The pragmatics of actuality entailments

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1 Introduction

The canonical case of actuality entailments in English is with *be able to*:

(1) a. Yesterday, Rebecca was able to swim across Lake Balaton (?#but she didn't).
(ability)

b. This morning, Thomas was able to leave the lecture hall without being noticed by the teacher (?#but he didn't leave).
(circumstantial modality)

c. Last Friday, thanks to the director of the library, I was able to borrow the first edition of *Syntactic Structures* (?#but I didn't borrow it).
(permission)

In languages with a morphological distinction between perfective and imperfective aspect, e.g. in French, actuality entailments seem to be restricted to the perfective:

(2) a. Hier, Rebecca a pu traverser le lac Balaton à la
yesterday Rebecca has can.PASTPART cross the lake Balaton at the
nage (?#mais elle ne l'a pas traversé).
swimming but she NEG it-has NEG cross.PASTPART
(Cf. (1a))

b. Ce matin, Thomas a pu quitter l'amphithéâtre sans
this morning Thomas has can.PASTPART leave the-lecture.hall without
se faire remarquer par l'enseignant (?#mais il ne l'a pas
REFL make notice by the-teacher but he NEG it-has NEG
quitté).
leave.PASTPART
(Cf. (1b))

c. Vendredi passé, grace au directeur de la bibliothèque, j'ai
Friday past thanks to.the director of the library I-have
pu emprunter la première édition de *Syntactic Structures*
can.PASTPART borrow the first edition of *Syntactic Structures*
(?#mais je ne l'ai pas empruntée).
but I NEG it-have NEG borrow.PASTPART
(Cf. (1c))

Actuality entailments seem to disappear in the imperfective:

(3) a. Dans sa jeunesse, Rebecca pouvait traverser le lac Balaton à
in her youth Rebecca could.IMPERF cross the lake Balaton at
la nage (mais elle ne l'a jamais traversé).
the swimming but she NEG it-has never cross.PASTPART
(Cf. (2a))

b. Au premier semestre, Thomas pouvait quitter l'amphithéâtre
at.the first semester Thomas could.IMPERF leave the-lecture.hall
sans se faire remarquer par l'enseignant (mais il ne l'a
without REFL make notice by the-teacher but he NEG it-has
jamais quitté).
NEG leave.PASTPART
(Cf. (2b))

c. Vendredi passé, grace au directeur de la bibliothèque, je
Friday past thanks to.the director of the library I
pouvais emprunter la première édition de *Syntactic Structures*
could.IMPERF borrow the first edition of *Syntactic Structures*
(mais je ne l'ai pas empruntée).
but I NEG it-have NEG borrow.PASTPART
(Cf. (2c))

Arguably, actuality entailments are not restricted to *be able to* (or French *pouvoir*), for they may also be seen to occur with certain stative verbs:

(4) a. La première édition de *Syntactic Structures* a couté 50€.
the first edition of *Syntactic Structures* has cost.PASTPART 50€
'The first edition of *Syntactic Structures* cost 50€.'

b. La première édition de *Syntactic Structures* coutait 50€.
the first edition of *Syntactic Structures* has cost.IMPERF 50€
'The first edition of *Syntactic Structures* cost 50€.'

In (4a), we tend to understand that the first edition of *Syntactic Structures* was sold, whereas in (4b), this is left open.

(5) a. Hier matin, Rebecca a été généreuse.
yesterday morning Rebecca has be.PASTPART generous
'Yesterday morning, Rebecca was generous.'

b. Dans sa jeunesse, Rebecca était généreuse.
in her youth Rebecca was.IMPERF generous
'In her youth, Rebecca was generous.'

In (5a), it appears that Rebecca did something that was generous, whereas in (5b), this is not necessarily the case. (See Martin 2011 for a recent discussion of such contrasts.)

(6) a. Cette carte a permis à Thomas d'utiliser la bibliothèque.
this card has permit.PASTPART to Thomas to-use the library
'This card permitted Thomas to use the library.'

b. Cette carte permettait à Thomas d'utiliser la bibliothèque.
this card permit.IMPERF to Thomas to-use the library

'This card permitted Thomas to use the library.'

Finally, in (6a), we are inclined to conclude that Thomas actually used the library, whereas in (6b), this is left open.

2 Two previous accounts

I will mention the two most explicit semantic accounts that I am aware of. Another recent account, that of Mari and Martin (2007, 2009), is officially semantic-ontological in character, but is less explicit.

