The exceptionality of referential antecedents: simple, functional, paycheck and otherwise

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Abstract

There are systematic differences between pronouns with referential antecedents and pronouns with quantificational antecedents. Pronouns with quantificational antecedents obey ordering constraints that pronouns with referential antecedents don't. Pronouns within quantificational antecedents obey the subordination principle and pronouns with referential antecedents seem exempt from it. Problematically, because of their traditional focus on quantificational antecedents, theories of pronouns, in particular Dynamic Semantics, treats both classes of pronouns equally. Following a suggestion from Heim (1982), I propose a solution to this problem. I treat referential expressions as anaphoric elements in need of a referent in the context ; I then propose and spell out an accommodation procedure by which referents may be introduced in the context. In this model, there is no formal link between a pronoun and its referential antecedents and thus lack of ordering constraint is expected. Moreover, the accommodation procedure predicts that pronouns with referential antecedents are exempt from the subordination principle, when appropriate contrast licenses it (Keshet, 2011). The overall theory predicts the possibility of paycheck pronouns, as well as their limited availability.

Pronouns are natural languages' very rich system to access and reuse contextual information. In most cases of use, the interpretation of a pronoun simply is identical to that of a referential DP in its linguistic context, its *antecedent*. This includes cases where the pronoun and its antecedent are unembedded, as in (1), or more complex situations where they are in the scope of different quantifiers, as in (1b) (ordinary quantifiers) or (1c) (modal quantifiers). (1b-c), I will refer to collectively as a *functional anaphor* ; I will call the anaphor of (1b), following the literature, a paycheck pronoun (Karttunen, 1969).

(1) a. The journalist$_1$ stood up. She$_1$ walked out.
         = *the journalist walked out*

     b. Every French tourist visited her favourite museum$_8$.
         Every English tourist surprisingly avoided it$_8$.
         = *every English tourist surprisingly avoided her favorite museum*

     c. The new president$_6$ might be a Republican.
         But she$_6$ may also be a Democrat.
         = *the new president may also be a Democrat*

In another use of the pronoun, the pronoun's interpretation is dependent on a quantificational DP in its context. Here, its interpretation does not simply repeat the semantic contribution of its

antecedent, i.e. the pronoun is not read as a carbon copy of the quantifier, but rather seems co-vary with it. Here too, the pronoun and its antecedent may be unembedded or may be in the scope of different operators (functional anaphor).

(2) a. Some chick$_7$ pecked at me. It$_7$ had just hatched.

   b. All French tourists visited a museum they liked$_7$.
       Most came back to visit it$_7$ again.
       $\neq$ *most came back to visit a museum they liked again*

   c. Susan might get a toy$_8$ from uncle Fred.
       She might even get it$_8$ as early as Tuesday.
       $\neq$ *she might even get a toy as early as Tuesday*[1]

More differences   There exist systematic differences between pronouns with quantificational antecedents and pronouns with referential antecedents to pronouns, beyond what defines them. For one, the former seems to obey order constraints that the latter does not. Thus, cataphora to referential elements are natural but cataphora to quantificational elements is in general degraded (the famed *weak cross-over* effect):

(3) a.   The person that interviewed her$_1$ likes the president$_1$.

   b. # The person that interviewed her$_1$ likes some candidate or other$_1$.

This observation extends to the more complex cases of functional anaphors. Placing the pronoun in the scope of a quantifier and its antecedent in the scope, we find that only when the antecedent is a referential DP is the sentence intelligible. ((4b) is also known as a Bach-Peters sentence, McCawley (1969); Karttunen (1971); Jacobson (2000))

(4) a. # Few of the people who backed it$_1$ up on time lost one of their documents$_1$.

   b.   Few of the people who backed it$_1$ up on time lost the document they needed the most$_1$

In addition to ordering constraints, referential antecedents and quantificational antecedents differ in whether they obey the subordination principle (Roberts, 1987). In a nutshell, this principle dictates that functional anaphors are only possible if the pronoun is in the scope of a quantifier whose domain is a subset of the witnesses of the quantifier which scopes over the antecedent. This principle is taken to explain why (5a) is flawless, because *children* is a subset of the set of all children, and why (5b) is unintelligible, because *adults* isn't such subset.

