We feel very squeamish indeed about `The king of France is bald' presented abruptly, out of context, just because we don't naturally and immediately think of a context in which interest is centered, say, on the question *What bald notables are there?* rather than on the question *What is the king of France like?* or *Is the King of France bald?*

Strawson (1964)

1

Antimatters

A misrepresentation of joint work by Davi Beaver, Craige Roberts, Mandy Simons and Judith Tonhauser

2

Phenomena

- Projection of presuppositions
- Projection of conventional implicatures
- Effects of focus on projection
- Structure of discourse

A) Every discourse is associated with a set of questions, most implicit, which represent the way information is being conveyed.

Comment

- This claim (that discourse is associated with a set of partly implicit questions representing the way information is being conveyed) is taken to be controversial.
- However: the semantic objects we use to represent information structure are of the same type as the objects we use for question meaning, e.g. alternative sets or structured meanings.
- So most people working on focus have implicitly accepted that there are implicit questions.
- The issue is not whether there are such questions, but what pragmatic constraints operate on them.

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B) What matters is what answers the question under discussion.

6

Comment

- Not everything matters.
- Apart from what matters, language has extras: (i) supporting structure, (ii) redundancy, and (iii) material superfluous to the QUD.
- These extras are *anti-matter*.
- Constraints imposed by anaphoric expressions exemplify (i).
- Backgrounded material can be redundant (ii).
- Many of Potts' conventional implicatures are in group (iii).

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C) The question under discussion targeted by a clause is heavily constrained by the surface form of that clause.

8

Comment

- Relevant features of surface form include word choice, word order, and intonation.
- These features constrain the QUD via *focus congruence.*
- Note that prior work (Simons et al 2011) discusses further constraints on the QUD, based on a notion of *relevance*.

Two consequences

- Using congruence-based QUDs has two consequences.
1. Identifying an approximation to the QUD is usually computationally simple, whereas relevance-based measures are AI-complete.
2. But when there's an overt question, we no longer have the computational shortcut of identifying it with the QUD: we must consider surface form of the new utterance. (This removes some putative counterexamples to Simons et al 2011)

D) Having determined the QUD, it is straightforward to define what matters, and hence what does not matter.

Definition of what matters

- Let us take a question to be a partition on a set of worlds. (Note: a procedure is needed to establish congruence of Rooth-Hamblin alternatives to Groenendijk & Stokhof partitions: take a subset of the alternatives, exhaustify them, check for isomprphism.)

- For a proposition P to matter for a clause C for which the QUD is Q, (i) P must be conveyed or entailed by a constituent within C, and (ii) P must be true in some cells in Q, and not true in others.

- Note: both weaker and stronger formulations are possible.

- P is anti-matter for C if (i) holds but (ii) fails.

Example

- Consider S: *Jane ate BIRTHDAY CAKE*.
- Among other questions, this is congruent to that for the question Q: *Did Jane eat cake, fish, or a bicycle?*
- If Q is the QUD targeted by S, then the proposition that *Jane ate cake* matters, because it is true in some cells and not in others.
- The proposition that *Jane ate something* is anti-matter, because it is true in all cells in Q.

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Another example

- Consider the same S but a different Q: *Did Jane eat any birthday cake?*
- If Q is the QUD targeted by S, then the proposition that *Jane ate cake* matters, because it is true in some cells and not in others.
- But now the proposition that *Jane ate something* also matters, because it is true all worlds in one cell in Q, but not established in the other.

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E) Some material does not differentiate alternatives in the focus meaning for a clause.

The only test

(1) Mary only doubts that BILL left

--> Bill is the only x for whom Mary doubts x left

(2) Mary only doubts it was Fred who left

-/-> The only thing Mary doubts is maximality

- Exclusives can associate with material in an attitude complement (1).

- But not with the maximality implication of a cleft (2).

- So this material doesn't differentiate alternatives for its clause.

- Given that it is also not a conversational implicature) this implication is conventionally anti-matter.

The only test

(3) Mary only introduced the ELDEST daughter to me

(4) Mary only introduced the SON OF A BITCH to me

- In general, exclusives can associate with descriptive content, as in (3).

- But the exclusive cannot associate with the property of being an SOB (though it can associate with that individual).

- Again, expressive content does not differentiate alternatives for its containing clause.