2.1 Hacquard (2006)

Hacquard proposes a semantic analysis that depends on a host of delicate syntactic and semantic assumptions: ingenious at first glance, it may be too neat at second glance.

(7) a. Rebecca a pu courir.
Rebecca has can.PASTPART run
'Rebecca was able to run.'

b. $\exists e(e \text{ in } w^* \wedge \tau(e) \subseteq t \wedge t \prec t^* \wedge \exists w'(w' \in \text{Acc}(w^*) \wedge \text{run}(w', e) \wedge \text{agent}(e, \text{rebecca})))$
(Based on Hacquard's (75c), p. 56)

To derive the formula in (7b)[1] (the steps of which I will not detail here), Hacquard has to assume that perfective aspect is base-generated as an argument of the verb and is then raised above the modal to AspP, which is between TP and ModP.[2] She appeals to a principle of event identification across worlds to ensure that e in (7b) has the same properties in both w^* and w'. (According to her, the actuality entailment is absent in the imperfective because of an intervening generic operator quantifying over worlds.)

Hacquard's analysis has been criticized from different angles by Mari and Martin (2007, 2009), Portner (2009), and Homer (2011). The assumption that aspect is base-generated as an argument of the verb is crucial to her account, and yet it is not a standard assumption in the literature on aspect. A main empirical difficulty is that there are examples with *pouvoir* in the passé composé where the actuality entailment does not hold, although on her analysis it presumably should:

(8) Notre nouveau robot a même pu repasser les chemises à un stade bien précis de son développement. Mais on a supprimé cette fonction qui n'a jamais été testée) pour des raisons de rentabilité.
'Our new robot could even iron shirts at a particular stage of its development. But we suppressed this function (which was never tested) for reasons of cost.'
(= Mari and Martin's (2009) (14))

[1]Note that w^* and t^* are the world and the time of evaluation, respectively (here, the actual world and the present time, respectively).

[2]Thus, basically, this is a scope-based analysis. An earlier scope-based analysis is found in Piñón 2003.

(9) Rebecca a soudain pu soulever un frigo, mais elle ne l'a
Rebecca has suddenly can.PASTPART lift a fridge but she NEG it-has
pas fait.
NEG do.PASTPART
'Rebecca was suddenly able to lift a fridge but she didn't.'
(Based on Homer's (15a))

2.2 Homer (2011)

Homer's analysis is based on the claim (p. 112) that "[a]ll stative predicates need to be coerced in the perfective." The idea is that an aspectual coercion operator, ACT, which he calls an *actualistic* coercion operator, both makes stative verbs bounded and triggers an actuality entailment:

(10) a. Rebecca a pu prendre le train.
Rebecca has can.PASTPART take the train
'Rebecca was able to take the train.'

b. $[\![\text{ACT}]\!]^{c,s} =$
$\lambda P \lambda Q \lambda w \lambda e. Q(e) \wedge e \text{ in } w \wedge \forall e'(e' \sqsubset e \rightarrow \neg Q(e')) \wedge$
$\exists e''(P(e'') \wedge \tau(e) = \tau(e''))$

c. Schematic LF for (10a):
[PRES [PERF [PFV [Q ACT [pouvoir [Rebecca prendre le train]]]]]]

d. $[\![$ (10a) $]\!]^{c,s}(w)(t) = 1$ iff
there is a past interval t such that there is an eventuality e of $s(Q)$ in t in w such that no proper part of e is an eventuality of $s(Q)$, and e is simultaneous with a state in w of Rebecca's taking the train being possible.
(Based on Homer's (20))

The denotation of ACT is given in (10b) (relative to a context c and an assignment function s), a schematic LF for (10a) is shown in (10c), and the denotation of (10a) is provided in (10d). Notice that Q is a predicate variable, syntactically represented in (10c), which will be identified (via functional application) with the second argument of the formula in (10b).[3]

Observe that, strictly speaking, the semantics given in (10d) does not entail that there is an eventuality e in which Rebecca takes the train but only that there is an eventuality e of type Q. According to Homer (p. 11), "the existence of some pragmatically determined event is entailed."

