

The molecular meaning of *milk*: Fully-Fledged Functions and Articulated Arguments

Kjell Johan Sæbø
ILOS, University of Oslo

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Abstract

The two scenarios sketched for the sentence *There is milk in the fridge* by Travis (1989) suggest that the contribution of a noun like *milk* to the truth conditions of sentences containing it depends on the context, and, moreover, that this dependency can involve pragmatic reasoning. After considering three alternative ways to account for this intuition, I discuss the implications of assuming that the content of a noun does vary with the context and that the relevant aspects of the context can indeed include a conception of the interlocutors' intentions and beliefs. I argue that – if this variance is encoded, through a situation variable (Kratzer 2004) or a parameterised property variable (von Stechow 1994) – this case hardly presents anything new in relation to more *bona fide* cases of context sensitivity, from covert determiner domain restriction via association with focus and relative modality to pronoun resolution. More specifically, I try to show that contextual determination does not involve substantially more pragmatic reasoning in the case of *milk* than in the case of (say) *must*, as invariably, the relevant function idealises from a complex calculus where inferencing over manifold information, even on the speech act, plays a vital role. Context dependency is thus essentially a pragmatic affair: Contexts (narrowly conceived) deliver values in close collaboration with speaker and hearer as rational agents. I conclude that although there is much to be done in bringing to light regularities in the modalities of context dependency, this should not discourage us from encoding the dependency and continuing pursuing, in the words of Kratzer and von Stechow (1976), a “Skelettsemantik”.

1 Introduction

Travis (1989: 18f.) noted that although none of the words constituting (1) are ambiguous (or commonly regarded as context-dependent), the sentence can be both true and false in the same circumstances of evaluation.

- (1) There's milk in the refrigerator.

It can be true and false in two different contexts, on two different 'speakings':

Scenario 1

the hearer evidently wants milk in his coffee and the speaker volunteers (1)

Scenario 2

the hearer has cleaned the fridge and the speaker looks in and exclaims (1)

Intuition: (1) can be true in Scenario 2 but false in Scenario 1, if the fridge "is devoid of milk except for a puddle... at the bottom" (p. 18). P. 19:

where different speakings of words may differ in their semantics, we will say that the semantics of the words is S-use sensitive...

One might reasonably draw the following twofold conclusion.

- (i) The content of the noun *milk* is context-dependent,
- (ii) this dependency may involve pragmatic reasoning.

Before addressing the implications of this conclusion, let us consider three ways of getting around it.

2 Escape routes

There seem to be three, two low routes (form) and one high (function).

2.1 Route 1: Information Structure

To evade (ii), note a different **information structure** in the two scenarios, partially signalled by intonation:

- (2) i. There is MILK in the FRIDGE.
- ii. There is MILK in the fridge.

(2i) can have a theme–rheme (topic–comment) structure, entailed by and entailing Scenario 1; (2ii), entailing Scenario 2, can be athetic statement.

In German, (3i) would be used in Scenario 1, (3ii) or (3iii) in Scenario 2:

- (3) i. Milch ist im Kühlschrank. / Milch gibt's im Kühlschrank.
- ii. Da ist Milch im Kühlschrank.
- iii. Im Kühlschrank ist Milch.

In Scenario 1, *Milch* is a **theme**. Themes are given **and** new; hooking onto something given (Büring 1999) – here the milk would hook onto the coffee. The content of *milk* may be context-dependent but this dependency need not involve pragmatic reasoning, just **accommodation**; in order to justify the theme presupposition, there must be a salient alternative, – and *coffee* is one iff *milk* ‘counts as’ (cf. MacFarlane 2009) ‘milk suitable for coffee’.

2.2 Route 2: Determiner Domain Restriction

A way to evade conclusion (i) is to posit a covert determiner, overt in French:

- (4) Il y a du lait dans le frigo.

