Varieties of projective content: presuppositional and expressive scope[1]

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[1] 24.979: Topics in semantics
Getting high: Scope, projection, and evaluation order

Schedule

Today Presupposition projection cont. & the scope of expressive adjectives.

May 7 Me on expressives and alternatives & Sherry on the interaction between universals and negation.

May 14 Enrico on Sauerland 2005 and Charlow 2010 on scoping out of DP & Tanya on Szabolcsi on disjoined questions.

1 *Roadmap for today's class*

- We'll begin with a summary of last week – a recap of the assumptions underlying Grove's approach the satisfaction theory.
- We'll move on to show how Grove's initial fragment is *upgraded* into fragment that allows for presuppositional scope, by allowing for the evaluation of a presuppositional side-effect to be delayed via an internal lift function.
- We'll ultimately aim to understand how incorporating a simple mechanism for presuppositional scope resolves the proviso problem – evaluation of a presuppositional side-effect can be delayed until after evaluation of a filtration environment.
- After that we'll move on to a different topic – *expressive adjectives*.
- We'll see another case study of a variety of projective content where generalized mechanisms for scope-taking seem independently necessary.
- Concretely, I'll suggest – building on Elliott 2019 – that so-called "non-local" readings of expressive adjectives are a scopal phenomenon. Evaluation of expressive side-effects can be delayed, similarly to what Grove suggests for presupposition.
- In next week's class, I'll aim to show how treating expressive adjectives as scope-takers accounts for otherwise mysterious interactions between expressives and quantification, then we'll have our first student presentation.

2 *Presupposition projection cont.*

2.1 *Proviso problem recap*

Goal: to account for the *proviso problem*:

(1) If Sam seems to be happy, then his sister is pregnant.
   a. *presupposition (predicted):*
   If Sam seems to be happy, then he has a sister. ✗
   b. *presupposition (attested): Sam has a sister* ✓

The *satisfaction theory* of presupposition projection (Heim 1983, Beaver 2001, a.o.) predicts a conditional presupposition where an unconditional presupposition is accommodated.

Exactly this feature of the satisfaction theory is necessary to account for the fact that presuppositions can be filtered, depending on the inferential properties of the local context.

(2) If Sam has a sister and seems happy,
then his sister is pregnant. *presuppositionless*

(2) is predicted to presuppose *if Sam has a sister and seems happy then Sam has a sister*, which is tautologous.

A (possible) pragmatic response: it seems reasonable to say that conditional presuppositions are in fact *always* generated, as predicted by the satisfaction theory, but they're sometimes strengthened via pragmatic mechanisms.

We saw some arguments against this view from Mandelkern 2016. Here are a couple of samples to remind you:

Argument 1: conditional presuppositions can't always be strengthened.

(3) Ka knows that if Sam seems happy, then he is playing Final Fantasy.
   a. *conditional presupp:*
   If Sam seems happy, then he is playing Final Fantasy. ✓
   b. *unconditional presupp.: Sam is playing Final Fantasy* ✗

Argument 2: in a context that conflicts with the unconditional but not the conditional presupposition of a sentence, the result is oddness.

(4) *# I don't know if Sam is playing Final Fantasy, but...*
If Ka got home early, he stopped playing Final Fantasy.

As we discussed last week, maybe we should take some of these arguments with a pinch of salt...

Grove's (2019) response: both conditional *and* unconditional presuppositions can be derived in the semantics, once we have a satisfaction theory *upgraded* with mechanisms allowing for *presuppositional scope*.

2.2 Recap of Grove's background assumptions

Component 1: trivalence Grove adopts a trivalent semantics – i.e., one with three truth-values, $\top$, $\bot$, and #.

In order to handle trivalence in the logical meta-language, **grove** assumes:

- Ordinary logical connectives ($\wedge, \vee, \rightarrow, \neg$) have a *weak Kleene semantics*, i.e., undefined always projects.
- The first-order existential quantifier has a *middle Kleene* semantics – $\exists x$ presupposes that its scope is defined for at least one x.

Presuppositions are encoded via Beaver's δ-operator, which maps $\bot$ to #:

(5) Beaver's δ-operator (def.)

$$p^{\delta} = \begin{cases} \top & p = \top \\ \# & p = \bot \end{cases} \qquad \delta : \mathtt{t} \rightarrow \mathtt{t}_{\#}$$

Component 2: alternatives in Grove's fragment a's are enriched into sets of a-world pairs, membership in which may be *undefined*. Formally, this is modeled by the applicative functor $\circledast$:

(6) $\circledast\ \mathtt{a} := \mathtt{s} \rightarrow \mathtt{a} \rightarrow \mathtt{t}_{\#}$

Pure (ρ) maps an a to a trivially enriched value, and ap ($\overset{\circledast}{\mathsf{A}}$) does function application in the enriched type-space.