(5) a.   Every child got a toy$_8$ but some children got it$_8$ late.

   b.   Every child got a toy$_8$ and some adults got it$_8$ late.

However, as (1b), repeated below in (6), attests, this principle does not seem to apply to referential antecedents: here the set of English tourists is not a subset of the set of French tourists.

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[1]The paraphrase, unlike the sentence, does not imply that the toy which may come comes from uncle Fred.

(6) Every French tourist visited her favourite museum.
    Every English tourist surprisingly avoided it.

How are these properties captured?   Under the framework of Dynamic Semantics (Groenendijk and Stokhof, 1990, 1991)[2], where clauses perform context updates, order constraints are natural and expected. They arise from the fact that updates must be applied sequentially, so that any update corresponding to a pronoun's clause must follow an update that makes its referent available, the update of its antecedent. Schematically, dynamic theories demands the configuration in (7a) but crashes on the configuration in (7b):

(7) a. $g \xrightarrow{\text{antecedent update}} g[i \rightarrow \text{referent}] \xrightarrow{\text{pronoun update}} \dots$

     b. $^*g \xrightarrow{\text{pronoun update}} g \xrightarrow{\text{antecedent update}} g[i \rightarrow \text{referent}] \dots$

This general strategy is exploited in Chierchia (2018) for an account of order constraints for quantificational and indefinite antecedents. Moreover, some dynamic theories (Brasoveanu, 2007, 2010) also explains the subordination principle. At bird's eye view, the proposal is that antecedents in the scope of a quantifier $\mathscr{Q}$ introduce one referent per quantificational case. This means that to each witness of $\mathscr{Q}$ and to them alone, a discourse referent is available ; for this discourse referent to be accessible in a later clause, the quantifier that scopes above the pronoun must range over a subset of $\mathscr{Q}$'s witnesses.

   Seldom discussed in depth, the case of referential antecedents, on the other hand, seems to put these analyses in jeopardy. The lack of ordering constraints with referential antecedents seems at odds with the assumption of sequential context updates. If the discourse referent of a pronoun is introduced by its antecedent, as is the case for indefinites and quantificational elements, they should obey the ordering constraints that quantificational antecedents do. This problem is particularly acute in the case of crossed dependencies, like the Bach-Peters sentence in (8). In these cases, one can see that no amount of reordering of the constituents at LF will produce a structure in which all antecedents precede their anaphors, even if one twist the notion of "*precedes*".

(8) **Bach-Peters sentences**
     [The pilot who shot at it$_2$ from above]$_1$ took down [the MIG that was chasing him$_1$]$_2$. (Karttunen, 1971; Jacobson, 2000)

Similarly, if referential antecedents introduced discourse referents the same way quantificational antecedents do, they should also obey the subordination principle, contrary to fact.

   The goal of this note is to fully develop one solution to this problem, first suggested by Heim (1982). According to this solution, referential expressions do not introduce discourse referents for pronouns to pick up. Rather, they are themselves just like pronouns: they carry indices and obtain their reference from the assignment function. Pronouns co-indexed with referential expressions are therefore not bound to them but merely have the same referent. Because there is no formal link

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[2]Beyond Dynamic Semantics, I do not know of a framework which speaks to all the functional anaphors that we will be looking at. In particular, the problem of subordination has been analysed in the E-type literature, even though it is mentioned (Elbourne, 2005). This justifies the focus of this paper on dynamic theories.

between a pronoun and its referential antecedent, the composition goes through regardless of what order a pronoun and its referential antecedent come in.

The second piece to this story is to explain why referential expressions do seem to introduce discourse referents, as attested by the fact that they can be used in out-of-the-blue contexts. Here, the solution assumes, following Heim (1982), that referents may be accommodated if enough is presupposed about them. Referential expressions, because they carry much descriptive content, are especially liable to this process, explaining why they can naturally occur in out-of-blue-contexts. The main contribution of this article is to spell out the accommodation procedure in its gory formal details, above and beyond Heim (1982)'s suggestion, and in particular extend it to the case of functional anaphors. Neither project, as far as I know, have been taken up in previous literature. The importance of filling in the formal details will be appreciated by the predictions which can be made when they have been carefully spelled out. Beyond simply accounting for the lack of ordering constraints and subordination principle, I will 1) predict the possibility of paycheck pronouns, 2) derive restrictions on the licensing of paycheck pronouns (Keshet, 2011), which previous accounts do not derive(Charlow, 2017).

