alternative (Q-hypothesis).

This leads me to postulating the generalized conversational implicature rule in (19). This rule gives rise to the conventional and utterance content of the sentence *Alex should have helped Kim* given in (20).

(19) $\textbf{SHOULD}(\phi) \mapsto_{GCI} \neg\dot{\phi}$

(20) a. Conventional content: **SHOULD**(**PAST**(**help**(**alex**, **kim**))) ‡ ⟨⟩

b. Utterance content:
SHOULD(**PAST**(**help**(**alex**, **kim**)))∧¬**PAST**(**help**(**alex**, **kim**)) ‡ ⟨⟩

The last critical context to look at is the restrictor of a universal quantifier. According to Heim (1984), we find a difference in NPI-licensing depending on whether there is some causal or necessary relation between the restrictor and the scope. Following Horn (1997, 161), Sailer (2009, 464–465) and Eckardt & Csipak (2013, 289) assume that what constitutes a law-like statement is that a law holds even if it is not applied. In other words, a law-like universal statement does not allow for an inference that its restrictor set is non-empty. An episodic statement, however, has exactly this inference. I write down these observations in the format of rules for generalized conversational implicatures in (21).

(21) a. $\forall x(\phi \rightarrow \psi) \mapsto_{GCI} \exists x \phi$ (for episodic universals)

b. $\forall x(\phi \rightarrow \psi) \mapsto_{GCI} \textbf{ModOp} \neg \exists x \phi$ (for lawlike universals)

I write **ModOp** in the rule for lawlike universals in (21b). This is intended as a placeholder for a modal operator. The operator could be just possibility, ◊, but it could also be some epistemic or deontic obligation. In the classical example in (4a), the understanding is that there should be no restaurant charging a dime for iceberg lettuce.

I will use the example in (22) to show that the inference for lawlike universal statements in (21b) is, indeed, a generalized conversational implicature. The inference is cancelled in (22a) and reinforced in (22b).

(22) Everyone who is caught driving drunk will loose their driver's license.
Inference: Possibly, no-one will be caught driving drunk.

a. . . . and, with all the controls over the weekend, it is certain that the police will get someone. $(\ldots \wedge \Box \exists x \phi)$

b. . . . , but possibly, the police will not find any drunken driver.
$(\ldots \wedge \textbf{ModOp} \neg \exists x \phi)$

To complete the argument, I have to show that the inferences are calculable. The fact that Horn (1997, 161) describes episodic universal statements as "general sentences of common speech" suggests that the inference in (21a) is based on the I-hypothesis ("What is expressed simply, is stereotypically exemplified"), capturing the ordinary case. The inference for lawlike statements in (21b), on the other hand, follows from the Q-hypothesis ("what isn't said, isn't"). As the universal quantifier in logic does not require a non-empty restrictor set, we can infer that option of an empty one.

Note that there is no problem in assuming two apparently contradictory ways of enriching the conventional content of an utterance. Instead, this is

exactly what we expect for conversational implicatures. Nonetheless, the two options for enrichment given in (21) are both general and not dependent on a particular situation.

The conventional content and the utterance content of the lawlike interpretation of example (22) is given in (23).

(23) a. Conventional content: $\forall x(\textbf{get-caught}(x) \rightarrow \textbf{loose-license}(x)) \ddagger \langle\rangle$

b. Utterance content:
$\forall x(\textbf{get-caught}(x) \rightarrow \textbf{loose-license}(x))$
$\wedge\textbf{ModOp}\neg\exists x(\textbf{get-caught}(x)) \ddagger \langle\rangle$

We can now take a look at the analyses of the three contexts discussed in this paper as posing a challenge to existing theories of NPI licensing. We observe that in all of them, there is no negation in the primary truth-conditional content, but there is a negation in the utterance content. .

5 A revised representational theory of NPI licensing

The result of the previous section can be used as the basis for a revised representational theory of NPI licensing. The basic idea of a representational theory of NPI licensing is that an NPI can lexically impose constraints on the semantic representations in which it can be used (see Sailer & Richter (2002), Richter & Soehn (2006) and other work by these authors). This makes it necessary to have a structural notion of an *NPI-licensing semantic environment*. For example, Richter & Soehn (2006) basically list all operators and their scope depending on the type of entailment they allow. Other publications propose some generalization, though this is not really important for the present purpose.