Although Homer's analysis largely avoids the controversial assumptions that Hacquard's requires, his actualistic coercion operator is nevertheless overkill if the original problem is merely that stative predicates need to be coerced in the perfective: a simpler operator could do the job. For example, an operator DELIM (for 'delimit') may be defined as follows:

(11) $\text{DELIM}(e') \stackrel{\text{def}}{=} \lambda P \lambda w \lambda e. e \text{ in } w \wedge e = e' \wedge P(e') \wedge e' \text{ in } w$

If P is a predicate of states, then $[\text{DELIM}(e')](P)(w)$ is a delimited predicate of states, for values of e', P, and w. If the perfective requires a bounded predicate, then DELIM could do the job. It is easy to check that $[\text{DELIM}(e')](P)(w)$ is bounded (in the

[3] Homer employs e, e', ... as variables for eventualities, which include states.

sense of not applying to proper parts—see Hacquard's (7). Of course, this is not the only way of defining a "bounding" operator, but one need not resort to the kind of complexity that the definition in (10b) introduces. The introduction of Q in (10b) is thus not motivated solely by a conflict between stative predicates and the perfective (granting that there is such a conflict, which is not obvious).

Another difficulty is that there is, strictly speaking, nothing incompatible between Homer's proposed meaning for the perfective operator PFV (see (10c)) and stative predicates:

(12) $[\![\text{PFV}]\!]^{c,s} = \lambda P \lambda t. \exists e(\tau(e) \sqsubseteq t \wedge P(e))$
(Based on Homer's (8a))

In (12), nothing would go wrong if P were not bounded. Homer alludes to (p. 108) but never explicitly gives "the selectional requirement of the perfective" such that stative predicates do not meet this requirement.

Finally, since Q is a free variable in (10d), Homer's story is crucially incomplete without some hint about how its value is set by the context. Any realistic context makes many properties available, and it is unclear how the value of Q should be determined.

3 Towards a pragmatic account

The idea that the actuality entailment may not be an entailment but rather a kind of implicature is not so new. This possibility is in fact explicitly considered but then rejected by Hacquard (sect. 1.2). If one is ready to read between the lines, it may be possible to understand Mari and Martin (2007, 2009) as suggesting a pragmatic account even though they officially claim that they are proposing a semantic-ontological analysis. The problem with a pragmatic account has been to explicate the pragmatic reasoning involved without an appeal to special syntactic, semantic, or ontological assumptions.[4]

I want to suggest that actuality entailments are in fact *abductive inferences*, hence not entailments at all. An abductive inference is an inference to the best explanation (Hobbs, Stickel, Appelt, and Martin 1993, Hobbs 2004). The schema for an abductive inference is as follows:

(13) $$\frac{\alpha \rightarrow \beta \quad \beta}{\alpha}$$

Intuitively, abductive reasoning is a search for an explanation of β, and if $\alpha \rightarrow \beta$ holds, α is such an explanation. Naturally, insofar as there are other propositions γ such that $\gamma \rightarrow \beta$ holds, α is not the sole explanation of β. Even so, in a given context, α may be considered a simpler or more optimal explanation of β than γ.

The perfective and the imperfective operators that I assume are defined as follows (with respect to a value of the eventuality variable e):

(14) a. $\textbf{perf}(e) \stackrel{\text{def}}{=} \lambda P \lambda t. P(e) \wedge \tau(e) \sqsubseteq t$
b. $\textbf{imperf}(e) \stackrel{\text{def}}{=} \lambda P \lambda t. P(e) \wedge t \sqsubseteq \tau(e)$

[4] I presented an initial attempt in Piñón (2009).

The preliminary observation is:[5]

(15) $\textbf{perf}(P)(t)(e)$ implicates $\neg\textbf{imperf}(P)(t)(e)$, for values of P, t, and e.
(It is also the case that $\textbf{imperf}(P)(t)(e)$ implicates $\neg\textbf{perf}(P)(t)(e)$.)

Applying this observation to (1a)/(2a), we have:

(16) $\textbf{perf}(\textbf{rebecca-ability-able-swim-across-lake-balaton})(t)(e)$ implicates
$\neg\textbf{imperf}(\textbf{rebecca-ability-able-swim-across-lake-balaton})(t)(e)$,
for values of t and e.

In (16), the predicate **rebecca-ability-able-swim-across-lake-balaton** is a predicate of eventualities (more specifically, states), namely, states in which Rebecca is able (in view of her abilities) to swim across Lake Balaton. Any standard analysis of how to derive this predicate compositionally would work for present purposes.