(7) a. $a^{\rho} \coloneqq \lambda wx\,.\,\delta\,(x = a)$ $\quad \mathsf{a} \to \circledast\,\mathsf{a}$

b. $m \overset{\circledast}{\mathsf{A}}\, n \coloneqq \lambda wp\,.\,\exists x, y[m\ w\ x\ \wedge n\ w\ y \wedge \delta\,(p = x\ \mathsf{A}\ y)]$
$\circledast\,(\mathsf{a} \to \mathsf{b}) \to \circledast\,\mathsf{a} \to \circledast\,\mathsf{b}$
$\circledast\,\mathsf{a} \to \circledast\,(\mathsf{a} \to \mathsf{b}) \to \circledast\,\mathsf{b}$

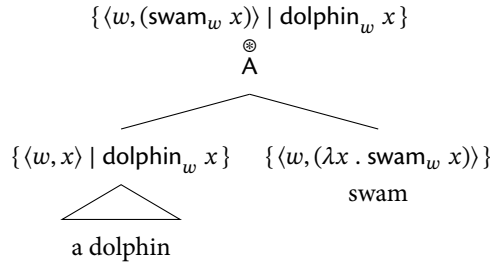

Figure 1: Alternative-semantic composition via $\overset{\circledast}{\mathsf{A}}$

Definites return undefined for individuals that don't satisfy the restrictor:

(8) $[\![\text{the dolphin}]\!] \coloneqq \lambda wx\,.\,\delta\,(\text{dolphin}_w\ x)$ $\quad \circledast\,\mathsf{e}$

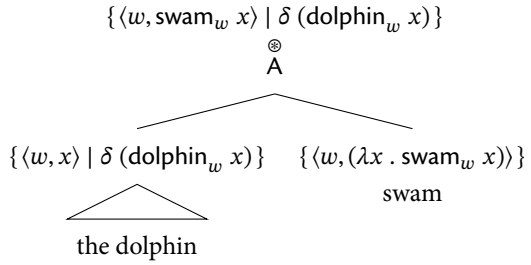

Figure 2: Composition with a definite description

The semantic presupposition of a sentence is the set of worlds which are mapped to $\top$ or $\bot$.

(9) The semantic presupposition of ϕ
$\{\, w \mid \exists t[([\![\phi]\!]\ \langle w, t\rangle = \top) \vee ([\![\phi]\!]\ \langle w, t\rangle = \bot)]\,\}$

Component 3: middle Kleene conjunction vanilla logical conjunction has a weak Kleene semantics; to get presupposition filtration, Grove also needs a logical conjunction with middle Kleene semantics: &.

&	$\top$	$\bot$	#
$\top$	$\top$	$\bot$	#
$\bot$	$\bot$	$\bot$	$\bot$
#	#	#	#

Figure 3: Short-circuited conjunction

Natural language conjunction/discourse sequencing is defined in terms of &. This gets us presupposition filtration in conjunctive sentences.

(10) Discourse sequencing (def.)
$\phi + \psi \coloneqq \{\langle w,t\rangle \mid \phi\ \langle w,\top\rangle\ \&\ \psi\ \langle w,t\rangle\}$ $\qquad (+) : \circledast\ \mathtt{t} \to \circledast\ \mathtt{t} \to \circledast\ \mathtt{t}$

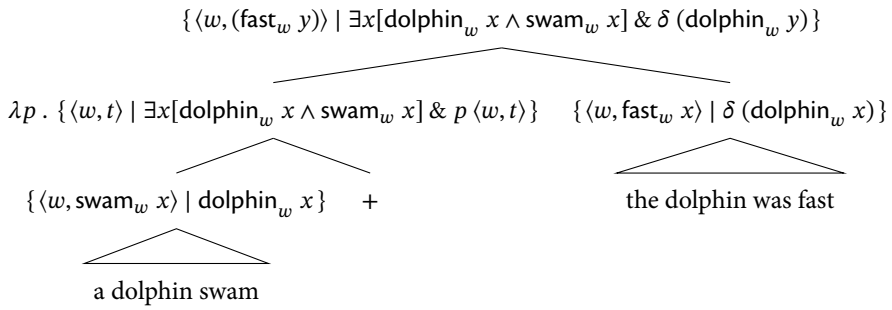

Figure 4: Presupposition filtration in a conjunctive sentence

Component 4: dynamic negation Grove assumes a standard dynamic entry for conjunction, which closes off the scope of indefinites.

(11) Sentential negation (def.)
$\text{not}\ \phi \coloneqq \{\langle w,\top\rangle \mid \neg\ (\phi\ \langle w,\top\rangle)\}$

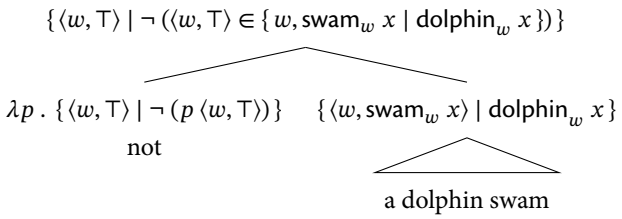

Figure 5: Sentential negation closes off indeterminacy

The conditional operator is defined under first-order equivalence with sentential negation.