I will start with the characterization of the licensing condition of *ever*-type NPIs. As these are the weakest type of NPIs in English, I assume that they are licensed in any NPI-licensing semantic structure. These include the scope of negation, the restrictor of a universal quantifier, the scope of *few* etc. As we have introduced not only the primary truth-conditional content, but also the conventional content and the utterance content, we now need to determine at which level of semantic representation the NPI needs to be licensed. I assume that the primary truth-conditional content is the right level for *ever*-type NPIs. This is summarized in (24).

(24) Licensing condition for *ever*-type NPIs:
The semantic contribution of an *ever*-type NPI must occur in an NPI-licensing environment within the primary truth-conditional content of a clause containing the NPI.

Let me go through the examples from this paper to see that this licensing condition makes the right predictions. To do this, I will look at relevant example

sentences and indicate their (simpified) primary truth-conditional content. The sentences from (2) are presented in such way in (25). The licensing condition is met in the examples (25a)–(25c). However, there is no licensing environment in the simple affirmative clause in (25d). Consequently, the NPI is not licensed in this sentence.

(25) a. Alex didn't do ANYTHING to help.
Primary content: $\neg\exists x(\mathbf{do}(\mathbf{alex}, x))$

b. Noone did ANYTHING to help.
Primary content: $\neg\exists y\exists x(\mathbf{do}(y, x))$

c. Few students did ANYTHING to help.
$[\mathbf{Few}\, y : \mathbf{student}(y)](\exists x(\mathbf{do}(y, x)))$

d. * Alex did ANYTHING to help.
$\exists x(\mathbf{do}(\mathbf{alex}, x))$

We can now look at the three environment discussed in more detail from Section 2 on. An *ever*-type NPI can occur in the restrictor of a universal quantifier, independently of whether it is intpreted as episodical or as lawlike. This follows from the classification of this environment as NPI-licensing. I sketch the primary content of the sentences from (5) in (26).

(26) [Every restaurant that ... EVER ...], ...
Primary content: $\forall x((\mathbf{restaurant}(x) \wedge \ldots \mathbf{npi} \ldots) \rightarrow \ldots)$

Matters are different in the other two environments discussed in Section 2. I provide the primary content and the utterance content of sentence (3b) in (27). For simplicity, I add a time argument to predicates for examples with *ever*.

(27) * But Bert DID EVER kiss Marilyn Monroe.
Primary content: $\exists t(\mathbf{time}(t) \wedge \mathbf{kiss}(t, \mathbf{bert}, \mathbf{mm}))$
Utterance content: $\exists t(\mathbf{time}(t) \wedge \mathbf{kiss}(t, \mathbf{bert}, \mathbf{mm}))$
$\ddagger \langle \mathbf{pdd}(\neg\exists t(\mathbf{time}(t) \wedge \mathbf{kiss}(t, \mathbf{bert}, \mathbf{mm})))\rangle$

The semantics of the NPI does not occur in an NPI-licensing environment in the primary content of the sentence. Consequently, the NPI is not licensed. It is immaterial for the *ever*-type NPI that its semantics occurs in the scope of negation in the use-conditional content.

The same explanation can be given for irrealis modals, as in example (8b) above, which I repeat in (28) together with its primary content and its utterance content. As the primary content does not contain an NPI-licensing environment, the *ever*-type NPI cannot be used. The negation that the generalized conversational implicature introduces into the truth-conditional content at the utterance level cannot license the NPI.

(28) * John should have eaten ANY healthy tofu.

Primary content: **SHOULD**(**PAST**($\exists x$(**tofu**(x) $\wedge$ **eat**(**john**, x))))
Utterance content:
SHOULD(**PAST**($\exists x$(**tofu**(x) $\wedge$ **eat**(**john**, x))))
$\wedge\neg$**PAST**($\exists x$(**tofu**(x) $\wedge$ **eat**(**john**, x))) $\ddagger \langle\rangle$

This completes the discussion of the licensing pattern of *ever*-type NPIs. I adopt an representational theory of NPI licensing and explicitly restrict the licensing of this type of NPI to the primary content.

