The Projection Problem for Predicates of Taste

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1. Introduction

The acquaintance inference:

- Utterances of simple sentences containing a predicate of taste typically give rise to an *acquaintance inference*, i.e. they typically convey that the speaker has a certain sort of first-hand experience with the object of predication (Mothersill, 1984; Robson, 2012; Pearson, 2013; MacFarlane, 2014; Ninan, 2014; Klecha, 2014; Bylinina, 2017).
- For example, an utterance of (1) would normally suggest that the speaker has tasted the cake in question, an utterance of (2) would normally suggest that speaker had traveled with Mary before, and an utterance of (3) would normally suggest that the speaker had seen the movie in question:

  (1) The carrot cake is delicious.
  $\hookrightarrow$ *the speaker has tasted the cake*

  (2) Traveling with Mary is fun.
  $\hookrightarrow$ *the speaker has traveled with Mary*

  (3) That movie is frightening.
  $\hookrightarrow$ *the speaker has seen the movie*

- If one had not tasted the carrot cake, but had merely heard that it was good, it would, for example, be better to say some thing like:

  (4) Apparently, the carrot cake is delicious.

- Taste predications contrast with more 'factual' predications: If I were to say (5), for example, you wouldn't necessarily reach any conclusion about the grounds for my assertion:

  (5) The carrot cake contains gluten.

Defeasibility, exocentric uses:

- The inference is a default inference, and doesn't always arise, even with relatively simple taste sentences.
- One source of defeasibility arises with 'exocentric' uses of taste predicates.
- Typically, our use of a simple taste sentence conveys something about our own tastes and sensibilities. These are *autocentric* uses.
- But sometimes we use simple taste sentences to convey something about someone else's tastes and sensibilities. These are *exocentric* uses.
- Exocentric uses don't give rise to a *speaker* acquaintance inference, but they may give rise to some sort of acquaintance inference (Anand and Korotkova, 2018).

  (6) a. [*A*]: How is Mary's trip to Morocco going?

b. [B]: It's great. The food is delicious, she's met a lot of interesting people, and she loves the beaches.
$\not\hookrightarrow$ *the speaker has tasted the food in Morocco*
$\hookrightarrow$ *Mary has tasted the food in Morocco*

- There may be other sources of defeasibility (Pearson, 2013), and there seems to be some speaker variation about how easily defeated the inference is.
- For simplicity, I will mostly set aside exocentric readings here along with other sources of defeasibility.

What is the scope of this phenomenon?

(7) The carrot cake is tasty to me.
$\hookrightarrow$ *the speaker has tasted the cake*

(8) The soup tastes like it has fish sauce in it.
$\hookrightarrow$ *the speaker has tasted the soup*

(9) John seemed tired this morning (Pearson, 2013)
$\hookrightarrow$ *the speaker interacted with John this morning*

For simplicity, I focus on predicates of gustatory taste, *delicious, tasty*, etc..

What is the semantic-pragmatic status of this inference?

Presupposition view (Pearson, 2013):

- The inference projects over negation, and isn't easily cancellable:

(10) a. The carrot cake is delicious.
b. The carrot cake is not delicious—it isn't moist enough.
$\hookrightarrow$ *the speaker has tasted the cake*

(11) ? The carrot cake is delicious, but I haven't tasted it.

- These facts would be nicely explained by the hypothesis that the inference is a presuppositional inference.

(12) a. Mary stopped smoking.
b. Mary hasn't stopped smoking.
$\hookrightarrow$ *Mary smoked in the past*

(13) # Mary stopped smoking, but she never smoked in the past.

Problem: Modals, conditionals, questions:

- Presuppositions project over epistemic modals, out of the antecedents of conditionals, and out of questions:

(14) a. Mary must have stopped smoking.
b. Mary might have stopped smoking.
c. If Mary stopped smoking, her doctor will be pleased.
d. Did Mary stop smoking?
$\hookrightarrow$ *Mary smoked in the past*

- The acquaintance inference doesn't project out of these environments:

(15) a. The carrot cake must have been delicious.
b. The carrot cake might have been delicious.
c. If the carrot cake was delicious, Mary will be pleased.
d. Was the carrot cake delicious?
$\not\rightsquigarrow$ *the speaker tasted the cake*

- Note that the acquaintance inference is not even locally accommodated in these environments:

(15a) The carrot cake must have been delicious.
$\not\rightsquigarrow$ *it must have been that: the speaker tasted the cake and it is delicious*

- The acquaintance requirement simply seems to disappear.
- Contrast (15a) with the explicitly relativized (16) (Anand and Korotkova, 2018):

(16) The carrot cake must have been tasty to me.

Two accounts of these data:

- Epistemic view: Acquaintance inferences are not presuppositional inferences; they are implicatures generated by the Maxim of Quality together with a principle in the epistemology of taste (Ninan, 2014).
- Presupposition-plus-obviation view: Acquaintance inferences are presuppositional inferences, but some operators (e.g. epistemic modals) obviate or erase any acquaintance requirement in their scope (Anand and Korotkova, 2018; Willer and Kennedy, Forthcoming).[1]

Outline:

- I want to spend most of my time today exploring the presupposition-plus-obviation view. So I'm going to set the epistemic view aside for the moment.
- Question: Is there a pattern as to which operators obviate the acquaintance requirement and which don't?
  - ▷ Suppose we examine a sentence of the form O(*the cake is delicious*) that we've yet to consider.
  - ▷ Is there a generalization about operators that will allow us to predict whether or not O(*the cake is delicious*) will carry the acquaintance requirement?
- We'll look at some data that suggest a simple pattern:
  - ▷ Intensional operators in general seem to obviate the acquaintance inference (Klecha, 2014; Cariani, Forthcoming).
  - ▷ Extensional operators (e.g. Boolean connectives, quantifiers) do *not* seem to obviate the acquaintance inference.
    - ∗ Furthermore, the way the acquaintance requirement interacts with extensional operators is broadly similar to the way presuppositions interact with those operators.
- I'll then offer a theory that predicts some of these data. The theory combines three components:
  - ▷ A supervaluationist account of projection.
  - ▷ A mechanism that allows operators to obviate the acquaintance requirement.
  - ▷ A constraint on lexical entries concerning which operators obviate the acquaintance requirement.
- Time-permitting, I may also say something about the epistemic view, and why the behavior of the acquaintance requirement w.r.t. extensional operators poses a problem for it.

