Discourse inference and the meaning of *presque*

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1 Introduction

In this paper, we describe the syntax-semantic interface of the French adverb *presque*, which is like its English counterpart *almost* in many respects. An apparent similarity is its behaviour with quantifiers. Both are not compatible with indefinites, e.g. *un* 'a', *quelques* 'some/a few' or *plusieurs* 'several'. This behaviour is due to their approximation value, since *à peu près* and *about* undergo the same restrictions (see Penka 2006 for a parallel proposal for English). However, the contrast in (1), that illustrates what Anscombre and Ducrot (1976) have called the 'argumentative' value of *presque*, points out that *presque* cannot be reduced to an approximator.

(1)   a.   #Ce livre n'est pas cher, presque 30 euros 'This book is cheap, almost 30 euros'
      b.   Ce livre n'est pas cher, à peu près 30 euros 'This book is cheap, about 30 euros'

We analyse the argumentative side of *presque* by showing in particular that it is 'two-layered' in the sense of Jayez (2005), i.e. it introduces a main content and a conventional implicature. Our proposal also covers the uses of *presque* as a quantifier modifier and preserves the unity of the adverb. Many aspects of the analysis extend to *almost*.

2 Main properties of *presque*

Presque is an adverb which can syntactically combine with APs, AdvPs, determiners and verbs, see (2).

(2)   a.   Le thé était presque (très) chaud 'The tea was almost (very) hot'
      b.   John a répondu presque (très) méchamment 'John answered almost (very) harshly'
      c.   John est presque le chef 'John is almost the leader'
      d.   John a presque 20 ans 'John is almost 20'
      e.   John a presque renoncé a son projet 'John almost abandoned his project'

It is ruled out in sentence initial, pre- and post-verb positions (see Bonami et al. 2004 for adverb position in French). Sentence (3a) shows that *presque* is not a sentential adverb and (3c) that it is not a manner adverb. *Presque* cannot occur after a non-finite verb (3c,d). In all other cases, *presque* occurs just before the phrase it adjoins to.

(3)   a.   *Presque John a renoncé à son projet 'Almost John abandoned his project'
      b.   *John presque a renoncé à son projet
      c.   *John a renoncé presque à son projet
      d.   *Jean a été accusé de renoncer presque à son projet
           'John was accused to abandon almost his project'

When *presque* combines with an adjective, the adjective cannot occur be in prenominal position (4b), in contrast with some French degree modifiers (4c).

(4)   a.   Un chat presque gros [lit. a cat almost big]
      b.   *Un presque gros chat
      c.   Un (très / assez / bien / trop) gros chat 'a (very / fairly / quite / rather / too) big cat'

When it combines with determiners, there are two main constraints. First, *presque* is incompatible with existential determiners such as *un* 'un' or *quelques* 'some/a few'(5a). In this respect, it behaves like *almost*. It also sounds awkward with *chaque* 'each' (5b), but can be used in the correction phrase *ou presque* 'or

almost'.[1] Second, the restriction must occupy a predicative position (5c,d), except for *tous les* and numerical determiners, which can occur in any position (5e).[2] Finally, *presque* can be inserted before certain nouns that head proportional quantifiers (5f), but we ignore this possibility here.

(5) a. *Presque un étudiant / quelques étudiants ont compris 'Almost a student / (some / a few) students understood'

   b. ??Presque chaque étudiant / quelques étudiants ont compris 'Almost each student understood'

   c. ??Presque (beaucoup d' / la plupart des / la majorité des / la totalité des) étudiants ont compris [lit Almost (many / most / the majority of / the totality of) students understood]

   d. Ce groupe représente presque (beaucoup d' / la majorité des) étudiants
      'This group represents almost (many / the majority of) students'

   e. Presque (tous les / 2000) étudiants se sont inscrits 'almost (all the / 2000) students registered'

   f. La presque totalité des étudiants se sont inscrits [lit the almost totality of students registered]

Presque has strong 'argumentative' properties, in the sense of Anscombre and Ducrot (1976), who mention the following example.