- So expressive content is conventional anti-matter.

The only test

(5) Mary only thinks I introduced Fred, her BEST friend, to Sue.

(5') Mary only introduced Fred, John's father, to Sue.

(5'') ? Mary introduced Fred, her best friend to Sue, and she also introduced Fred, John's father, to Sue.

- An exclusive outside an appositive cannot associate with material in the appositive (*best friend* in (5)).

- So appositive content does not differentiate alternatives for the clause containing the appositive.

- Therefore appositive content is conventional anti-matter.

Comment

- The *only* test is not in fact the only test for whether material is conventionally anti-matter.
- Various of the other properties could (and should) be used as diagnostics.
- I chose to discuss *only* because I take it to shed light on what alternatives are computed.
- e.g. the alternatives for a clause with an apositive can be calculated by temporarily ignoring the apositive.

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F) Affirmation and denial target what matters.

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Example

(6) A: Bradley, a friend of mine, has gone to the airport.
   B: Yes. / That's right.
   B': No. / That's not true.

- Affirmation/denial targets claim that Bradley has gone to the airport, not claim that he is a friend of mine.

G) The direct answer to an explicit question matters, so it should not be encoded as anti-matter.

Example

(7) A: Where's Bob these days?
   B: # Bob, who is in Austin, hasn't called me for a week.
   B': Bob, who called me yesterday, is in Austin.

(8) A: What do you think of Bob?
   B:# That SOB Bob is dating my sister.

H) Apositives and expressives target their own questions.

Comment

- Some apparent counterexamples to Simons et al (2011) involve CIs apparently answering questions.

(9)   Q: Where's Bob?
        A: Bob, who is having lunch with someone else, is not HERE.

- In (9A), the alternatives for the main clause should be calculated as for (10):

(10)   Bob is not HERE.

- The alternatives for (10) are themselves underspecified by surface form, but could be of the form *Bob is in place X*, so that the QUD is just what is given explicitly in (9Q).

Comment continued

- But in that case (9) is not problematic, since the NRRC content, i.e. that Bob is having lunch with someone else, is antimatter: it doesn't remove cells except under additional assumptions.

- This still leaves us with a question: if NRRC content doesn't target the QUD for the containing clause, what does it do?

- Observation: appositives can contain their own Focus Sensitive Particles, and these associate within the appositive.

(11) Bob, who only eats VEGETABLES, is not HERE.

Comment continued

- Given that I take *only* to target questions, I'm forced to the conclusion that the NRRC must target a separate question from the QUD for (11) as a whole, namely: what does Bob eat?

- More generally: I postulate that both appositives and expressives are conventionally required to target a question other than the QUD for their containing clause.

- For an expressive, the question might be of the form *What do I think/feel about X?*

I) Operators target what matters, so only anti-matter tends to project.

Presuppositions project

Guaraní (Paraguay, Tupí-Guaraní)

(1) Maléna   o-heja la   jepita.
    Malena   3-stop   the   smoke
    'Malena stopped smoking.'
(2) Maléna   nd-o-hejá-i   la   jepita.
    Malena   NEG-3-stop-NEG the   smoke
    'Malena didn't stop smoking.'
(3) I-katu   Maléna   o-heja la   jepita.
    3-possible   Malena   3-stop   the   smoke
    'It's possible that Malena stopped smoking.'

Imply: Malena smoked.
Do not imply: Malena is not smoking anymore.   29

Presuppositions project

At least the following project:

- Definites
- Factive verbs and nouns
- Telic and implicative verbs
- Aspectual adverbs
- Sortally restricted adjectives
- Clefts
- Intonational backgrounding
- ...

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Not all that projects is a presupposition

Non-restrictive relative clauses

(4) Sweden may export synthetic wolf urine — sprayed along roads to keep elk away — to Kuwait for use against camels. *(Associated Press, January 19, 1995, from Beaver 2001)*

(5) Maléna, ha'é-va Juan angiru, nd-o-hó-i   Caaguasú-pe.

Malena   3.pron-RC Juan   friend   NEG-3-go-NEG Caaguasu-to

'Malena, who is Juan's friend, did not go to Caaguasu.'

Implies: Malena is Juan's friend.