[1] Willer and Kennedy don't describe their view this way, but it is, I think, a not inaccurate description of their view.

2. An apparent pattern

Intensional operators:

- If we set aside interrogatives, we saw above that epistemic modals and indicative conditionals obviate the acquaintance inference.
- Klecha (2014) observes that future operators also obviate the acquaintance inference:

(17) The cookies in the oven will be tasty when they're done. It's a shame that they contain arsenic and so will have to be destroyed.
$\not\hookrightarrow$ *the speaker has tasted/will taste the cookies* (Ninan, 2014)

- On many views, future operators are themselves modal operators of some kind (e.g. Copley, 2009; Cariani and Santorio, 2018). So the generalization here seems to be that *modals* obviate the acquaintance inference (Cariani, Forthcoming).
- Let's say an operator is *intensional* just in case it shifts the world of evaluation.
- INTENSIONAL CONJECTURE: All intensional operators obviate the acquaintance inference.

What about extensional operators?

Boolean connectives:

- Negation: Acquaintance inference projects over negation.
- Conjunction: This seems true of conjunction as well:

(18) The cake is delicious and it is gluten-free.
$\hookrightarrow$ *the speaker has tasted the cake*

- Disjunction: Cariani (Forthcoming) observes that a disjunction of simple taste sentences seems to give rise to a disjunction of acquaintance claims:

(19) *A* has just arrived at the wedding banquet. He's hungry.
a. [*A*]: What's good here?
b. [*B*]: Either the moussaka is delicious or the lasagna is—I couldn't tell which was which.
$\hookrightarrow$ *the speaker has tasted the moussaka or the speaker has tasted the lasagna*

The acquaintance requirement doesn't *project*, but it is interpreted.

- So it seems that *Boolean connectives* (negation, conjunction, disjunction) do not obviate the acquaintance requirement.

Quantifiers:

- When a simple taste sentence occurs in the (nuclear) scope of an existential quantifier, it seems to give rise to a (quantified) acquaintance requirement:

(20) Something on the dessert table is delicious.
$\hookrightarrow$ *something on the dessert table is such that the speaker has tasted it*

- This seems true of other quantifiers as well. For example:

(21) Everything on the dessert table is tasty.
$\hookrightarrow$ *everything on the dessert table is such that the speaker has tasted it*

Strong conjecture:

- EXTENSIONAL CONJECTURE: No extensional operator obviates the acquaintance inference.
- Putting our two conjectures together we get:

  STRONG CONJECTURE: An operator O obviates the acquaintance inference iff O is an intensional operator.

- This is strong, and so I wouldn't be surprised if it proved false, but provisionally adopting it may help guide our theorizing by, e.g., pointing us to a more adequate generalization regarding obviation.

Comment on EXTENSIONAL CONJECTURE:

- Two different claims:

  (i) No extensional operator obviates the acquaintance inference, i.e. the acquaintance requirement affects the interpretation of complex sentences in which a simple taste sentence is embedded under such an operator.

  (ii) The acquaintance requirement behaves like a presupposition with respect to such operators.

- I'm a bit more confident in (i) than I am in (ii), but the following examples are suggestive:

(22) Negation:

a. The carrot cake is not delicious—it isn't moist enough.
$\hookrightarrow$ *the speaker has tasted the cake*

b. Mary hasn't stopped smoking.
$\hookrightarrow$ *Mary smoked in the past*

(23) Disjunction:

a. The cake is delicious or the pie is delicious.
$\hookrightarrow$ *the speaker has tasted the cake or the speaker has tasted the pie*

b. Mary stopped smoking or John stopped smoking.
$\hookrightarrow$ *Mary smoked in the past or John smoked in the past*

(24) Conjunction:

a. The cake is delicious and it is gluten-free.
$\hookrightarrow$ *the speaker has tasted the cake*

b. Mary stopped smoking and she feels much better now.
$\hookrightarrow$ *Mary smoked in the past*

(25) Existential quantification:

a. Something on the dessert table is delicious.
$\hookrightarrow$ *something on the dessert table is such that the speaker has tasted it*

b. Some student stopped smoking.
$\hookrightarrow$ *some student smoked in the past*

(26) Universal quantification:

a. Everything on the dessert table is tasty.
$\hookrightarrow$ *the speaker has tasted everything on the dessert table*

b. Every student stopped smoking.
$\hookrightarrow$ *every student smoked in the past*

3. The presupposition-plus-obviation view

The account I develop below builds on previous work:

- The basic idea I shall be pursue can be found in Anand and Korotkova (2018) and Willer and Kennedy (Forthcoming).
- Taste predicates: Lasersohn (2005), Stephenson (2007a,b), Sæbø (2009), and MacFarlane (2014).
- Trivalent accounts of presupposition projection: Peters (1979), Beaver and Krahmer (2001), Fox (2008), George (2008a,b), and Schlenker (2008).
- Supervaluationism, esp. as developed in branching time frameworks: Thomason (1970, 1984), and MacFarlane (2014).