(6) #Peu d'automobilistes dépassent le 120 km/h, presque 20%
    'Few car drivers go faster than 120 km/h, almost 20 %'
    [intended: it is correct to say that few car drivers go faster than 120 km/h since they are (only) 20%]

Intuitively, *presque P*, where P is a property, conveys the two pieces of information that P is not fulfilled and that the actual value or position on a scale is 'near to P'. But it is difficult to see how this intuition could account for (6), since both pieces of information are compatible with the justification discourse relation conveyed by the sentence, as evidenced by (7).[3] We address this problem in the next section.

(7) Peu d'automobilistes dépassent le 120 km/h, (moins de / à peu près) 20%
    'Few car drivers go faster than 120 km/h, (less than / about) 20 %'

3   The argumentative profile of *presque*

The argumentative properties of *presque* cannot be derived from its approximation value. One might argue[4] that, given the monotonicity of scales, the intuitive description of *presque* mentioned in the previous section suffices to account for examples of type (6). Let us see why this is not the case. Consider an account that assigns to *presque* a conjunction of conditions defined over a contextually relevant scale (8), as in Penka's (2006) proposal for *almost*. The first member asserts that the proposition p is false and the second one that some proposition q is true, which is close to p w.r.t. scale s. How does this fare with respect to (6)?

(8) $[\![presque]\!]_s = \lambda w \lambda p. \neg p(w) \,\&\, \exists q(q \approx_s p \,\&\, q(w))$.

The proximity ($\approx_s$) depends on the direction of the scale s and percentages are downward monotone down to 0 (if 20% of the car drivers satisfy a property P, $x\%$ satisfy P for any x such that $0 < x \leq 20$). In a world w, $[\![presque]\!]_\%(w)$(number of car drivers = 20%) asserts that the number of car drivers is not equal to 20% and that it is slightly under 20%. Hence, it is unexplained why (6) is odd when a discourse like (9) is perfectly natural.

(9) Peu d'automobilistes dépassent le 120 km/h, légèrement moins de 20% 'slightly less than 20%'

Next, *à peine* 'hardly' is quite similar to *presque* (Jayez 1987): *à peine 20%* entails that the actual number is very close to 20% and slightly superior. To capture the strong analogy between them, one could simply propose to replace '$\approx_s$' by '$>$ & $\approx$'. Again, the oddity of (10) is unexpected under such a view.

(10) ??Beaucoup d'automobilistes dépassent le 120 km/h, à peine 20%
     'Many car drivers go faster than 120 km/h, hardly 20 %'

Finally, it is unclear why similar effects obtain with comparatives, for instance equality comparatives (11).

(11) a. Marie est grande puisqu'elle a presque la même taille que Yolanda
        'Mary is tall since she is almost the same size as Yolanda'

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[1]E.g. *Chaque étudiant (, ou presque,) a compris (, ou presque).* 'each student got it, or nearly so' is fine. This possibility of combining with a correction phrase is not open to *un* and *quelques*.

[2]In contrast to the English *all the* N, which could be analysed as *all* + *the* N, *tous les* N cannot, since *tous* does not exist independently in combination with a N, see *all students* vs. *tous étudiants*.

[3]Note that we take $\neg P$ to entail 'less than P' when P is associated with a downward monotonic scale.

[4]This was suggested to us by an anonymous reviewer.

    b.   # Marie est petite puisqu'elle a presque la même taille que Yolanda
           'Mary is short since she is almost the same size as Yolanda'
    c.   Marie est grande / petite puisqu'elle a la même taille que Yolanda
           'Mary is tall / short since she is the same size as Yolanda'

The same unability to predict correct discourse connections affects intensional analyses. Nouwen (2006) proposes that *almost p* is true iff *p* is true in some world that differs minimally from the actual world w.r.t. the denotation of (contextually relevant) properties. Although there exist minimally different worlds in which the number of car drivers is exactly 20% (6, 7) or Marie's size is just Yolanda's size (11), this does not explain how an indication of proximity –be it intensional– constrains discourse sequences. Being approximately the same size as Yolanda or approximately 20% of the total does not favour inferences about (non-)tallness or (non-)fewness in itself.