The licensing condition of *lift-finger*-type NPIs differs from that of *ever*-type NPIs. To capture the more restricted occurrence pattern in standard contexts as the ones in (1), I assume that *lift-finger*-type NPIs can only be licensed by negation itself. However, this licensing is not restricted to the primary content, but can be checked throughout the entire utterance content. This is expressed in (29).

(29) Licensing condition for *lift-finger*-type NPIs:
The semantic contribution of a *lift-finger*-type NPI must occur in the (immediate) scope of negation within the utterance content of the utterance containg the NPI.

This condition directly captures the data in (1). I repeat the examples in (30) together with their utterance content.

(30) a. Alex didn't LIFT A FINGER to help.
¬lift-finger(**alex**) $\ddagger \langle\rangle$

b. Noone LIFTED A FINGER to help.
$\neg\exists x$**lift-finger**(x) $\ddagger \langle\rangle$

c. * Few students LIFTED A FINGER to help.
[**Few**x : **student**(x)](**lift-finger**(x)) $\ddagger \langle\rangle$

d. * Alex LIFTED A FINGER to help.
lift-finger(**alex**) $\ddagger \langle\rangle$

In the first two examples, the NPI is in the scope of negation in the truth-conditional part of the utterance content. This is not the case in (30c) and (30d). As the NPI is not in the scope of negation in the conventional implicatures either, it is not licensed. This shows that the licensing condition in (29) allows us to capture the core data on *lift-finger*-type NPIs, i.e., their restriction to occurrence with negation only and not with weaker licensors such as *few*.

We can now turn to the examples from Sedivy (1990). I repeat example (3a) in (31) together with its utterance content.

(31) But I DO GIVE A DAMN.
give-damn(**speaker**) $\ddagger \langle$**pdd**($\neg$**give-damn**(**speaker**))$\rangle$

The NPI does not occur in the scope of negation in the primary truth-conditional content. However, the semantics of the NPI occurs in the scope of negation in the use-conditional content, inside the argument of the predicate **pdd**, which takes care of the management of the question under discussion. As the licensing condition on *lift-finger*-type NPIs takes this level of semantics into consideration as well, the NPI is licensed.

In the remaining two contexts, we observe licensing through a generalized conversational implicature. The use of an irrealis modal in (8a), repeated in (32), triggers the inference that John did not lift a finger to help Mary. As shown in the utterance content of this sentence, this inference is included inside the overall truth-conditional semantics. As the licensing condition of *lift-finger*-type NPIs are only checked at that level, the NPI is licensed.

(32) John should have lifted a finger to help Mary.
SHOULD(**PAST**(**lift-finger**(**john**)))∧¬**PAST**(**lift-finger**(**john**)) ‡ ⟨⟩

We can now look at *lift-finger*-type NPIs in the restrictor of a universal quantifier. I indicate the conventional content directly below the example in (33). The content of the NPI, schematically indciated by **npi**, is not in the scope of negation. In a lawlike reading, we can add the generalized conversational implicature from (21b) to the truth-conditional meaning of the utterance content. This results in a semantic representation in which the NPI's semantics occurs in the scope of negation, thus satisfying the licensing condition of the NPI.

(33) [Every restaurant that charges SO MUCH AS a dime for iceberg lettuce]
Conventional content: $\forall x((\textbf{restaurant}(x) \wedge \ldots \textbf{npi} \ldots) \rightarrow \ldots)$ ‡ ⟨⟩

a. ... ought to be closed down.
$\forall x(((\textbf{rest}(x) \wedge \ldots \textbf{npi} \ldots) \wedge \textbf{ModOp}\neg\exists x(\textbf{rest}(x) \wedge \ldots \textbf{npi} \ldots)) \rightarrow \ldots)$ ‡ ⟨⟩

b. ?? ... actually has four stars in the handbook.
$\forall x(((\textbf{rest}(x) \wedge \ldots \textbf{npi} \ldots) \wedge \exists x(\textbf{rest}(x) \wedge \ldots \textbf{npi} \ldots)) \rightarrow \ldots)$ ‡ ⟨⟩

In the case of an episodic reading, the generalized conversational implicature from (21a) can be added, see (33b). This inference does not introduce a negation. Consequently, the *lift-finger*-type NPI cannot be used in this reading.