Starting idea: at a point of evaluation e, *a is delicious* says that a is delicious according to the standard of taste determined by e.

3.1. Basic framework

Standards of taste:

- Assume we have a set of worlds W and a domain of individuals D (we ignore times for the sake of simplicity).
- **Definition.** A *standard of taste* is a (possibly partial) function f from D to $\{0, 1\}$.

  $f(o) = 1$ if f evaluates o positively, $f(o) = 0$ otherwise.
- **Definition.** An agent j's *dispositional standard of taste* in world w, $\delta^{w,j}$, is a total function from D to $\{0, 1\}$.

  Intended interpretation (roughly):

  ▷ $\delta^{w,j}(o) = 1$ if it's true in w that if j were to try o, she would like it, and

  ▷ $\delta^{w,j}(o) = 0$ if it's true in w that if j were to try o, it is not the case that she would like it.
- **Definition.** An agent j's *categorical standard of taste* in world w, $\chi^{w,j}$, is the restriction of $\delta^{w,j}$ to the things j has tasted in w.

  ▷ So $\chi^{w,j}$ will typically be a partial function.

  ▷ If $o \in dom(\chi^{w,j})$, then $\chi^{w,j}(o) = \delta^{w,j}(o)$.

  Intended interpretation (roughly):

  ▷ $\chi^{w,j}(o) = 1$ if j has tasted o and liked it in w,

  ▷ $\chi^{w,j}(o) = 0$ if j has tasted o and did not like it in w, and

  ▷ $o \notin dom(\chi^{w,j})$ if j hasn't tasted o in w

  We ignore the possibility that one is disposed to like something, but didn't like it on a particular occasion because of some extenuating circumstance (e.g. one is feeling ill).
- Example: If you have not tried sea urchin, your categorical standard is not defined for it, but your dispositional standard is. If you have tried it, both standards evaluate it in the same way.

Standards generators:

- Let a *centered world* be a pair of a world and an individual.

- **Definition.** A *(standards) generator* is a (total) function from centered worlds to standards of taste. A generator takes a centered world and 'generates' a standard of taste.
  Assume δ and χ are generators in this sense (letting $\delta^{w,j} = \delta(w,j)$).
- **Definition.** A generator σ is *complete* iff for all (w,j), $\sigma^{w,j}$ is a total function.
- **Definition.** A generator σ is a *complete extension of* χ iff
  (i) σ is complete, and
  (ii) for all (w,j) and all $o \in D$, if $o \in dom(\chi^{w,j})$, then $\sigma^{w,j}(o) = \chi^{w,j}(o)$.

  So a complete extension of χ agrees with χ on all the cases that χ decides, but then goes on and decides all other cases as well.

Some complete extensions of χ:

- So δ is a complete extension of χ, since δ is complete, and if $o \in dom(\chi^{w,j})$, then $\delta^{w,j}(o) = \chi^{w,j}(o)$.
- But there are other complete extensions of χ. Two important ones:
  - ▷ **Definition.** The 'picky' generator σ_0 defined as follows:
    (i) $\sigma_0 \geq \chi$, and
    (ii) for all (w,j) and all $o \notin dom(\chi^{w,j}), {\sigma_0}^{w,j}(o) = 0$.
    So ${\sigma_0}^{w,j}$ maps everything not in the domain of $\chi^{w,j}$ to 0.
  - ▷ **Definition.** The 'easy-to-please' generator σ_1 defined as follows:
    (i) $\sigma_1 \geq \chi$, and
    (ii) for all (w,j) and all $o \notin dom(\chi^{w,j}), {\sigma_1}^{w,j}(o) = 1$.
    So ${\sigma_1}^{w,j}$ maps everything not in the domain of $\chi^{w,j}$ to 1.[2]

Language, models:

- Formal language: variables, individual constants, n-ary predicates (including a distinguished one-place taste predicate T), Boolean connectives, generalized quantifiers, epistemic modals, attitude verbs.
- Models: an n-tuple that includes the following elements: W, D, δ, χ, and I, where I assigns functions from worlds to extensions to all individual constants and to all n-ary predicates other than the taste predicate T.
- Assume for simplicity that all individual constants are rigid. If a is an individual constant, we simply write a for the denotation of a.

Recursive clause for atomic taste sentences:

- Let Ta translate *The cake is delicious.*
- **Definition.** Let a *point of evaluation* be a n-tuple (w, j, σ, g) consisting a world w, a judge j, a complete generator σ, and a variable assignment g.
- $[\![Ta]\!]^{w,j,\sigma,g} = 1$ iff $\sigma^{w,j}(a) = 1$
- Since σ is a complete generator, truth-at-a-point-of-evaluation is bivalent.

Supervaluationist definition of truth/falsity at a context:

[2] It is possible that we could restrict the set of complete extensions over which we supervaluate to just these two complete extensions; see George (2008b) for related discussion in the Strong Kleene setting.

- **Definition.** Let a *context* c be a n-tuple (w_c, s_c, j_c, g_c) consisting of a world w_c, a speaker s_c, a judge j_c, and a variable assignment g_c.
  - ▷ When the judge is the speaker, we get autocentric readings of taste predicates.
  - ▷ When the judge is distinct from the speaker, we get exocentric readings.
- **Definition.** *Truth and falsity at a context*:

  A sentence ϕ is *true at a context* c, $[\phi]^c = 1$, iff for all $\sigma \geq \chi$, $[\![\phi]\!]^{w_c,j_c,\sigma,g_c} = 1$.
  A sentence ϕ is *false at a context* c, $[\phi]^c = 0$ iff for all $\sigma \geq \chi$, $[\![\phi]\!]^{w_c,j_c,\sigma,g_c} = 0$.