These and many similar observations push us to explore a different route. We propose that *presque P* conveys two pieces of information. It entails (main content) that the actual value or degree of *P*-ness is superior to a threshold beyond which it is possible to assign 'approximately *P*' to an entity. It conventionally implicates that the actual value or degree of is not sufficient to assign *P* to this entity. In general, discourse inferences based over discourse relations exploit the main content and leave out implicatures. For instance, in (6), the justification relation holds between 'few car drivers go faster than 120 km/h' and 'the number of car drivers who go faster than 120 km/h is superior to the approximately-20% threshold'. Suppose, for the sake of illustration, that this threshold is 19.5; then, we can paraphrase (6) by 'the number of car drivers is small since it is superior to 19.5%'. Intuitively, this is a strange form of argument. One does not normally infer that a quantity is small from the fact that is *superior* to a certain value. We will see in the next section that Merin's theory of argumentation is intended to capture precisely this kind of constraint.

4   A two-layered approach

4.1   The syntax-semantics interface

For compactness, we use a categorial grammar presentation (see Steedman 2000, for instance). We note X/Y any category Z such that any string of the form x:Zy:Y is of category X; X\Y denote any category Z such that any string of the form x:Xy:Z is of category Y. Strings x, y, etc. can be assigned features such as +pred (predicative) + fin (finite). In the previous section, we saw that *presque* can combine with adjectival, adverbial, noun and verb phrases. For adjectives, we posit (12), where C is a context.

(12)   Syntax: (N\N)/x:AP   Semantics: $[\![presque]\!]_C([\![x]\!])$

For adverbials, the condition is straightforward.

(13)   Syntax: AdvP/x:AdvP   Semantics: $[\![presque]\!]_C([\![x]\!])$

For NPs, we must preserve the difference between predicative and non-predicative NPs as well as the *tous les* exception. Det abbreviates the complex category (NP/N).

(14)   a.   Syntax: Det/x:Det, = *tous les*   Semantics: $[\![presque]\!]_C([\![x]\!])$
        b.   Syntax: (NP:+pred/N)/x:Det, $\neq$ *tous les*   Semantics: $[\![presque]\!]_C([\![x]\!])$

Finally, (15) corresponds to the finiteness condition.

(15)   Syntax: x:((NP\S)/y),+fin\$x$:((NP\S)/$y$),+fin   Semantics: $[\![presque]\!]_C([\![xy]\!])$

4.2   The meaning of *presque*

Formally, *presque* can have arguments of the following types: properties (corresponding to APs and VPs), sets of properties (generalised quantifiers) and $\langle \sigma, \sigma \rangle$, where σ is a suitable type for adverbial modifiers. So we assign to *presque* a general form $\lambda Z. \phi(Z)$ where Z is a variable of type $\langle e, t \rangle$, $\langle \langle e, t \rangle, t \rangle$ or σ.

We note $s_{C,A}$ the scale associated with a context C and an expression A.[5] The right approximation threshold is defined in (16a) as this point ℓ such that every $\neg A$-point superior to every A-point and inferior to ℓ satisfies A 'approximately' in the context C (in symbols $\approx(A(x), C)$)). The symmetric definition for the left threshold is provided in (16b).

(16)   a. $<$-$approx(s_{C,A}) = \imath\ell(\forall x((x \notin [\![A]\!]_C \,\&\, \forall y(y \in [\![A]\!]_C \Rightarrow x >_s y) \,\&\, x <_s \ell) \Rightarrow \approx(A(x), C)))$

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[5]We could use sets of scales to make room for a certain indetermination, but we ignore this option for simplicity.

b. $>\text{-}approx(s_{C,A}) = \imath\ell(\forall x((x \notin [\![A]\!]_C \,\&\, \forall y(y \in [\![A]\!]_C \Rightarrow x <_s y)\,\&\, x >_s \ell \Rightarrow) \approx(A(x),C)))$