Before closing this section, I would like to address a potential concern. Any scalar implicature introduces a negation (of stronger scalar alternatives). One might wonder if this means that *lift-finger*-type NPIs should be licensed whenever there is a scalar inference. The answer to this is clearly no. Consider the rule for a scalar implication for the scale $\exists < \forall$ in (34).

(34) $\exists x(\phi \wedge \psi) \mapsto_{GCI} \neg\forall x(\phi \rightarrow \psi)$

Sentence (35) can give rise to this inference. I indicate the utterance content for this example. The material from the scope of the existential quantifier, here: **read**(x), does not occur in the immediate scope of a negation anywhere in the utterance content. Consequently, *lift-finger*-type NPIs cannot be licensed.

(35) Some students read the book.
Scalar implicature: Not all students read the book.
$\exists x(\textbf{student}(x) \wedge \textbf{read}(x)) \underbrace{\wedge \neg \forall x(\textbf{student}(x) \rightarrow \textbf{read}(x))}_{\ddagger} \langle\rangle$

In this section, I went through the examples discussed in the first two sections of this paper. I showed that they can be captured in a theory of NPI licensing which takes into account two parameters: first, the type of licensing operator, and second, the level of semantic representation within which the NPI needs to be licensed.

6 Conclusion

In this paper, I have proposed an extension of a representational theory of NPI licensing that includes use-conditional content as well as generalized conversational implicatures. The theory presented here is conservative in that the licensors of *ever*-type NPIs are a superset of the licensors of *lift-finger*-type NPIs. However, the licensing condition for *ever*-type NPIs can only be checked in the primary content, whereas *lift-finger*-type NPIs can be licensed anywhere within the utterance content. This new theory provides a systematic account of the previously unexplained data from Sedivy (1990), in which *lift-finger*-type NPIs are possible in contexts in which *ever*-type NPIs are not licensed.

There is an important difference in the categorization of the data in contrast to most approaches to NPI-licensing. Even though the restrictor of a universal quantifier is an anti-additive environment, I do not consider it a licensing context for *lift-finger*-type NPIs *per se*. My motivation for this move is that licensing of *lift-finger*-type NPIs is only possible in this context under a certain reading.

It might be argued that the contexts discussed in Section 2 are marginal and that they need not be taken into consideration. However, Fritzinger et al. (2010) show that natural occurrences of NPIs in contexts with negative inferences can be found in corpora. This makes me optimistic that systematic empirical work on the critical contexts will provide us with a more solid database in the future.

The paper proposes an extension of the architecture of semantics within a constraint-based view of grammar. This, admittedly programmatic, part of the paper is an attempt to further enlarge the connection between formal semantics and formal pragmatics by providing an integrated architecture. My proposal combines work on conventional implicatures and use-conditional semantics with the theory of generalized conversational implicatures of Levinson (2000). The licensing behaviour of NPIs shows that these pragmatic inferences have a grammatical effect and should, consequently, be part of the semantic

representation of an utterance. At the same time, the differences between *ever*-type NPIs and *lift-finger*-type NPIs also show that we need to be able to keep the various levels of semantic representation apart.

When I introduced the rules for generalized conversational implicatures in Section 3, I emphasized that these rules apply optionally. However, if a *lift-finger*-type NPI is used in an utterance in which it is not licensed in the conventional content, it can only be rescued by applying a rule that introduces a licensing negation. In this sense, the application of a generalized conversational implicature – i.e. the restriction to a particular reading – can be enforced by the NPI. This is, of course, not special to NPIs. Examples like (10) and others that prove the truth-conditional relevance of generalized conversational implicatures illustrate the same point: The examples are not sensibly interpretable unless the implicature is being evoked.

At present, I do not see that *particularized conversational implicatures* should be part of the utterance content. There are two reasons for this: First, they do not seem to have a grammatical or truth conditional effect. Second, they seem to depend purely on the extra-linguistic context – rather than on the words or structures (like conventional implicatures) or the semantic representation (like generalized conversational implicatures).

I refrained from proposing an explicit integration of the proposed semantic-pragmatic interface into HPSG. I hope that this non-technical way of presentation makes it possible to evaluate my proposal independently of a particular framework of grammar. Nonetheless, I hope that the characterization given in this paper is precise enough to show that such an integration is possible.

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