Result for atomic taste sentences:

Fact 1. $[Ta]^c = 1$ *only if* $\chi^{w_c,j_c}(a) = 1$

Proof. Note that:

$[Ta]^c = 1$ iff
for all $\sigma \geq \chi$, $[\![Ta]\!]^{w_c,j_c,\sigma,g_c} = 1$ iff
for all $\sigma \geq \chi$, $\sigma^{w_c,j_c}(a) = 1$.

Suppose that $[Ta]^c = 1$. So for all $\sigma \geq \chi$, $\sigma^{w_c,j_c}(a) = 1$. And suppose, for *reductio*, that $\chi^{w_c,j_c}(a) \neq 1$. Then either $\chi^{w_c,j_c}(a) = 0$ or $a \notin dom(\chi^{w_c,j_c})$. In either case, the picky extension of χ, σ_0, will be such that ${\sigma_0}^{w_c,j_c}(a) = 0$. But since $\sigma_0 \geq \chi$, that contradicts the claim that every $\sigma \geq \chi$ is s.t. $\sigma^{w_c,j_c}(a) = 1$. □

Comment: If in an autocentric context, I say *The cake is delicious*, this will imply that I have tasted the cake and liked it.

3.2. Extensional operators

Classical recursive clauses for Boolean connectives:

- $[\![\neg\phi]\!]^{w,j,\sigma,g} = 1$ iff $[\![\phi]\!]^{w,j,\sigma,g} = 0$
- $[\![\phi \wedge \psi]\!]^{w,j,\sigma,g} = 1$ iff $[\![\phi]\!]^{w,j,\sigma,g} = [\![\phi]\!]^{w,j,\sigma,g} = 1$
- $[\![\phi \vee \psi]\!]^{w,j,\sigma,g} = 1$ iff $[\![\phi]\!]^{w,j,\sigma,g} = 1$ or $[\![\psi]\!]^{w,j,\sigma,g} = 1$

Some results:

Fact 2. $[\neg Ta]^c = 1$ *only if* $\chi^{w_c,j_c}(a) = 0$

Fact 3. $[Ta \wedge \phi]^c = 1$ *only if* $\chi^{w_c,j_c}(a) = 1$

Fact 4. $[Ta \vee Tb]^c = 1$ *only if* $\chi^{w_c,j_c}(a) = 1$ *or* $\chi^{w_c,j_c}(b) = 1$

Comments:

- So if you say, *The cake is not delicious*, this will imply that you tasted and didn't like the cake.
- If you say *The cake is delicious and it's gluten-free*, this will imply that you tasted and liked the cake.
- If you say, *Either the cake is delicious or the pie is*, this will imply that either (you tasted and liked the cake) or (you tasted and liked the pie).
  - ▷ So the disjunction will imply that you tasted at least one of them, but it in fact implies something stronger: that you tasted *and liked* at least one of them.

▷ If you tasted the pie and didn't like it, and you didn't taste the cake but are disposed to like it, the disjunction will not be true.

Problem: disjunction:

(27) *We're in a restaurant, about to order, seeing everyone around us eating lobster rolls. I say:* Either the lobster rolls here are delicious or they're out of everything else.

- The theory predicts that my utterance is true only if either (I've tasted and liked the lobster rolls) or (they're out of everything but lobster rolls).
- This doesn't look correct. This is a problem both for our semantics and for (the L-to-R direction) of our STRONG CONJECTURE (unless disjunction is intensional (Zimmermann, 2000)).
- If we are willing to permit an exception our STRONG CONJECTURE, we could posit a silent operator in (27) that shifts σ to δ. But unless we can constrain its distribution, the resulting theory would over-generate readings.

Standard recursive clauses for generalized quantifiers:

- $[\![some_x(\phi)(\psi)]\!]^{w,j,\sigma,g} = 1$ iff $\{o \in D : [\![\phi]\!]^{w,j,\sigma,g[x/o]} = 1\} \cap \{o \in D : [\![\psi]\!]^{w,j,\sigma,g[x/o]} = 1\} \neq \emptyset$
- $[\![every_x(\phi)(\psi)]\!]^{w,j,\sigma,g} = 1$ iff $\{o \in D : [\![\phi]\!]^{w,j,\sigma,g[x/o]} = 1\} \subseteq \{o \in D : [\![\psi]\!]^{w,j,\sigma,g[x/o]} = 1\}$
- $[\![most_x(\phi)(\psi)]\!]^{w,j,\sigma,g} = 1$ iff $|\{o \in D : [\![\phi]\!]^{w,j,\sigma,g[x/o]} = 1\} \cap \{o \in D : [\![\psi]\!]^{w,j,\sigma,g[x/o]} = 1\}| >$ $|\{o \in D : [\![\phi]\!]^{w,j,\sigma,g[x/o]} = 1\} - \{o \in D : [\![\psi]\!]^{w,j,\sigma,g[x/o]} = 1\}|$
- $[\![exactly\ two_x(\phi)(\psi)]\!]^{w,j,\sigma,g} = 1$ iff $|\{o \in D : [\![\phi]\!]^{w,j,\sigma,g[x/o]} = 1\} \cap \{o \in D : [\![\psi]\!]^{w,j,\sigma,g[x/o]} = 1\}| = 2$

Result 1:

- First note that for each generalized quantifier Q_x, there is a corresponding binary relation Q_R on subsets A, B of D:
  - ▷ $some_x : A \cap B \neq \emptyset$
  - ▷ $every_x : A \subseteq B$
  - ▷ $most_x : |A \cap B| > |A - B|$
  - ▷ $exactly\ two_x : |A \cap B| = 2$
- Then we have:

  Fact 5. *For any generalized quantifier Q_x and corresponding binary relation Q_R on subsets of D:*

  If $[Q_x(Fx, Tx)]^c = 1$, then $Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o : \chi^{w_c, j_c}(o) = 1\})$.