(12) Conditional operator (def.)
$\text{if}\ \phi\ \psi \coloneqq \text{not}\ (\phi + \text{not}\ \psi)$

This entry predicts presupposition filtration, but results in the proviso problem. This is illustrated in figure (6), for *If Theo has a brother, then he'll bring his wetsuit*.

We can more clearly see what the presupposition on the resulting meaning is if we translate the resulting set back into function talk:

(13) $\lambda wt\ .\ \neg \begin{pmatrix} \text{has-brother}_w\ \text{Theo} \\ \&\ \neg\ (\exists x[\delta\ (\text{wetsuit}_w\ x) \wedge \text{Theo bring}_w\ x]) \wedge t = \top \end{pmatrix}$

- Since ¬ preserves undefinedness, the presupposition of the second conjunct of & is that Theo has a wetsuit.

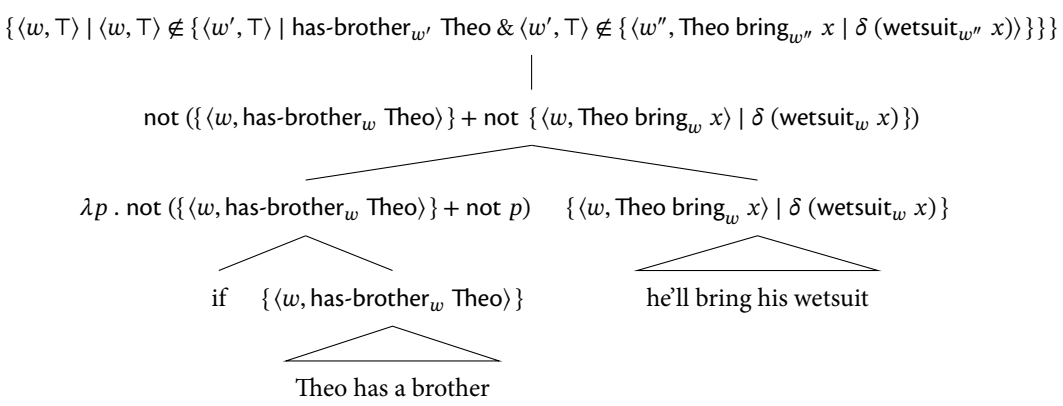

Figure 6: The proviso problem emerges

- The first conjunct asserts that Theo has a brother. By dint on the semantics of &, the presupposition of the second conjunct will only be evaluated in those worlds in which *Theo has a brother* is true.
- The definedness condition of the whole sentence is therefore: *Theo has a wetsuit if he has a brother*.

2.3 Shifting perspective: a grammar with scope-taking

In order make sense of the idea of presuppositional scope, we need to extend our fragment with a new operation: *join*:

(14) Join (def.)
$\mu\ m \coloneqq \{\langle w, x\rangle \mid \exists n[\langle w, n\rangle \in m \wedge \langle w, x\rangle \in n]\}$ $\qquad \mu : \circledast\ (\circledast\ \mathsf{a}) \rightarrow \circledast\ \mathsf{a}$

- Here, m is a set of world-set pairs – join tells us how to take a set of world-set pairs, and "flatten it" into a set of world-value pairs.
- Both the main set and the paired sets may, in principle, have definedness conditions on membership.
- μ takes m, and gives back a set containing all members of the paired sets in m which preserve the world with which they are paired.

Now, let's see how we convert a definite description into a scope taker.

$[\![\text{the dolphin}]\!] \coloneqq \{\langle w, x\rangle \mid \delta\ (\text{dolphin}_w\ x)\}$ $\qquad \circledast\ \mathsf{e}$

In order to lift this into a scope-taker, we apply ρ to the contained individual value. We can define an operation, which we'll call *internal lift* which does just this.[2]

[2] Internal lift in fact is implicit in our existing operations; this is because an applicative functor implies a way `fmap` for mapping functions into enriched values. Internal lift is just `fmap` ρ.

(15) Internal lift (def.)
$m^{\uparrow\uparrow_{\circledast}} \coloneqq \{\langle w, x^{\rho}\rangle \mid \langle w, x\rangle \in m\}$ $\qquad \uparrow\uparrow_{\circledast} : \circledast\, \mathsf{a} \to \circledast\,(\circledast\, \mathsf{a})$

Applying internal lift to *the dolphin* gives back a higher-order member of the enriched type-space, where the definedness condition on membership is on the outer layer of the set:

(16) $[\![\text{the dolphin}]\!]^{\uparrow\uparrow_{\circledast}} = \{\langle w, \{\langle w', x\rangle\}\rangle \mid \delta\,(\mathsf{dolphin}_w\ x)\}$ $\qquad \circledast\,(\circledast\, \mathsf{a})$

In order to compose this with a predicate, the predicate must be lifted via ρ.