With *presque*, the approximation threshold depends on the monotonicity direction. E.g. for *presque chaud* 'almost hot', the approximation threshold is slightly less than hot whereas it is slightly more than cold for *presque froid* 'almost cold'. However, the strength of this preference may vary across speakers and contexts in more or less unpredictable ways for nonmonotonic scales. This non-rigid constraint accounts for the fact that examples like (1a) and (6) may sound more natural under interpretations such as '(only) slightly more than 30 euros' and ' (only) slightly more than 20%'. This happens in particular with numerical scales under an 'exactly n' reading (if the price is more/less than 30 euros, it is not exactly 30 euros, etc.). We do not seek to model the preference relation in this paper and simply note the preferred direction in the formulas by $\sqrt{}$. The $\times$ constructor signals that we have two different pieces of information (main content vs. implicature).

(17)   a.   Let s be a downward monotonic scale, then

$[\![presque]\!]_C = \lambda x^{\langle\sigma,\tau\rangle}. \lambda y^\sigma. [\![y]\!]_C >_s \text{<-}approx(s_{C,x}) \times [\![y]\!]_C \notin [\![x]\!]_C.$

       b.   Let s be an upward monotonic scale, then

$[\![presque]\!]_C = \lambda x^{\langle\sigma,\tau\rangle}. \lambda y^\sigma. [\![y]\!]_C <_s \text{>-}approx(s_{C,x}) \times [\![y]\!]_C \notin [\![x]\!]_C.$

       c.   Let s be a nonmonotonic scale, then

$[\![presque]\!]_C = \lambda x^{\langle\sigma,\tau\rangle}. \lambda y^\sigma. ([\![y]\!]_C >_s \text{<-}approx(s_{C,x})^{\sqrt{}} \vee ([\![y]\!]_C <_s \text{>-}approx(s_{C,x})) \times$
          $[\![y]\!]_C \notin [\![x]\!]_C.$

For example, *presque gros* 'almost big' gives $\lambda x^e. [\![x]\!]_C >_s \text{<-}approx(s_{C,gros}) \times [\![x]\!]_C \notin [\![gros]\!]_C$. A generalised quantifier NP like *presque tous les* 'almost all the' corresponds to $\lambda P. [\![P]\!]_C > \text{<-}approx(s_{C,tous\,les}) \times$
$[\![P]\!]_C \notin [\![tous\,les]\!]_C)$.

4.3   The layered structure of *presque*

Ducrot (1972) has proposed that *peu* 'little' and *un peu* 'a little' have symmetric semantic structures. *Peu* asserts that the quantity referred to is small, and presupposes that there exists some quantity. *Un peu* asserts (presupposes) what is presupposed (asserted) by *peu*. This accounts for contrasts like (18).

(18)   a.   ??John va mieux puisqu'il a peu mangé 'John is recovering since he ate little'
       b.   John va mieux puisqu'il a un peu mangé 'John is recovering since he ate a little'

Ducrot's (1972) *loi d'enchaînement* ('connection law') predicts that discourse markers cannot connect the main content and the presupposed content in a natural way. For instance, *John has stopped smoking* presupposes that John has smoked before, but in (19), there is no available connection with the presupposed content and this causes a feeling of incoherence. Jayez (1987) extends this treatment to *presque* by proposing that *presque* conveys a main content and a presupposition.[6]

(19)   a.   ??John has stopped smoking because he liked the taste of tobacco
       b.   ??John has bad teeth because he has stopped smoking

In retrospect, one may doubt that we have real presuppositions for *peu*, *un peu* and *presque*. One of the standard tests for presuppositions (see Geurts (1999) for details) is embedding under epistemic operators. For instance (20a) presupposes that Mary has children, exactly like the embedded sentence *Mary's children are on vacations*. However, (20b) does not presuppose that Mary ate nor does (20c) presuppose that Mary is under 20. As a result, Jayez (2005, 2006) proposes that the information layers of certain determiners and adverbs are defined in terms of main content and conventional implicature. Conventional implicatures obey the *loi d'enchaînement* of Ducrot, since they are subject to the same constraints on discourse attachment than presuppositions (Jayez 2006), and it comes as no surprise that the implicature conveyed by *presque* is not freely accessible. For instance, the preferred implicature ('less than 20%') hardly provides a justification for *Few car drivers go faster than 120 km/h* in (6).