A central axiom on Rebecca's ability to swim across Lake Balaton is given in (17), where $\textbf{etc}_1$ is a normality predicate for her ability to swim across Lake Balaton. (See Hobbs et al. 1993 and Hobbs 2004 for the need for such predicates in non-monotonic reasoning.)

(17) $\forall e(\textbf{rebecca-ability-able-swim-across-lake-balaton}(e) \wedge \textbf{etc}_1(e) \rightarrow$
$\exists e'(e \sqsubset_{ini} e' \wedge \textbf{rebecca-ability-able-swim-across-lake-balaton}(e')))$

In prose, this axiom says that if e is a normal state in which Rebecca is able (in view of her abilities) to swim across Lake Balaton, then there is a bigger state e' such that e is an initial proper part of e' and e' is a state in which Rebecca is able (in view of her abilities) to swim across Lake Balaton. In other words, abilities are normally persistent. Naturally, this axiom would simply be a specific instance of a more general axiom for abilities.

From (16) and its application to (1a)/(2a), we derive the following implicature:

(18) $\textbf{perf}(\textbf{rebecca-ability-able-swim-across-lake-balaton})(t)(e)$ implicates
$\neg\exists e'(e \sqsubset_{ini} e' \wedge \textbf{rebecca-ability-able-swim-across-lake-balaton}(e')))$,
for values of t and e.

The axiom in (17) may be equivalently reformulated follows:

(19) $\forall e(\textbf{rebecca-ability-able-swim-across-lake-balaton}(e) \wedge$
$\neg\exists e'(e \sqsubset_{ini} e' \wedge \textbf{rebecca-ability-able-swim-across-lake-balaton}(e')) \rightarrow$
$\neg\textbf{etc}_1(e))$

From (18) and (19), we derive the following implicature:

(20) $\textbf{perf}(\textbf{rebecca-ability-able-swim-across-lake-balaton})(t)(e)$ implicates
$\neg\textbf{etc}_1(e)$,
for values of t and e.

The right side of the implicature in (20) needs to be explained, i.e., why e is an ab-

[5]For simplicity, I am treating the notion 'implicate' as a relation between propositions, but this is ultimately inaccurate: it would be more accurate to say that a speaker *sp* with an utterance u of a sentence s denoting a proposition p implicates a proposition q. Here, I abstract away from *sp*, u, and s.

normal (better: non-normal) state in which Rebecca is able (in view of her abilities) to swim across Lake Balaton.

The next axiom offers an explanation for this kind of non-normal state:

(21) $\forall e(\mathbf{rebecca\text{-}swim\text{-}across\text{-}lake\text{-}balaton}(e) \rightarrow$
$\exists e'(\mathbf{rebecca\text{-}ability\text{-}able\text{-}swim\text{-}across\text{-}lake\text{-}balaton}(e') \wedge \neg\mathbf{etc}_1(e') \wedge$
$\tau(e') = \tau(e)))$

This axiom says that if *e* is an eventuality (event) in which Rebecca swims across Lake Balaton, then there is a non-normal state e' such that e' is a state in which Rebecca is able (in view of her abilities) to swim across Lake Balaton and the time of e' is identical to the time of *e*.

Summing up, the conclusion is:

(22) The proposition
$\exists e(\mathbf{perf}(\mathbf{rebecca\text{-}swim\text{-}across\text{-}lake\text{-}balaton})(t)(e)$
is an abductive inference that explains the implicature of
$\mathbf{perf}(\mathbf{rebecca\text{-}ability\text{-}able\text{-}swim\text{-}across\text{-}lake\text{-}balaton})(t)(e')$
that
$\neg\mathbf{etc}_1(e')$
holds, for values of t and e'.

Insofar as the abductive inference in (22) counts as an optimal explanation of the non-normal state (Rebecca's short-term ability) in the absence of special contextual assumptions, there will be a strong tendency on the part of the hearer to draw it, but it is (like all abductive inferences) a defeasible inference. In special contexts, there may be other explanations that do not require Rebecca to actually swim across Lake Balaton. For example, if the hearer has reason to believe that Rebecca yesterday miraculously acquired a short-term ability to swim across Lake Balaton (e.g., because of a wonder drug that she took), then the particular abductive inference (22) would not be optimal and hence not necessarily drawn.

It is hoped that the same pattern of reasoning will apply to the other examples involving the perfective in (1)–(6).

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