(17) $[\![\text{swam}]\!]^{\rho} = \{\langle w, \{\langle w', (\lambda x\,.\,\mathsf{swam}_w\ x)\rangle\}\rangle\}$ $\qquad \circledast\,(\circledast\,(\mathsf{e} \to \mathsf{t}))$

We also need a way of doing function application in a *higher-order* enriched type-space. This is defined in the obvious way below:

(18) $m \overset{\circledast}{\mathsf{A}}_2 n \coloneqq \lambda w p\,.\,\exists x, y[m\ w\ x\ \wedge n\ w\ y \wedge \delta\,(p = x \overset{\circledast}{\mathsf{A}} y)]$
$\circledast\,(\circledast\,(\mathsf{a} \to \mathsf{b})) \to \circledast\,(\circledast\,\mathsf{a}) \to \circledast\,(\circledast\,\mathsf{b})$
$\circledast\,(\circledast\,\mathsf{a}) \to \circledast\,(\circledast\,(\mathsf{a} \to \mathsf{b})) \to \circledast\,(\circledast\,\mathsf{b})$

The role of join will be to evaluate the scope of the presupposition trigger. This is illustrated for a trivial example below, in which the presupposition associated with *the dolphin* vacuously takes scope, and is evaluated at the root level.

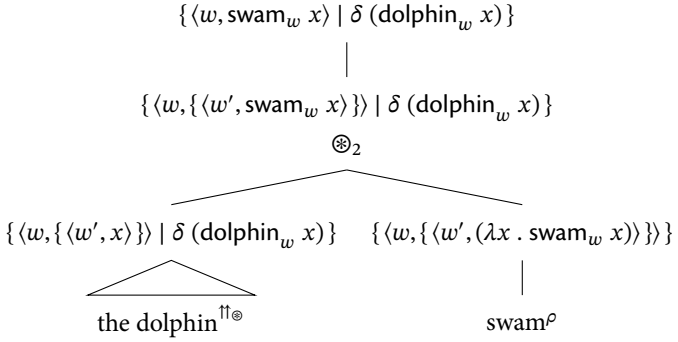

Figure 7: Vacuously scoping a uniqueness presupposition

With this mechanism in hand, however, a presupposition can scope out of an environment in which it would otherwise be filtered.

Now, back to our proviso problem case. We can generate the unconditional presupposition just by applying internal lift to *his wetsuit*, and evaluating via *join* at the root node.

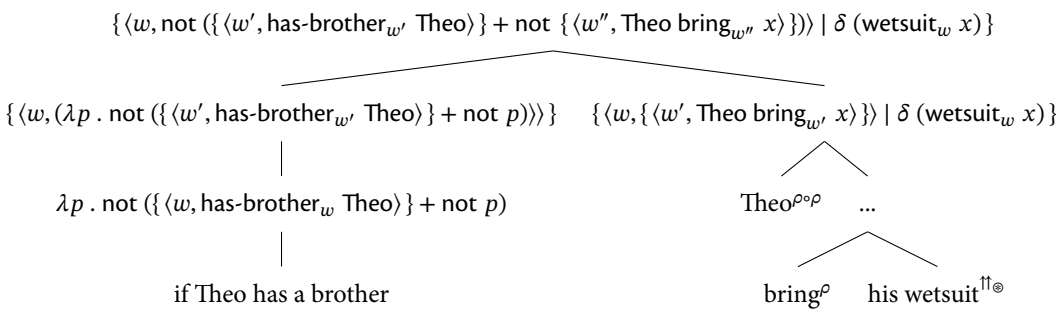

Figure 8: Resolving the proviso problem via scoping out

Applying join to the resulting meaning will have the effect that the presupposition of the outer set takes precedent over either any at-issue content or presuppositions contributed by any inner sets.

Many questions remain:

- Mandelkern's data suggests that, if the presupposition of the consequent isn't entailed in its local context, scoping out is *obligatory*. Why should this be?
- In general, wide-scope seems to be the "default", but as we've discussed in class, scope-shifting operations are often marked in the domain of quantificational scope.
- It can't be quite as simple as that however, since if the presupposition of the consequent *is* entailed in its local context, narrow scope is the default.

Does the following sentence even *have* a reading that presupposes that Theo has a wetsuit? Given hearer charitability, how do we tell?

(19) If Theo is a scuba diver, then he'll bring his wetsuit.

3 *Expressive adjectives*

At a broad level of abstraction Expressive Adjectives (EAs) convey a *negative expressive attitude* towards some entity, be in an individual, a *kind*, or something like a *state of affairs*.[3]

(20) a. I have seen most bloody Monty Python sketches!
b. Nowhere did it say that the damn thing didn't come with an electric plug!
c. I have to mow the fucking lawn.
d. My friggin' bike tire is flat again!