Covert domain restrictors are commonly assumed – primarily for monotone decreasing determiners, but according to Heim (t.a.), monotone increasing determiners may well have them too:

For all we can tell, every determiner may be construed with a covert restrictor in addition to its overt one and thus apply to an effectively narrowed set of contextually relevant...entities. We just don't see this as clearly with some determiners as with others. *the*, along with *every* and *no*, is not upward monotone, so covert restrictors weaken the presupposition or assertion, giving an otherwise...false claim a chance to be felicitous and true.

2.3 Route 3: Speech Act Insincerity

One might dispute the intuition of falsehood in Scenario 1 by appealing to **speech act insincerity**, easily confused with falsity in **commissive cases** (a strategy in line with ‘minimal semantics’ (Cappelen and Lepore 2005)).

However, a similar case with a natural kind noun casts doubt on that idea:

- (5) There is a bull in the field.

Suppose the bull the speaker has in mind is Ferdinand, undoubtedly a bull but not one likely to constitute a threat to anyone – (5) would still be true, but the warning would be judged insincere. – Now Travis writes (1989: 18):

The problem is that for *any* putative example of S-use sensitivity, there are many not obviously wrong strategies for avoiding the consequence that it really does exhibit S-use sensitivity. Nor are these strategies beyond the ingenuity of most philosophers.

But anyway, disputing the intuition of falsity in Scenario 1 or escaping the double conclusion (i)–(ii) is not my prime concern here.

3 Articulated Contexts

Even if we grant that a word like *milk* is context-dependent (and, after all, it has been argued, i.a., by Stanley and Szabó (2000), that nouns harbour restrictors in their own right) and that “context” must be understood in a wide, communicative sense here, this does not conflict with the view that context dependencies are linguistically anchored functional dependencies, – not more, at least, than several *bona fide* cases of context dependency do.

That is not to say that the determination of the function values is simple – on the contrary, the arguments must be richly structured, or **articulated**,¹ and the functions must model **cognisance**.

A careful analysis of a variety of cases will illustrate this.

3.1 A Count Noun: the Small Situation

Consider, first, an indefinite description in a situation of utterance where the ultimate denotation of the (count) noun is effectively narrowed down to a set of cardinality ± 10 :

- (6) She shuffled the pack, cut off some ten cards and fanned them out, saying, “Pick a card and I will guess it”.

The hearer is supposed to pick one of the some ten cards fanned out in the speaker’s hand, not one of the some forty-two cards stacked on the table (even though these may be just as close at hand). Why? Well, the speaker’s attention is directed at those cards.²

¹I borrow the term from Kamp (2010), who uses it in a related, if not identical sense.

²Note that the speaker’s ‘referential intention’ concerning the indefinite description as such cannot be at issue here, as the indefinite is clearly not used in a specific sense.

Domain restriction à la Heim (t.a.) (ignoring intensions here and onward):

$$(7) \quad \llbracket a \rrbracket^c = \lambda P \lambda Q \boxed{P \cap \mathcal{R}_c} \cap Q \neq \emptyset$$

where \mathcal{R} is something like ‘the salient entities’, and \mathcal{R}_c for a certain c could be ‘the entities fanned out in \mathcal{S}_c ’s hand’.

Domain restriction according to Kratzer (2004):

$$(8) \quad \llbracket card \rrbracket = \lambda x \lambda \rho \text{ card}(x)(\rho)$$

The resource situation argument ρ could, ultimately, be saturated by that subsituation of the utterance situation containing just what \mathcal{S} attends to.

Domain restriction à la Stanley (2002):

the noun . . . is associated syntactically with domain indices,
which are assigned values by context (Stanley 2002: 157)

$$(9) \quad \begin{array}{ll} \text{a.} & \llbracket card \mathcal{R} \rrbracket^c = \boxed{\text{card} \cap c(\mathcal{R})} \quad (\text{card is the set of all cards}) \\ \text{b.} & \llbracket card \mathcal{R} \rrbracket^c = \boxed{\text{card} \cap \mathcal{R}(c)} \quad (\text{card is the set of all cards}) \end{array}$$

Here \mathcal{R} may again be ‘the salient entities’, or more specifically, ‘the entities \mathcal{S} attends to’, and $c(\mathcal{R})$ could again be ‘the entities fanned out in \mathcal{S} ’ hand’.