(20)   a.   John believes that Mary's children are on vacations
       b.   John croit que Marie a peu mangé 'John believes that Mary ate little'
       c.   John croit que Marie a presque 20 ans 'John believes that Mary is almost 20'

We have given a precise status to the layers, but the question of how to represent them formally is still open (see Geurts and Maier 2003, Jayez 2006, Nouwen 2007, Potts 2005) and won't be discussed here. For the sake of clarity, we will limit ourselves to a simplified version of Pott's treatment. We assume that (i) we

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[6]The two-layered nature of *almost* has been independently contemplated by Penka and assumed by Nouwen, but they do not draw conclusions from this possibility.

have product types in addition to elementary and functional types, (ii) product distributes over application, i.e. $(X \times Y)[t] = X[t] \times Y[t]$, and that (iii) discourse relations target the main content, as in (21).

(21) If A = A1 $\times$ A2 and B = B1 $\times$ B2 are two discourse constituents and R is a discourse relation, $R(\text{A}, \text{B})$ iff $R(\text{A1}, \text{B1})$.

So far, we have not dealt with the fact that the main content of *presque* conflicts with certain propositions, for instance x being almost 20% with the proposition that x is 'small'. We now turn to this problem.

4.4 Inference

The fact that 'comparative' indications—i.e. expressions of the form xRy, where R is $<, >, \leq$ or $\geq$—raise problems with certain inferential connections has been noted but not properly explained by Jayez (1987). Taking up this problem again, Jayez (2005) resorts to Merin's (1999) notion of relevance. In the following, we use probability distributions P_W on sets W of information points ('worlds' in standard Kripke models). We make the usual assumptions on P_W, in particular that (i) $W' \subset W'' \subseteq W$ entails $P_W(W') < P_W(W'')$ and (ii) if $W \subseteq W'$, $\neg p_{W'} \subset \neg p_W$, and $p_{W'} = p_W$, then $P_{W'}(p) > P_W(p)$.[7]

(22) Let W be a set of propositional information points and P_W a probability distribution on W; let $W \dot{+} p$ the result of updating W with p and $W \Vdash p$ note the fact that p is true at every point of W. p is positively (resp. negatively) relevant to $p' =_{df}$ for every W such that $W \nVdash p$, $W \nVdash \neg p$, $W \nVdash p'$ and $W \nVdash \neg p'$, $P_{W \dot{+} p}(p') > P_W(p')$ (resp. $P_{W \dot{+} p}(p') < P_W(p')$).

When p is positively (negatively) relevant to p', it is intuitively perceived as an 'argument' for (against) p' in Ducrot's sense. E.g., the fact that the weather is warm is positively (resp. negatively) relevant to the fact that I don't wear (resp. wear) a jumper. Let s be a scale and l_1, l_2 two points on s such that $l_1 <_s l_2$. For a set X of variables, let W be the set of assignments of positions on s to the variables in X and $x >_s l_1$ and $x >_s l_2$ be the two propositions of which we evaluate the mutual relevance. Suppose that $W \nVdash x >_s l_1, x > l_2, x \nsucc_s l_1, x \nsucc_s l_2$, and $W \Vdash l_1 <_s l_2$. Consider $W \dot{+} x >_s l_1$. Since $W \nVdash x >_s l_1$, $W \dot{+} x >_s l_1 \subset W$. Since $W \Vdash l_1 <_s l_2$, $(x >_s l_2)_W = (x >_s l_2)_{W \dot{+} x >_s l_1}$. Therefore, $P_W(x >_s l_2) < P_{W \dot{+} x >_s l_1}(x >_s l_2)$. A similar reasoning applies to other cases. Going back to (6), if we interpret 'few car drivers go faster than 120 km/h' as asserting that the proportion of car drivers who go faster than 120 km/h is less than or equal to a certain threshold-value, say l_2 on the scale of proportions, and if we note l_1 the approximation threshold for *presque 20%*, we have the following situation (23).