- If you say *Q things on the dessert table are delicious*, this will imply that there are Q things on the dessert table that you tasted and liked.
- For example, if you say, *Something on the dessert table is delicious*, this will imply that there is something on the dessert table that you tasted and liked.
  - ▷ Note again that this is stronger than just: there is something on the dessert table that you tasted.
  - ▷ It's not enough that you have tasted something on the table, didn't like, but are disposed to like something else on the table.
- Another example: if you say, *Exactly two things on the dessert table are delicious*, this implies that exactly two things on the table are such that you tasted and liked them.

Result 2:

- There are some more specific results pertaining to particular quantifiers, such as:

  Fact 6. *If* $[\text{EXACTLY TWO}_x(Fx, Tx)]^c = 1$*, then for all* $o \in D$*, if* $o \in I(F)(w_c)$*, then* $o \in dom(\chi^{w_c, j_c})$*.*

- So if you say, *Exactly two things on the dessert table are delicious*, this implies that you've tasted everything on the dessert table.

- Note that our earlier result was that if you say, *Exactly two things on the dessert table are delicious*, this implies that you've tasted *and liked* exactly two things on the table.

- One thing interesting about this is that there's apparently an empirical difference here between the behavior of the acquaintance requirement and standard presuppositions. Consider

  (28) Exactly two students in my class stopped smoking recently.

- Suppose there are ten students in my class, two of whom smoked in the past and no longer smoke, eight of whom never smoked.

- According to George (2008a, 13), (28) has a reading on which it is true in this situation, a judgment I agree with.

- This consequence is a problem for the supervaluational treatment of presupposition triggers like *stops* (and for the Strong Kleene approach George develops), but the corresponding prediction seems right in the case of taste predicates.

3.3. Intensional operators

How do intensional operators obviate the acquaintance requirement?

- An operator will obviate the acquaintance requirement in this system if it shifts the generator parameter σ to δ, viz. the generator that maps each (w, j) to j's dispositional standard at w (cf. Anand and Korotkova, 2018).

- Example:

  $$[\![must\ \phi]\!]^{w,j,\sigma,g} = 1 \text{ iff for all } w' \in R(w),\ [\![\phi]\!]^{w',j,\delta,g} = 1$$

  where $w' \in R(w)$ iff w' is compatible with what is known in w.

- So:

  $$\begin{aligned} &[must\ Ta]^c = 1 \text{ iff} \\ &\text{for all } \sigma \geq \chi\text{: } [\![must\ Ta]\!]^{w_c,j_c,\sigma,g_c} = 1 \text{ iff} \\ &\text{for all } \sigma \geq \chi\text{: for all } w' \in R(w_c) : [\![Ta]\!]^{w',j_c,\delta,g_c} = 1 \text{ iff} \\ &\text{for all } w' \in R(w_c) : [\![Ta]\!]^{w',j_c,\delta,g_c} = 1 \text{ iff} \\ &\text{for all } w' \in R(w_c) : \delta^{w',j_c}(a) = 1 \end{aligned}$$

- Note that this condition places no constraint on χ^{w_c,j_c}, and so it can hold even if a is not in the domain of χ^{w_c,j_c}, i.e. even the speaker has not tasted the cake.

- If you say, *The cake must be delicious*, you're saying that it follows from what is known that you are disposed to like the cake. This can be true even if you've never tasted the cake.

Strong conjecture:

- STRONG CONJECTURE: An operator O obviates the acquaintance inference iff O is an intensional operator.
- Here is the conjecture cast in terms of the present theory:

  STRONG CONJECTURE$'$: An operator O shifts the generator parameter to δ iff O shifts the world parameter.
- We assume that if an operator shifts the generator parameter, then it shifts it to δ.
- So the lexicon can contain only certain types of operators:

  ✓ $[\![O\phi]\!]^{w,j,\sigma,g} = 1$ iff ...$[\![\phi]\!]^{w,j,\sigma,g'}$...
  ✓ $[\![O\phi]\!]^{w,j,\sigma,g} = 1$ iff ...$[\![\phi]\!]^{w',j,\delta,g}$...
  ✗ $[\![O\phi]\!]^{w,j,\sigma,g} = 1$ iff ...$[\![\phi]\!]^{w',j,\sigma,g}$...
  ✗ $[\![O\phi]\!]^{w,j,\sigma,g} = 1$ iff ...$[\![\phi]\!]^{w,j,\delta,g}$...
- This is for unary operators, but it presumably holds for n-ary operators in general.

Summary:

- Intensional operators seem to obviate the acquaintance inference.
- Extensional operators seem not to obviate it. And the acquaintance requirement interacts with extensional operators in much the way presuppositions do.
- We tried to capture some of these data in a system that combines a supervaluationist account of projection together with a mechanism that allows operators to obviate the acquaintance requirement.
- We also essentially stipulated a constraint on lexical entries. Ideally, we would have derived that stipulation from something independent, but I don't quite see how to do that at the moment.