Not all that projects is a presupposition

(6)   Politeness morphemes
Falls **Sie** hungrig sind, wird mein Sohn das Essen servieren.
'If you (formal) are hungry, my son will serve the food.'
Implies: speaker in deferential position wrt addressee

(7)   Expressives
If that **son-of-a-bitch** Patrick left, he'd better not have taken the flower arrangement.
Implies: Speaker has negative attitude towards Patrick.

Comment

- To understand how logical operators target what matters, it's perhaps easier to consider why they don't target anti-matter.
- Consider e.g. not(A & B), but suppose A holds in all alternatives.
- In that case, after update we will only have alternatives where A & not(B) holds.
- This shows that anti-matter entailments are not targeted by negation.

Comment continued

- Now consider an appositive within the syntactic scope of a negation.
- By assumption, the appositive targets a question other than the QUD, and does not enter into the content the negation applies to.
- Thus negation cannot target it.
- Note that the treatment of appositives is quite similar to that of Chris Potts, except that (i) I take appositives to answer a non-UD question, and (ii) I subsume appositives within a broader class of antimatters.

J) "Softness" of triggers could be explained as non-conventional anti-matter content.

Projection of definites is variable

Hajičová (1984):

(11) This time our defeat wasn't caused by [Harry]$_F$.
Defeat projected.

(12) This time Harry didn't cause our [defeat]$_F$.
Defeat local.

Projection of factive complements is variable

Karttunen (1971) on `semifactives':

(13)   If I realize later that I have not told the truth, I will confess it to everyone.

But note:

(14)#   If I [realize]$_F$ later that I have not told the truth, I will confess it to everyone.

Projection of factive complements is variable

More `semifactive' examples:

(15) If scientists discover that there's [water]$_F$ on Mars, we can start a colony

(16)# If scientists [discover]$_F$ that there's water on Mars, we can start a colony.

(17) If I discover that there's [water]$_F$ on Mars, we can start a colony.

Proposal

- I suggest analyzing these cases in terms of the interaction between focus and which QUDs are pragmatically plausible.
- Let us say that S is *about* X if the alternatives in S's QUD differ only minimally wrt entities other than X.
- Generalization: we tend to take a sentence in which the main verb is a psych verb to be about the mental state of the subject.
- In such a case, let us say that we have *purely psych alternatives.*
- Claim: these are favored with VP or (non-contrastive) V focus.

Proposal continued

- But now consider a simple factive sentence *X knows p,* and (ignoring philosophical complexities) represent the meaning as JTB(p)
- Suppose the QUD corresponded to, e.g. {JTB(p), not (JTB(p)) }
- In that case, the sentence would not be about X's psychological state, because something other than this varies across alternatives, i.e. the truth of p.
- On the other hand, {JTB(p), p & not(JTB(p)) } would be purely psych alternatives.

Example

(28)   [Background scenario: a nutritionist has been visiting
first grade classrooms to talk to the children about
healthy eating.]

Q: What most surprised you about the first graders?

A: They didn't know that you can eat raw vegetables.

- The question: which implications of the negated proposition
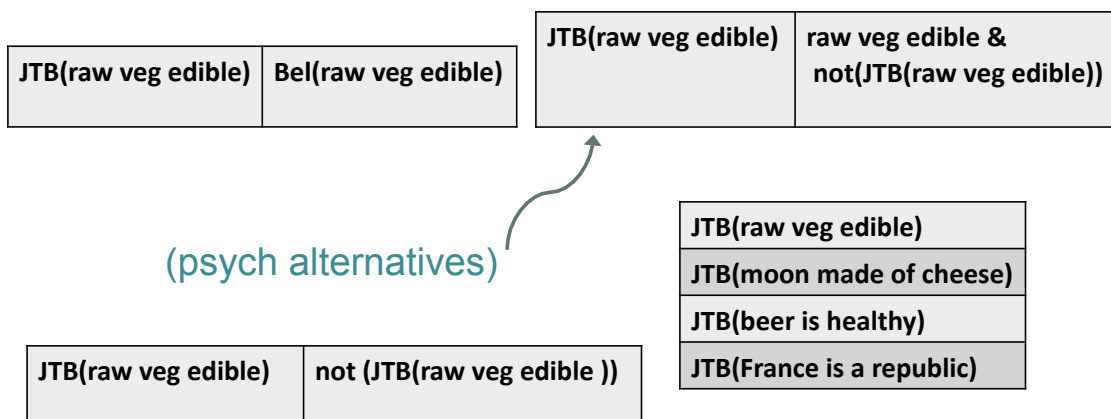*they knew that you can eat raw vegetables* matter?