(23)

relative positions of l_1 and l_2	relevance of $x >_s l_1$ w.r.t. $x \leq_s l_2$
$l_1 =_s l_2$	inconsistent!
$l_1 >_s l_2$	inconsistent!
$l_1 <_s l_2$	negative

The only consistent possibility is negative relevance, which is not compatible with a justification relation. In that kind of example, negative relevance would be compatible with a relation of concession/correction, paraphrased by 'Few drivers . . ., still, they are 20%', as noted by Anscombre et Ducrot (1976, p. 8).

5 Generalising the approach

The double-layered nature of *presque* is not idiosyncratic. A similar division of information is to be found in a number of determiners or modifiers. Ducrot (1972) mentions *peu* and *un peu*. *A peine* 'hardly' is described in Jayez (1987) and can be represented in a way symmetric to that of *presque*, for some of its uses. For instance, for a nonmonotonic scale s, the condition on *à peine* is:

$$\llbracket \textit{à peine} \rrbracket_C = \lambda x^{\langle \sigma, \tau \rangle}.\, \lambda y^\sigma.\, \llbracket y \rrbracket_C <_s \text{>-}approx(s_{C,x}) \times \llbracket y \rrbracket_C \in \llbracket x \rrbracket_C.$$

Another interesting pair is *plusieurs* 'several' vs. *quelques* 'a few', as shown by the contrast in (24).

(24) a. ??Seuls plusieurs mathématiciens maîtrisent le concept
          'Only several mathematicians master the concept'
       b. Seuls quelques mathématiciens maîtrisent le concept
          'Only a few mathematicians master the concept'

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[7]p_W denotes the set of points in W where p is true, in symbols $\{w \in W : w \models p\}$.

We assume that *seuls* 'only' indicates that the number of mathematicians that master the concept is low on some relevant scale. *Plusieurs P Q* implicates conventionally that the quantity of P-object that Q is moderate and asserts that this number is superior to some context-dependent threshold, say l_1. (24a) asserts literally that only a number of mathematicians superior to l_1 master the concept, which is as strange a thing to assert as, for instance, 'only more than 10 people came'. In contrast, *quelques P Q* does not carry any implicature and asserts that the quantity of P-objects that Q is small or moderate, an indication which is compatible with a restrictor like *seul*. More unexpectedly, equality can give rise to argumentative effects (as already noted by Anscombre and Ducrot (1976)). Consider (25). Why does *autant* create a contrast (25a,b) whereas *le même nombre* does not (25c)?

(25) a. #John n'est pas très prolifique puisqu'il a écrit autant d'articles que Marie
          'John is not highly productive since he has written as many papers as Mary'
      b. John est très prolifique puisqu'il a écrit autant d'articles que Marie
          'John is highly productive since he has written as many papers as Mary'
      c. John (n')est (pas) très prolifique puisqu'il a écrit le même nombre d'articles que Marie
          'John is not highly productive since he has written the same number of papers than Mary'

In short, we propose that *autant de* in (25) asserts that John has written at least ($\geq$) as many papers as Mary and simultaneously implicates that John has written at most ($\leq$) as many papers. Combining the main content and the implicature, we obtain the equality without assigning the same discourse salience to both pieces of information. Being asserted, 'John has written at least the same number of papers than Mary' is the preferred candidate for the justification relation, which creates a tension in (25a).

6   Conclusion

We have proposed an analysis of *presque* that accounts for its discourse properties as well as covering its use as a quantifier modifier and applying to its English counterpart *almost*. By pinning down the comparative nature of the semantic content, we account for the distribution of the adverb as a quantifier modifier, since the actual value or degree is located in a span between a threshold and a border (approximation). By modelling the double status of the information, we account for its argumentative properties, since discourse inferences based over discourse relations exploit the main content and leave out implicatures. Furthermore, we note that a similar division of information can be found in other determiners and modifiers.

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