4. Attitude verbs

Believes:

- The literature generally seems to agree that *believes*, *thinks*, and *knows* obviate the acquaintance inference, and do not even imply that the subject of the attitude has tasted the item in question.[3]

  Example: *believes*:

  (29) John believes the carrot cake is delicious.
  $\not\rightsquigarrow$ *the speaker has tasted the carrot cake*
  $\not\rightsquigarrow$ *John has tasted the carrot cake*
- Obviation will follow from our STRONG CONJECTURE together with the claim that *believes* shifts the world parameter.
- We assume *believes* also shifts the judge parameter, so that it is the subject of the attitude's standard that matters for the interpretation of the taste predicate, not the speaker's.
- Entry for *believes*:

  $$[\![B_a\phi]\!]^{w,j,\sigma,g} = 1 \text{ iff for all } w' \in B_{w,a},\ [\![\phi]\!]^{w',a,\delta,g} = 1\ .$$

  (Note that the judge parameter is shifted to the subject of the attitude verb.)

[3]See Stephenson (2007b), Anand and Korotkova (2018), Muñoz (2019), and Willer and Kennedy (Forthcoming).

Finds:

- *Finds* seems to imply that the subject of the attitude verb has tasted the object of the taste predication (Stephenson, 2007b):

(30) John finds the cake tasty.
$\hookrightarrow$ *John has tasted the cake*

- So if *finds* is an intensional operator, it may be a (R-to-L) counterexample to our STRONG CONJECTURE.
- But on one influential treatment of *finds*—that of Sæbø (2009)—it is *not* an intensional operator in our sense, for it does not shift the world of evaluation—it merely shifts the judge parameter. So our STRONG CONJECTURE would require that it leave the generator parameter alone.
- In our setup, Sæbø's idea would yield:

$$[\![F_a\phi]\!]^{w,j,\sigma,g} = 1 \text{ iff } [\![\phi]\!]^{w,a,\sigma,g} = 1$$

- So:

$[F_a\ Tb]^c = 1$ iff
for all $\sigma \geq \chi$, $[\![F_aTb]\!]^{w_c,j_c,\sigma,g_c} = 1$ iff
for all $\sigma \geq \chi$, $[\![Tb]\!]^{w_c,a,\sigma,g_c} = 1$ iff
for all $\sigma \geq \chi$, $\sigma^{w_c,a}(b) = 1$

And this can only be true if $\chi^{w_c,a}(b) = 1$, which means a must have tasted and liked b in w_c.

- *John finds the cake tasty* is true only if John has tasted and liked the cake.

5. Definedness condition or assertability condition?

Two objections to treating the acquaintance requirement as a presupposition:

(i) Metalinguistic negation can target standard presuppositions, but can't target the acquaintance requirement (Ninan, 2014):

(31) a. Mary didn't *stopped* smoking—she's never smoked a cigarette in her life!
b. The carrot cake isn't *delicious*—I haven't even tried it!

(ii) A more conceptual objection:

- Suppose I haven't tried the carrot cake.
- I think it might be delicious, but I'm not sure.
- Is thinking that the carrot cake *might* be delicious compatible with knowing that the sentence *The carrot cake is delicious* is not true in my context?
If I think the carrot cake might be delicious, shouldn't I also think that that sentence might be true in my context?
- Similarly, I might have non-zero credence n that the carrot cake is delicious. Is that compatible with knowing that the sentence *The carrot cake is delicious* is not true in my context?
Shouldn't my credence that that sentence is true be n as well?[4]

An alternative way of construing the proposal?

[4] A similar issue arises for supervaluational treatments of future operators; see MacFarlane (2014, Ch. 11) for discussion.

- Keep the same recursive semantics, but change the 'postsemantics'.
- Bivalent *truth at a context*:

  Definition. A sentence ϕ is *true at a context* c, $[\phi]^c = 1$ iff $[\![\phi]\!]^{w_c, j_c, \delta, g_c} = 1$
- So if I say, *The cake is delicious*, the proposition I express is that I am disposed to like the cake.
- Re-deploy the supervaluationist machinery to characterize *assertability*:

  Definition. A sentence ϕ is *assertable at a context* c iff $[\![\phi]\!]^{w,j,\sigma,g} = 1$ for all complete extensions σ of χ.
- If one hasn't tasted the cake, both *the cake is delicious* and its negation will be unassertable.

Is this just terminological? Perhaps, but depending on one's account of metalinguistic negation, it may make an empirical difference.

6. The epistemic view

Epistemic view:

> MAXIM OF QUALITY (KNOWLEDGE NORM): One may assert ϕ only if one knows ϕ (Gazdar, 1979; Williamson, 1996).
>
> > If the speaker asserts ϕ, that implies that the speaker knows ϕ.
> > $\phi \hookrightarrow K\phi$
>
> ACQUAINTANCE PRINCIPLE: One knows whether *a is delicious* is true only if one has tasted a (Wollheim, 1980; Ninan, 2014).
>
> > If the speaker knows that a is delicious, that implies that the speaker has tasted a.
> > If the speaker knows that a is not delicious, that implies that the speaker has tasted a.
> > $KTa \hookrightarrow Aa$
> > $K\neg Ta \hookrightarrow Aa$

Notation:

- Think of a here as a singular term (e.g. *the carrot cake*).
- For the moment, $\phi \hookrightarrow \psi$ ("ϕ implies ψ") iff ψ is an entailment or a Quality implicature of ϕ.
- $K\phi$ translates *the speaker knows* ϕ, Ta translates *a is delicious*, Aa translates *the speaker has tasted a*

The epistemic view predicts the initial data that led us to the presupposition view:

(10) a. The carrot cake is delicious.
$Ta \hookrightarrow KTa \hookrightarrow Aa$
b. The carrot cake is not delicious—it isn't moist enough.
$\neg Ta \hookrightarrow K\neg Ta \hookrightarrow Aa$

(11) ? The carrot cake is delicious, but I haven't tasted it.
$(Ta \wedge \neg Aa) \hookrightarrow K(Ta \wedge \neg Aa) \hookrightarrow KTa \hookrightarrow Aa$
$(Ta \wedge \neg Aa) \hookrightarrow \neg Aa$

On the epistemic view, (11) is akin to the Moore-paradoxical (32):

(32) ? Mary was at the office, but I don't know that Mary was at the office.