Example continued

(28)   Q: What most surprised you about the first graders?
       A: They didn't know that you can eat raw vegetables.

- Some possible QUDs for *They know you can eat raw. veg.:*

JTB(raw veg edible)	raw veg edible & not(JTB(raw veg edible))

JTB(raw veg edible)	Bel(raw veg edible)

(psych alternatives)

JTB(raw veg edible)
JTB(moon made of cheese)
JTB(beer is healthy)
JTB(France is a republic)

JTB(raw veg edible)	not (JTB(raw veg edible))

K) Yet further diagnostics bring out the differences between matter and various types of anti-matter

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Taxonomy of matter and anti-matter

		Projection	Strong contextual felicity	Local effect
MATTER	At-issue entailments	✖	✖	✔
ANTIMATTER	Backgrounded content	✔	✖	✔
	Discourse constraints	✔	✔	✖
	Conventional Implicatures	✔	✖	✖

(Diagnostics discussed in *Tonhauser et al, ms)*   44

Taxonomy of anti-matter

Backgrounded content	Pragmatic	*factives, aspectual verbs*
		clefts, exclusives, focus, approximatives
Discourse constraints	Conventional	*anaphora, honorifics*
Conventional Implicatures		*appositives, expressives*

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Conclusion

- My goal has been ambitious: a unified account of projection, focus, and discourse based on a relatively `surfacy' model of questions under discussion.

- While I can't claim to have achieved the goal, I do claim that the surfacy QUD model offers some promising lines of attack on a wide range of phenomena, both new and old.

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END

More tricky cases involving CIs

- Some difficult cases (e.g. the following due to Chris Barker p.c.) are resolved once the QUD for a clause is constrained by focal alternatives.

(29)   Q: What do you think of Bill?

A: I've never MET the son-of-a-BITCH.

- Here, congruence means that the QUD for (29A) must be *Have you ever met Bill?*

- I assume that material in an expressive need not contribute to the alternatives for the main clause.

- Evidence: I only gave the son-of-a-BITCH WATER, *only* associates with *water*, not *bitch*.

When something that projects is still where it started

(25)   Mary hopes that it's a cheap glass which broke.

(26)   Something broke.

(27)   Mary hopes that something broke.

Puzzle: what is the proposition which Mary hopes is true in (25)?

Something that projects is still where it started

(25) Mary hopes that it's a cheap glass which broke.
- The argument of hopes is exactly what it seems to be (the proposition that a cheap glass broke)
- The cleft sets the QUD to be: what broke?
- Suppose "hopes" has a free parameter, a Kratzerian modal base
- The modal base is restricted to salient worlds, those where the question of what broke is non-trivial.
- So (25) says that of the worlds where something broke, her favorites are those where the broken thing is a cheap glass.
- Nothing follows about her preferring breakage worlds to non-breakage worlds.

Something that projects is still where it started

- Intriguing alternative: perhaps "hope" and other attitudes have as a free parameter not a modal base, but a question.
- The question parameter is pragmatically resolved to the local QUD.
- Then (25) means that Mary hopes the answer to the question "what broke?" is "a cheap glass."
- Again, it doesn't follow that Mary hopes that something broke.

Something that projects is still where it started

- Note that on either proposal, the projected material (that something broke) is still present in the overt argument of "hope", despite appearances.
- So consideration of the QUD offers a line of attack on an old philosophical problem, closure of attitudes.

Closing remarks

- **Our goal:** a unified account of projection for all instances of projective content.

- **Our proposal:** this account will make crucial reference to the discourse role of elements of content, which we characterize in terms of at-issueness.

Sketch

- **Projection**

  Semantic content **projects** if it contributes content at a non-local level in spite of being embedded under one or more operators that might be expected to block inferences from expressions in their scope.

- **Antimatter**

  Material which resolves the **Question Under Discussion** matters. Conventional implicatures, backgrounded material, and structural constraints on the discourse context don't do this. They are anti-matter.

- **Proposal**

  Anti-matter projects since operators target the things that matter.