# A Null-Theory of Haddock's Puzzle and its Implications for the Role of Presupposition in Reference Resolution

Martin Hackl . MIT

1. Haddock's puzzle: A magician is working with two rabbits and two hats, one of the hats has a rabbit in it, the other is empty, (1-c). As Haddock (1987) points out, if speaker and audience are cognizant of this situation the definite descriptions in (1-a) is felicitous as a means of referring to the rabbit that is in one of the hats – despite the fact that there are evidently two hats in the context.

c.

(1)   a.   The rabbit in the hat is excited.
         b.   #The excited rabbit is in the hat.
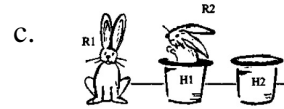
Importantly, (1-b) is infelicitous. That is, the context by itself does not make the relevant hat salient enough to serve as referent for *the hat*. Thus, successful reference resolution for *the hat* in (1-a) appears to depend on *the hat* being in a particular syntactic configuration, namely nested inside another definite DP, *the rabbit in the hat*, (see e.g. Champollion & Sauerland '11 (C&S11) and Bumford 2017 (B17)).

2. A null-theory of Haddock's puzzle: We present an account of Haddock's puzzle in terms of situational uniqueness (e.g. Schwarz'09) in an effort to shed light on the different roles asserted and presupposed content play in reference resolution. Concretely, on this null-theory *the* is assumed to function much like a pronoun – it introduces an index i whose value must be given by the assignment a while the NP sister of *the* contributes a constraint on the kind of entity that can serve as the value of i in the form of a presupposition, (2), (e.g. Heim'82, a.o.).

(2) $[\![\mathbf{the}_i]\!]^a = \lambda f: f \in D_{\langle e,t \rangle} \ \& \ f(a(i))=1. \ a(i)$

Note that *the*, if analyzed as in (2), does not directly introduce a uniqueness requirement. Rather, much like free pronouns using [$\mathbf{the}_i \ \alpha$] obligates the speaker to ensure that the intended referent of the definite DP is recoverable for her audience based on the utterance context and the constraints introduced by α. Crucially, in a nested structure like (1)a the constraints on referents accumulate conjunctively and yield a complex constraint on referents for the larger DP, (3).

(3)   a. $[\![\mathbf{the}_7 \ \mathbf{hat}]\!]^a$ = a(7) is a hat. a(7)[1]
         b. $[\![\mathbf{in \ the}_7 \ \mathbf{hat}]\!]^a$ = $\lambda x: x \in D_e$ & a(7) is a hat. x is in a(7)
         c. $[\![\mathbf{rabbit \ in \ the}_7 \ \mathbf{hat}]\!]^a$ = $\lambda x:$ a(7) is a hat. x is a rabbit & x is in a(7)
         d. $[\![\mathbf{the}_8 \ \mathbf{rabbit \ in \ the}_7 \ \mathbf{hat}]\!]^a$ = a(7) is a hat & a(8) is a rabbit & a(8) is in a(7). a(8)

The audience's task, then, is simply to query the context as to whether there is a unique rabbit-hat pair s.t. the former is inside the latter (Haddock's original insight, which is captured in C&S11 via LF scoping and intermediate accommodation and in B17 via interleaving the uniqueness filter of the Haddock DP *the hat* between the variable introduced by the hosting NP *SOME rabbit* and its uniqueness filter). Crucially, for non-nested cases like (1)b the constraints on reference project separately and do not yield a complex constraint tied together by the relation in, (4). Reference resolution thus fails in (1)b since the context does not provide sufficient information to determine a value for 7.

(4) $[\![\mathbf{the}_8 \ \mathbf{excited \ rabbit \ is \ in \ the}_7 \ \mathbf{hat}]\!]^a$ = a(8) is an excited rabbit & a(7) is a hat. a(8) is in a(7).

3. A constraint on reference resolution. Even though both utterances in (1) make the same relevant content available to the audience (there is a unique rabbit-hat pair with the former inside the latter) it appears that that content can be used for reference resolution only when it is presupposed. This motivates our conjecture in (5).

---

[1]Notation: $[\![\alpha]\!] = \phi.\psi$ states that the semantic value of α is defined only if ϕ and when defined $[\![\alpha]\!] = \psi$.

(5) **Constraint on Reference Resolution:**
Presupposed content of an utterance can be used for identifying the extension of referring expressions in the utterance, at-issue content cannot.

A full investigating of (5) is a large scale project. Here we focus on Haddock-style cases and show that, in conjunction with the null-theory of the definite article sketched above, a number or novel predictions are made that are distinct from extant proposals, and in particular from C&S11 and B17.

3. Some predictions:

1. Necessity of a second presupposition trigger: The present account requires for reference resolution that the Haddock DP is in the scope of another (suitable) presupposition trigger (shared by C&S11 but not by B17). Existence introducing predicates like creation verbs or *to count* in the sense of *determining the number to be* suggest that genuine indefinite host DPs do not support Haddock-DPs, (6).

(6) a. Jack is drawing a rabbit in a/$^{\#}$the hat.
 b. Jack counted one rabbit in a/$^{\#}$the hat (and two in a basket).

2. Locality The present account predicts (like B17 and unlike C&S11) that embedding the Haddock-definite inside a relative clause should not undermine licensing.

(7) a. The rabbit that is in the hat is excited.
 b. The rabbit that is in a/the hat that is on top of the chair is excited.

C&S11 predicts (7) to be infelicitous and presents results from an online, forced-choice study in support of this. Specifically, they compare rates of choosing definite and indefinite articles for Haddock-DPs inside PP-modifiers such as (1)a and inside relative clauses (RCs), (7), and find fewer definite article choices in the latter condition (76.2%) than in former (85.5%). We agree with B17, however, and take the substantial rate of *the* choices in the RC condition as the main result which, thus, indicates that there is no locality effect due to RC embedding.

3. Other presupposition triggers: The present proposal predicts, unlike B17 but arguably like C&S11 (modulo locality), that suitable embedding of a non-nested version of a Haddock sentence under an additional presupposition trigger will be felicitous and exhibit "weakened" uniqueness requirements when compared to non-presuppositional baselines.

(8) a. (Now) the rabbit is in the hat again.
 b. The rabbit is still in the hat.
 c. Remove the rabbit from the hat! (Stone &Weber'98)
 cf. $^{\#}$*Put the rabbit in the hat!*
 d. The rabbit stopped chewing on the hat.
 cf. $^{\#}$*The rabbit is(n't) chewing on the hat.*
 e. Only John put a rabbit inside the hat.
 cf. $^{\#}$*John put a rabbit inside the hat*
 f. John knows that a rabbit is inside the hat.
 cf. $^{\#}$*John thinks that a rabbit is inside the hat*

4. (Apparent) redundancy: Appealing to the different status of presupposed and asserted content wrt. reference resolution offers also a perspective on the curious fact that Haddock-DPs tolerate amendments with apparently redundant relative clauses, (9-a), without giving rise to the normally detected degradedness of such relative clauses, (9-b,c).

(9) a. The rabbit in the hat that has a rabbit in it was very quiet.
 b. $^{\#}$Jack saw a rabbit in a hat that had a rabbit in it.
 c. $^{\#}$Jack found no rabbit in any hat that had no rabbit in it.