[3] See McCready 2012 for an important class of exceptions.

Potts 2005: 18

Potts 2005: p. 6

Potts 2005: 60

Potts 2005: 6

(21) Fucking Ollie!? He's a fucking knitted scarf that twat. He's a fucking balaclava.

The Thick of it, BBC

(22) You shitting idiot.

Touching the Void, David Greig

A naturalistic example in German:

(23) *Die wollen eine verfickte unterbezahlte Putzfrau einstellen, nur*
They want a fucking underpaid cleaning-lady hire, only
weil sie "keine Zeit" zum Putzen haben.
because they "no time" to clean have.
"They want to hire a fucking underpaid cleaning lady, just because they have 'no time' to clean."

Twitter

In the following, I'll use the fictional expressive adjective *frakking* in my examples.[4] Expressives are, by their very nature, distracting! Fortunately, intuitions seem to remain robust, even with novel coinages.

[4] Taken from *Battlestar Galactica*.

I'll use ☹ to indicate the object of the speakers negative expressive attitude, as illustrated in the following:

(24) "There is no Earth. It's a frakking joke. There is no Earth."
Admiral Adama, *Battlestar Galactica*

(25) The frakking cat is being affectionate for once. ☹ $\iota x[\mathsf{cat}\ x]$

N.b. that the example above is tailored to independently rule out a reading where the target of the expressive attitude is the state of affairs conveyed by the sentence, or cats in general

Rather, the target of the expressive attitude is the particular cat that the definite description refers to.

It's important to remember that ☹ is just a *placeholder* for a fully-fledged semantics for expressive attitudes – how exactly to cash out ☹ is an interesting and important question, but not one we'll be concerned with here.

Rather, we'll be concerned with how expressions that contribute *expressive side-effects* interact with other aspects of our compositional regime.

There are two signature properties of expressive content: (i) *projection*, and (ii) *non-interaction*.

PROJECTION: much like presuppositions, expressive content projects out of embedded constituents.

(26) Nobody who has met that frakking cat enjoys its company. ☹ that-cat

Unlike presuppositions, expressive content is *indexical* and (seemingly?) cannot be filtered.

(27) Either I love my dog, or my frakking dog is driving me crazy.
☹ my-dog

Non-interaction: an expressive adjective in the scope of an expressive adjective has no affect on its semantic contribution.

(28) The frakking editor of this journal won't respond to my emails.
☹ the-editor-this-journal

(29) The editor of this frakking journal won't respond to my emails.
☹ this-journal

(30) [The frakking editor of [this frakking journal]]
won't respond to my emails. ☹ the-editor-this-journal
☹ this-journal

4 *Multi-dimensional semantics via Writer*

4.1 *Writer for expressives*

Following, e.g., Potts 2005, McCready 2010, and others, we'll adopt a *multi-dimensional* semantics for expressives.

Concretely, we'll be adopt (roughly) Giorgolo & Asudeh's (2012) writer-monadic semantics for conventional implicature, adapted to deal with expressives.

Aping Potts, we'll use $(\cdot)$ to separate ordinary semantic values from expressive content.[5]

(31) Expressive type-constructor (def.)
`W a ≔ a · t`

[5] Formally, this is just sugar for a pair constructor.

`t` is a stand-in for your favorite propositional type.

We'll define two helper functions to retrieve the assertive/expressive components from a multidimensional meaning:

(32) Retrieval functions A and E (defs.)

a. $(x \cdot p)^{\mathsf{A}} \coloneqq x$ $\qquad \mathtt{a} \cdot \mathtt{t} \to \mathtt{a}$

b. $(x \cdot p)^{\mathsf{E}} \coloneqq p$ $\qquad \mathtt{a} \cdot \mathtt{t} \to \mathtt{t}$

We'll be adopting a composition strategy which should be very familiar to you by now, from previous classes. Namely, one that makes use of type-shifters.

Our first type-shifter, *return*, takes a value and returns a multidimensional value with trivial expressive content – namely, a tautology.

(33) Expressive *return* (def.)

$x^{\eta} \coloneqq x \cdot \top$ $\qquad \eta : \mathtt{a} \to \mathtt{a} \cdot \mathtt{t}$

We'll also define an *ap* function – it composes two multidimensional meanings by doing Function Application (FA) in the ordinary dimension, and conjunction in the expressive dimension.

(34) Apply (def.)