Modals, conditionals, and questions:

- Note that the ACQUAINTANCE PRINCIPLE only concerns *atomic* taste sentences Ta and their negations $\neg Ta$.
- So it simply doesn't say anything about other kinds of embeddings. So it doesn't predict that the acquaintance inference will project over modals, conditional operators, etc...
- Furthermore, the acquaintance inference does seem to pattern like a Quality implicature here:

  (15) a. The carrot cake must have been delicious.
  b. The carrot cake might have been delicious.
  c. If the carrot cake was delicious, Mary will be pleased.
  d. Was the carrot cake delicious?
  $\not\hookrightarrow$ *the speaker has tasted the cake*

  (33) a. Mary must have been at the office.[5]
  b. Mary might have been at the office.
  c. If Mary was at the office, she'll be tired.
  d. Was Mary at the office?
  $\not\hookrightarrow$ *the speaker knows Mary was at the office*

Problem: extensional operators:

- The fact that the acquaintance requirement appears to interact non-trivially with extensional operators poses a problem for this view.
- This is because the ACQUAINTANCE PRINCIPLE only concerns atomic taste sentences and their negations.
- Example: disjunction:

  (34) The cake is delicious or the pie is delicious.
  $\hookrightarrow$ *the speaker has tasted the cake or the speaker has tasted the pie*

- Acquaintance under disjunction: $(Ta \vee Tb) \hookrightarrow (Aa \vee Ab)$
- The epistemic view doesn't predict this. It predicts:

  $$(Ta \vee Tb) \hookrightarrow K(Ta \vee Tb)$$

- But the ACQUAINTANCE PRINCIPLE is simply silent on what $K(Ta \vee Tb)$ implies about what the speaker has tasted.

Quantifiers raise a similar problem.

Other problems for the epistemic view are discussed in Anand and Korotkova (2018); Franzén (2018); Muñoz (2019); Willer and Kennedy (Forthcoming).

[5] The point is controversial with *must*. If *must* ϕ entails ϕ (von Fintel and Gillies, 2010), then asserting *must* ϕ will imply $K($*must* $\phi)$. If knowledge is closed under deduction, this will imply $K\phi$.

7. Some proofs

Fact 4. $[Ta \vee Tb]^c = 1$ *only if* $\chi^{w_c,j_c}(a) = 1$ *or* $\chi^{w_c,j_c}(b) = 1$

Proof. Suppose $[Ta \vee Tb]^c = 1$. Then for all $\sigma \geq \chi$, either $[\![Ta]\!]^{w_c,j_c,\sigma,g_c} = 1$ or $[\![Tb]\!]^{w_c,j_c,\sigma,g_c} = 1$. So for all $\sigma \geq \chi$, either $\sigma^{w_c,j_c}(a) = 1$ or $\sigma^{w_c,j_c}(b) = 1$.

Suppose for *reductio* that both $\chi^{w_c,j_c}(a) \neq 1$ and $\chi^{w_c,j_c}(b) \neq 1$. Then the picky extension σ_0 of χ will be such that ${\sigma_0}^{w_c,j_c}(a) = 0$ and $\sigma^{w_c,j_c}(b) = 0$. But that contradicts the claim that for all $\sigma \geq \chi$, either $\sigma^{w_c,j_c}(a) = 1$ or $\sigma^{w_c,j_c}(b) = 1$.

□

Fact 5. *For any generalized quantifier Q_x and corresponding binary relation Q_R on subsets of D:*

If $[Q_x(Fx, Tx)]^c = 1$, *then* $Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o : \chi^{w_c,j_c}(o) = 1\})$.

Proof. Suppose $[Q_x(Fx, Tx)]^c = 1$.

So for all $\sigma \geq \chi$, $[\![Q_x(Fx, Tx)]\!]^{w_c,j_c,\sigma,g_c} = 1$.

So for all $\sigma \geq \chi$, $Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o \in D : \sigma^{w_c,j_c}(o) = 1\})$.

Suppose, for *reductio*, that it is not the case that $Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o : \chi^{w_c,j_c}(o) = 1\})$.

Note that, where σ_0 is the picky extension of χ, we have the following:

$$\{o \in D : \chi^{w_c,j_c}(o) = 1\} = \{o \in D : {\sigma_0}^{w_c,j_c}(o) = 1\}$$

It follows from this and our *reductio* assumption that it is not the case that
$Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o \in D : {\sigma_0}^{w_c,j_c}(o) = 1\})$.

But this contradicts our assumption that for all $\sigma \geq \chi$, $Q_R(\{o \in D : o \in I(F)(w_c)\}, \{o \in D : \sigma^{w_c,j_c}(o) = 1\}$.

□

Fact 6. If $[\text{EXACTLY TWO}_x(Fx, Tx)]^c = 1$, then for all $o \in D$, if $o \in I(F)(w_c)$, then $o \in dom(\chi^{w_c,j_c})$.