But how do the salient entities become the entities fanned out in \mathcal{S} ’ hand – how does \mathcal{R} assign that set to c , or how does c assign that set to \mathcal{R} ? How does the situation ρ become so small as to exclude the cards on the table? Kratzer might say: The resource situation parameter ρ may zoom in on the smallest situation defining a natural class, – which is clearly not sufficient; suppose that three cards stood out above the others – design or accident?

Regarding \mathcal{R} , identifying the salient entities, or what the speaker attends to, requires cognisance, so c must be “articulated” (Kamp 2010), incorporating any shared clues to the speaker’s intentions, and \mathcal{R} must embody a model hearer and speaker, competent at “rich, abductive” (Borg 2009a) reasoning.

Sensitivity to speakers’ intentions has been recognised for **demonstratives**, whose reference, according to Perry (2001: 58f.), is “discretionary” rather than “automatic”, depending not just on “public contextual facts” but on the speaker’s intention. Bach (2005), among others, concludes that usually, the context does not determine the reference of a context-dependent word, in the sense of making it the case that it has it; the broad, communicative context enables the hearer to figure it out, but it cannot **determine** it, for contexts do not contain intentions. Borg (2009a) concurs.

This conclusion is not compelling, however. There are two things to note. First, the **context** should not be expected to provide more than **clues** to the speaker’s intention; inferring it from those must be left to the **function**, \mathcal{R} in (7) or (9b), CQ in 3.2, f and g in 3.3, etc. Second, these functions – which may be partial – model hearers’ (and, by self-monitoring, speakers’) context theoretic (semantic and pragmatic) **competence**, not performance. They are like programs emulating a totally rational communicative agent.³

3.2 The Current Question is itself Sensitive

According to a recent influential theory (Beaver and Clark 2008), particles like *only* do not associate with focus but with the **Current Question** (CQ), a contextually given set of propositions.

The semantics of *only* (after Beaver and Clark 2008: 260ff.)

$$\llbracket \text{only} \rrbracket_v = \lambda\pi \frac{\forall p \in \text{CQ}_\sigma \ p_v \supset \pi \geq_\sigma p}{\forall p \in \text{CQ}_\sigma \ \pi \leq_\sigma p}$$

The denominator, encoding the presupposition, says that any member of CQ_σ is at least as strong as π . The numerator, encoding the descriptive content, says that any true member of CQ_σ is at most as strong as the “prejacent”, π .

As shown by (10), a context in the narrow sense may underdetermine CQ_σ .

- (10) – Do you think she’s Russian?
 a. – No, she only SPEAKS Russian.
 b. – Yes, she only SPEAKS Russian.

For (10a), the Current Question must be something like $\llbracket \text{she} \text{ --- Russian} \rrbracket$, for (10b), it must be something like $\llbracket \text{she speaks ---} \rrbracket$.

But the only contextual difference is the negative versus affirmative answer to the explicit yes/no question, and to get from there to the different CQs, we must consider **discourse relations**: That the only relation she bears to Russian is speaking the language is a sensible explanation only for the belief that she is **not** Russian; that the only language she speaks is Russian is a sensible explanation only for the belief that she **is** Russian.

This is not exactly about the speaker’s referential intentions – but again, it seems as if the value of a contextual function is only arrived at through an algorithm assessing what the speaker can reasonably be taken to mean.

³Stokke 2008, 2010 (23–54) propounds the more radical view that speakers’ intentions are parameters of the “narrow” contexts serving as arguments of characters.

3.3 Ordering Sources do not fall from Heaven

In Kratzer’s theory of relative modality (Kratzer 1976, 1978, 1981, 1991), every modal comes with two contextual parameters, each of type $(s((st)t))$ (a function from worlds to sets of propositions), the **modal base** (f) and the **ordering source** (g). The former yields relevant facts while the latter provides propositions that may not be true: typically ideals or stereotypes; “normative” ordering sources interact with “circumstantial” modal bases; “stereotypical” ordering sources interact with “epistemic” modal bases.