$(x \cdot p) \circledast (y \cdot q) \coloneqq (\mathsf{A}\ x\ y) \cdot (p \wedge q)$ $\qquad \circledast : \mathtt{a} \cdot \mathtt{t} \to (\mathtt{a} \to \mathtt{b}) \cdot \mathtt{t} \to \mathtt{b} \cdot \mathtt{t}$

$(\mathtt{a} \to \mathtt{b}) \cdot \mathtt{t} \to \mathtt{a} \cdot \mathtt{t} \to \mathtt{b} \cdot \mathtt{t}$

4.2 Back to expressive adjectives

Consider again an example such as the following:

(35) Frakking Lou is being affectionate for once. $\qquad \frownie\ \mathsf{lou}$

We'll take this as a baseline – in order to account for the attested reading, we'll adopt the following lexical entry for *frakking*:

(36) $\mathsf{frakking}\ (x \cdot p) \coloneqq x \cdot (p \wedge \frownie\ x)$ $\qquad \mathtt{e} \cdot \mathtt{t} \to \mathtt{e} \cdot \mathtt{t}$

It takes an individual with associated expressive content, returns that individual, and bumps an expressive attitude towards the individual into the expressive dimension.

Composition can now proceed via expressive return and expressive apply:

We stated the meaning of *frakking* in such a way that it anticipates that its argument may be associated with expressive content. This captures *non-interaction*,

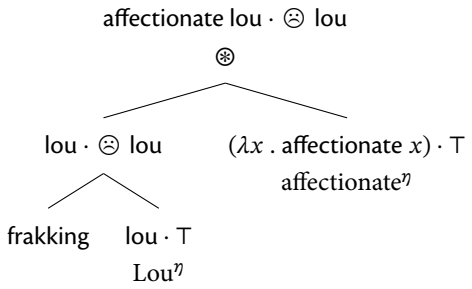

Figure 9: "Frakking Lou is being affectionate (for once)."

as illustrated in figure 10.

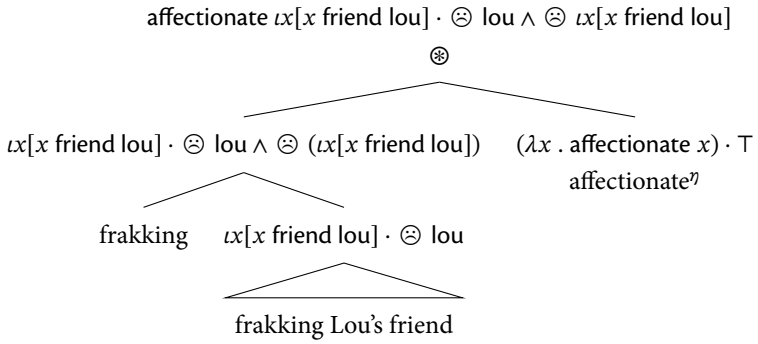

Figure 10: "Frakking [frakking Lou's friend] is being affectionate for once."

An aside on *mixed expressives*

We've been concentrating here on what Gutzmann (2015) calls *functional expletive expressives* – adjectives that *only* contribute expressive content, but no descriptive content.
There are other kinds of *mixed expressives*, such as pejoratives, which contribute both descriptive and expressive content. We won't be concentrating on this class here, but it's straightforward to model them in the current setting as predicates which encode an expressive attitude towards a particular *kind*:

(37) $\text{mudblood} \coloneqq (\lambda x\ .\ \text{muggle}\ x) \cdot ☹\ \text{muggle}^{\cap}$

4.3 Non-local readings

In the examples we've analyzed so far, the expressive adjective composes directly with the individual towards which the expressive attitude is directed. Surface compositionality can therefore be straightforwardly achieved.

Gutzmann (2019) argues extensively that EAs give rise to what he calls *non-*

local readings. I'll take his empirical claims to be essentially correct – the questions we'll be asking here will be *why* and *how*.

We've actually already seen many examples of non-local readings.

(38) The [frakking cat] is being affectionate for once. ☹ (ιx[cat x])

(38) can convey that the speaker has a negative attitude towards whatever *the cat* refers to, despite the fact that *frakking* takes as its sister just the NP cat.

Importantly, (38) is compatible with (i) the speaker having a positive attitude towards the situation, and (ii) the speaker having a positive attitude towards cats in general.

Similarly, the following examples can convey that the speaker has a negative attitude towards *the fact that the cat peed on the couch*

(39) The frakking cat (which I love) is peeing on my favorite couch. ☹ *p*

(40) The cat is peeing on my favorite frakking couch. ☹ *p*

4.4 Gutzmann's AGREE-based account

In order to account for non-local readings, Gutzmann (2019) claims that EAs come with an uninterpretable expressive feature, and the heads of constituents which be the target of the expressive attitude come with an unvalued, interpretable expressive feature.