Proof. Suppose $[\text{EXACTLY TWO}_x(Fx, Tx)]^c = 1$. So for all $\sigma \geq \chi$:

$$|\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : \sigma^{w_c,j_c}(o) = 1\}| = 2.$$

And note that, by **Fact 5** we have:

$$|\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : \chi^{w_c,j_c}(o) = 1\}| = 2.$$

So let o_1, o_2 be distinct elements of D such that:

$$\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : \chi^{w_c,j_c}(o) = 1\} = \{o_1, o_2\}.$$

Now suppose, for *reductio*, that there is an $o \in I(F)(w_c)$ such that $o \notin dom(\chi^{w_c,j_c})$. Let o_3 be such an o. Note that o_3 is distinct from both o_1 and o_2 since χ^{w_c,j_c} maps both of those to 1.

Then the easy-to-please extension σ_1 of χ will be such that ${\sigma_1}^{w_c,j_c}(o_1) = {\sigma_1}^{w_c,j_c}(o_2) = {\sigma_1}^{w_c,j_c}(o_3) = 1$. Thus:

$$\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : {\sigma_1}^{w_c,j_c}(o) = 1\} = \{o_1, o_2, o_3\}.$$

But then:

$$|\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : {\sigma_1}^{w_c, j_c}(o) = 1\}| = 3$$

which contradicts the claim that for all $\sigma \geq \chi$:

$$|\{o \in D : o \in I(F)(w_c)\} \cap \{o \in D : \sigma^{w_c, j_c}(o) = 1\}| = 2.$$

$\square$

References

Anand, Pranav and Korotkova, Natasha. 2018. "Acquaintance Content and Obviation." In *Proceedings of Sinn und Bedeutung*, volume 22, 55–72.

Beaver, David and Krahmer, Emiel. 2001. "A Partial Account of Presupposition Projection." *Journal of Logic, Language, and Information* 10:147.

Bylinina, Lisa. 2017. "Judge-Dependence in Degree Constructions." *Journal of Semantics* 34:291–331.

Cariani, Fabrizio. Forthcoming. *The Modal Future: A Theory of Future-Directed Thought and Talk*. Cambridge: Cambridge University Press.

Cariani, Fabrizio and Santorio, Paolo. 2018. "*Will* Done Better: Selection Semantics, Future Credence, and Indeterminacy." *Mind* 127:129–165.

Copley, Bridget. 2009. *The Semantics of the Future*. Routledge.

von Fintel, Kai and Gillies, Anthony. 2010. "*Must*... Stay... Strong!" *Natural Language Semantics* 18:351–383. doi:10.1007/s11050-010-9058-2.

Fox, Danny. 2008. "Two Short Notes on Schlenker's Theory of Presupposition Projection." *Theoretical linguistics* 34:237–252.

Franzén, Nils. 2018. "Aesthetic Evaluation and First-Hand Experience." *Australasian Journal of Philosophy* 96:669–682.

Gazdar, Gerald. 1979. *Pragmatics*. Academic Press.

George, Benjamin. 2008a. "Predicting Presupposition Projection: Some Alternatives in the Strong Kleene Tradition." Unpublished manuscript, UCLA.

—. 2008b. *Presupposition Repairs: A static, Trivalent Approach to Predicting Projection*. Master's thesis, UCLA.

Klecha, Peter. 2014. "Diagnosing Modality in Predictive Expressions." *Journal of Semantics* 31:443–455.

Lasersohn, Peter. 2005. "Context Dependence, Disagreement, and Predicates of Personal Taste." *Linguistics and Philosophy* 28:643–686. doi:10.1007/s10988-005-0596-x.

MacFarlane, John. 2014. *Assessment-Sensitivity: Relative Truth and its Applications*. Oxford: Oxford University Press.

Mothersill, Mary. 1984. *Beauty Restored*. Oxford: Oxford University Press.

Muñoz, Patrick. 2019. *On Tongues: The Grammar of Experiential Evaluation*. Ph.D. thesis, University of Chicago.

Ninan, Dilip. 2014. "Taste Predicates and the Acquaintance Inference." In *Semantics and Linguistic Theory*, volume 24, 290–309.

Pearson, Hazel. 2013. "A Judge-Free Semantics for Predicates of Personal Taste." *Journal of Semantics* 30:103–154. doi:10.1093/jos/ffs001.

Peters, Stanley. 1979. "A Truth-Conditional Formulation of Karttunen's Account of Presupposition." *Synthese* 40:301–316.

Robson, Jon. 2012. "Aesthetic Testimony." *Philosophy Compass* 7:1–10. doi:10.1111/j.1747-9991.2011.00455.x.

Sæbø, Kjell Johan. 2009. “Judgment Ascriptions.” *Linguistics and Philosophy* 32:327–352.

Schlenker, Philippe. 2008. “Local Contexts: Presuppositions, Dynamic Semantics and Transparency.” Unpublished early version.

Stephenson, Tamina. 2007a. “Judge Dependence, Epistemic Modals, and Predicates of Personal Taste.” *Linguistics and Philosophy* 30:487–525.

—. 2007b. *Towards a Theory of Subjective Meaning*. Ph.D. thesis, MIT.

Thomason, Richmond H. 1970. “Indeterminist Time and Truth-Value Gaps.” *Theoria* 36:264–281.

—. 1984. “Combinations of Tense and Modality.” In *Handbook of Philosophical Logic*, 135–165. Dordrecht: Springer.

Willer, Malte and Kennedy, Chris. Forthcoming. “Assertion, Expressions, Experience.” *Inquiry* .

Williamson, Timothy. 1996. “Knowing and Asserting.” *Philosophical Review* 105:489–523.

Wollheim, Richard. 1980. *Art and Its Objects*. Cambridge: Cambridge University Press.

Zimmermann, Thomas Ede. 2000. “Free Choice Disjunction and Epistemic Possibility.” *Natural Language Semantics* 8:255–290.