The question how such high-level parameter values are set is accentuated by sentences that lend themselves equally well to both kinds of modal reasoning, circumstantial – normative and epistemic – stereotypical, like (11).

- (11) i (– I want to be removed from duty.)
 ii (– I want to fly combat missions.)
 – You must be insane.

That you are insane might be meant to be a necessary condition for the ideal or a conclusion from the fact that you have the ideal, and whether g is set to your ideals or not evidently depends on what there is reason to believe about the speaker’s beliefs, generally, on the interlocutors’ information state(s).

3.4 The 1st person plural and cooperativity

When do the referents of *we* include the addressee(s)? (12) can be...

- (12) We love each other but we have nothing else in common.
 i (...so let’s call the whole thing off.)
 ii (...so I’ve called the whole thing off.)
 iii (...so we could use some expert advice.)

used to explain a declaration of intention to end the relationship with the addressee, or to explain a declaration of intention to renew the relationship with the addressee, or to explain a request for advice from a third party...

Why is the addressee included in the referents of *we* in one case but not in the other two? Ultimately, because the utterance would be strange otherwise: it would violate Quality or Relevance, or no felicitous speech act would ensue.

This judgment can only be made by a cognisant function from articulated contexts, modelling a competent pair of interlocutors.

4 Conclusions (and more on milk)

More cases (e.g. anaphoric 3rd person pronoun resolution, Bach 2005: 26f.) could be adduced to underscore that functions coding context dependencies abbreviate algorithms involving inference machines even in common cases.

Formal semanticists have long acknowledged this – for the most part tacitly; compare, however, this passage from Kratzer and von Stechow (1976):

Man kann nun versuchen, diese Hinweise, die den Bezug eines situationsabhängigen Wortes wie *wir* in einer Situation klarmachen, zu systematisieren. Das ist sicher eine interessante und lohnende Aufgabe, die natürlich eine Bedeutungstheorie, wie wir sie hier vorschlagen, ergänzen würde. Trotzdem sehen wir hier von derartigen Versuchen ab, und nennen unser Vorgehen, um keinen Zweifel über unsere Absichten im Raum zu lassen, zu Ehren von Konrad Röntgen **Skelettsemantik**.

This is not yet evidence that a mass noun like *milk* is context-dependent – or that if it is, the dependence should be coded in a restriction function; it merely shows that the way such a function would assign a value to a context is not radically different from (more pragmatic than) the way that functions coding context-dependencies commonly assign values to contexts.

There are alternatives to restriction functions. On the connectionist model by Smolensky (1988), COFFEE is an “activity vector” over “micro-features”, and context-dependent: the vector for COFFEE in CUP OF COFFEE is not the same as that for COFFEE in SACK OF COFFEE; the feature HOT LIQUID will be active in the former but inactive in the latter. Going from *coffee* to *milk*, from cognitive science to linguistics, and from context in the narrowest sense to context in the broadest sense, we might hypothesise that a feature like UPRIGHT CONTAINER (one of Smolensky’s for CUP OF COFFEE) is active in a situation like Scenario 1 but inactive in a situation like Scenario 2, – as a result of applying a cognisant function to an articulated context.

Anyway, my bottom line is that it does not seem wrong to envisage a word with a built-in function capable of reading the signs from a context, even if the value is not some figure to be read off from some column. To offer that up as proof that words do not depend on context for content is to insist that pragmatics **takes over** once pragmatics kicks in⁴ – and to misinterpret and misrepresent the semanticist’s intention when, carelessly, she writes a letter (say, *f*, or *g*) to take care of a heavy-duty and high-impact assignment and provisionally leaves it at that, intending maybe to elaborate on it some day

⁴taken to its consequence, this view implies that semantics **and** syntax come to a halt before quantifier scope ambiguities, or structural ambiguities generally, are resolved

but knowing deep down that she never will.

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