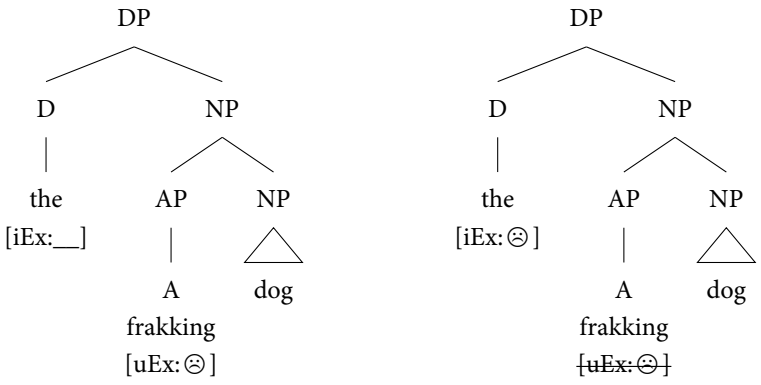

Figure 11: Gutzmann's AGREE-based account

The feature on *frakking* values the feature on *the* via upwards AGREE, and the uninterpretable feature is deleted. This is illustrated in figure 11.

Some (obvious) objections:

- Find me a language with some overt realization of expressive agreement!

- The syntactic restrictions on non-local readings seem to pattern with restrictions on scope (as we'll see later) – the agree based account is missing a generalization.

- Nothing insightful to say about the interaction between expressive adjectives and quantificational determiners.

Instead, I'll pursue a scope-based account of non-local readings, using continuations.[6]

[6] This material is based on Elliott 2019.

4.5 Scope via continuations – a recap

(41) Tower notation (def.)

$$\frac{f\ []}{x} \coloneqq \lambda k\ .\ f\ (k\ x)$$

(42) Tower types (def.)

$$\frac{\mathsf{b}}{\mathsf{a}} \coloneqq (\mathsf{a} \to \mathsf{b}) \to \mathsf{b}$$

Crucially, the type-shifters we've been using to compose scopal meanings don't presuppose *anything* about the return type `r`.

(43) *lift* (def.)

$$a^{\uparrow} \coloneqq \frac{[]}{a} \qquad\qquad (\uparrow) : \mathsf{a} \to \frac{\mathsf{r}}{\mathsf{a}}$$

(44) Scopal Function Application (SFA) (def.)

$$\frac{f\ []}{x}\ \mathsf{S}\ \frac{g\ []}{y} \coloneqq \frac{f\ (g\ [])}{x\ \mathsf{A}\ y} \qquad\qquad \mathsf{S} : \frac{\mathsf{r}}{\mathsf{a} \to \mathsf{b}} \to \frac{\mathsf{r}}{\mathsf{a}} \to \frac{\mathsf{r}}{\mathsf{b}}$$

When discussing quantificational scope, we assumed that the return type was `t`; in the following, in order to model expressive scope, we'll assume that the return type is a *fancy* type, namely $\mathsf{e} \cdot \mathsf{t}$.

4.6 Lifting multidimensional values into scope-takers

We can now recast our old meaning for *frakking* as an identity function with an expressive side-effect:

(45) $\text{frakking}_S \coloneqq \dfrac{\text{frakking }[]}{id} \qquad \dfrac{\mathtt{e}\cdot\mathtt{t}}{\mathtt{a}\to\mathtt{a}}$

frakking_S (i) contributes an identity function locally, and (ii) waits for a fancy individual in order to evaluate its scope.

This generalizes our non-scopal treatment of EAs, as illustrated below. Note that the definition of expressive *lower* doesn't use the identity functional, but rather ρ. Looking at the type of expressive lower should tell you why.

(46) Expressive lower (def.) $m^{\downarrow} \coloneqq m\ \rho \qquad \downarrow : \dfrac{\mathtt{a}\cdot\mathtt{t}}{\mathtt{a}} \to \mathtt{a}\cdot\mathtt{t}$

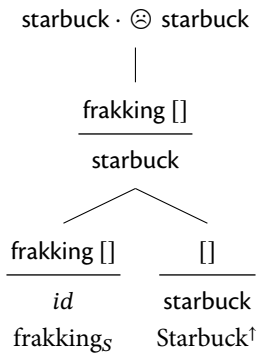

Figure 12: "fracking Starbuck"

DP-level readings are accounted for by assuming that expressive lower is *delayed*, as shown in figure 13.

One way of accounting for clausal readings without positing a polysemous entry for the expressive adjective is to invoke a proposition-to-individual shift. This is sketched out in figure 14.

4.7 Expressive adjectives and scope islands

Conjecture so-called "non-local readings" of EAs are a scopal phenomenon.

Prediction Non-local readings of EAs should be sensitive to scope islands.

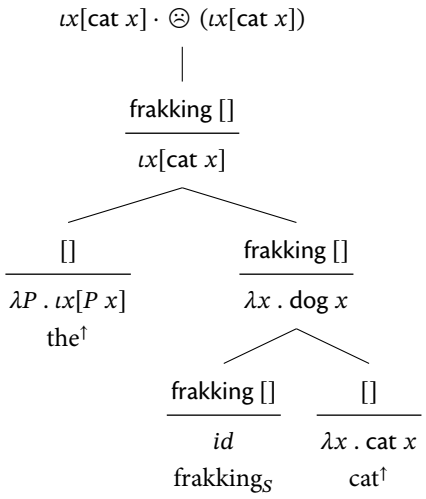

Figure 13: "The fracking cat"

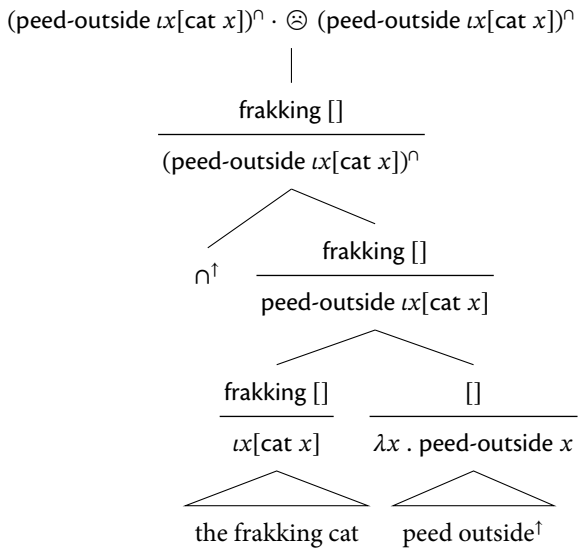

Figure 14: "The frakking cat peed outside."

Gutzmann (2019) provides extensive argumentation that non-local readings of EAs are subject to syntactic restrictions – they are sensitive to syntactic islands such as relative clauses, but crucially also cannot extend out of finite clauses, just like other scope-takers.

(47) Peter said [that the dog ate the frakking cake].
- ✓☹ (the dog at the cake)
- ✓☹ (the cake)
- ✗ ☹ (Peter said that the dog ate the cake)
- ✗ ☹ Peter

(48) The dog that ate the frakking cake is hungry.
- ✓☹ (the dog ate the cake)
- ✓☹ (the cake)
- ✗☹ (The dog that ate the cake is hungry)
- ✗☹ (The dog that ate the cake)

The sensitivity of EAs to scope islands falls out as a *prediction* of the semantics we assigned them.

Consider the semantics of an unevaluated relative clause with an expressive side-effect:

(49) $[\![\text{[that ate the frakking cake]}]\!] = \dfrac{\text{fracking }[\,]}{\lambda y\,.\,y \text{ ate the cake}}$ $\qquad \dfrac{e \cdot t}{e \to t}$

The scope of the expressive cannot be evaluated since the bottom of the tower isn't (and can't be shifted to) type e.

The scope of the expressive must therefore be evaluated *inside* of the relative clause.

One thing that's important to note – expressive side-effects *once evaluated* are predicted to survive through scope islands.

To see why, consider the semantics of an *evaluated* relative clause with expressive side effects:

(50) $[\![\text{[that ate the frakking cake]}]\!] = (\lambda y\,.\,y \text{ ate } \iota x[\text{cake } x]) \cdot ☹\ (\iota x[\text{cake } x])$

The evaluated relative clause can be *re-lifted* into an expressive scope-taker via expressive bind, and composition can continue.

(51) Expressive bind (def.)
$(x \cdot p)^{\star} \coloneqq \lambda k \,.\, (k\ x)^{\mathsf{A}} \cdot ((k\ x)^{\mathsf{E}} \wedge p)$ $\qquad \star : \mathtt{a} \cdot \mathtt{t} \to (\mathtt{a} \to \mathtt{b} \cdot \mathtt{t}) \to \mathtt{b} \cdot \mathtt{t}$

(52) $[\![\text{that ate the frakking cat}]\!]^{\star} = \dfrac{(id \cdot \text{☹}\ (\iota x[\mathsf{cake}\ x])) \circledast []}{\lambda y \,.\, y\ \mathsf{ate}\ \iota x[\mathsf{cake}\ x]}$ $\qquad \dfrac{\mathtt{b} \cdot \mathtt{t}}{\mathtt{e} \to \mathtt{t}}$

4.8 Quantification, binding, and expressives

When uttered by a speaker who likes cats, the following example can express a negative attitude towards whichever cat happens to be being affectionate – the resolution of the expressive attitude is therefore *indeterminate*.

A first crack at approximating the reading we're interested in is given below:

(53) A frakking cat is being affectionate for once. ✗ $\exists x[\text{☹}\ x]$

This isn't right – it would fail to guarantee that the target of the expressive attitude is the same as the cat being affectionate.

Rather, it seems like we want the existential quantifier to take scope over *both* the descriptive and the expressive content. Something like: $\exists x[(\mathsf{cat}\ x \wedge \mathsf{affectionate}\ x) \cdot \text{☹}\ x]$. It's not clear how to accomplish this compositionally, however.

By way of contrast:

(54) Every fucking cat is being affectionate for once. $\forall x[\text{☹}\ x]$

In order to capture the interaction between expressives and indefinites, we'll need to fold in alternatives.

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