Our roadmap is as follows: in section 1, I spell out the accommodation procedure and how it can account for lack of ordering constraints. In section 2, I present the subordination constraint that applies to quantificational antecedents, present the accommodation procedure required to deal with these cases, and how paycheck pronouns avoid the subordination constraint. Section 3 presents some extensions and loose ends.

One caveat before we start: although this theory is meant to be embedded within dynamic semantics, our focus on referential elements and the theory itself permits me to present an entirely static account. I assume, for most of the paper, nothing more than a standard semantics, like Heim and Kratzer (1998). Readers can substitute truth-conditions with the corresponding dynamic tests to recover the underlying dynamic account. Some talk of the dynamic aspect of the theory will be made toward the end (section 3.3)

1 Simple anaphors

1.1 Anaphoricity all the way through

Following Heim (1982)'s suggestion then, I assume that any referential expression -definite descriptions, proper names, etc.- carries an index. The referential expression acts as a presupposition on the value of this index. The presupposition that each type of referential expressions contributes is different. For proper names, the index is simply restricted to the referent of the proper name, as in (9a). For definites, the index is restricted to be part of the denotation of the NP, as in (9b).

(9) a. $[\![$Angela Merkel$_8]\!] = g(8)$ (**pres.:** $8 \in g$ and $g(8)$ is Angela Merkel)

   b. $[\![$the$_8$ chancellor of Germany$]\!] = g(8)$ (**pres.:** $8 \in g$ and $g(8)$ is a chancellor of Germany)

The special status of definites with respect to proper names is motivated by the known fact that previously mentioned definites lose their uniqueness presupposition, as (10) shows. Thus, we do not wish to encode uniqueness as part of the meaning of the definite[3].

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[3]There is a raging debate about which of the uniqueness or the anaphoric use, if any, is primitive to the English definite.

(10)   A man and a woman$_6$ talked to my sister in the street. The woman$_6$ told my sister the most incredible stories.
       $\not\leadsto$ there is a unique woman (in the world/in the street)

With these assumptions, we predict that referential expressions may only be used if their referent is part of the assignment function, just like pronouns. Furthermore, definites used in such configurations will not trigger uniqueness presupposition, as confirmed by fact. Unwelcome is the prediction that they cannot be used in contexts where their referent is not in the assignment function, e.g. when they are discourse-new. In fact, they can:

(11)   **Context:** *Speaker bursts into the room full of people he has never met.*

   a.   # She$_7$ is coming.

   b.   Angela Merkel$_7$ is coming.

   c.   The chancellor of Germany$_7$ is coming.

1.2   Referent accommodation

To solve this problem, I propose that in case an assignment function g does not meet the requirements a sentence S imposes on it, it may be extended so that it can meet them. We stipulate following Heim (1982) that the proposed extension has to be minimal and unique. These stipulations are natural: minimality is motivated by the fact that we do not want speakers to accommodate more discourse referents than is strictly required to interpret S; uniqueness corresponds to the idea that accommodation is impossible if there isn't enough information to uniquely identify a missing discourse referent.

Let's make these intuitions formal. Let us first define a notion of *extending* the assignment function:

Extension.

We say that g' extends$_{\text{VI}}$ g (denoted $g \prec_{V1} g'$) iff:

   1. **dom**$(g) \subset$ **dom**(g'): the domain of g' contains the domain of g

   2. $\forall i \in$ **dom**$(g), g(i) = g'(i)$: g' coincides with g on its domain

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In other words, g' extends$_{\text{VI}}$ g if it has strictly all the discourse referents that g has, plus some more. The subscript "VI" is there to indicate that we will be revising this definition later, when we turn to functional anaphors. Extension is an order on assignments, hence the notion of minimal extension of g which satisfies some condition is well-defined. Given the definition of notion of extension, a minimal extension is simply one whose domain is smallest among the set of extensions considered:

Supporters of the uniqueness definite contend that anaphoric uses are uniqueness uses with so small a domain that they neutralize the uniqueness presupposition. I adopt the other position here, because I don't know of any detailed account of how the cross-sentential case illustrated in (10) is supposed to work in these theories (see Mandelkern and Rothschild (2019)).

(12) $\min G := \{g \in G \mid \neg\exists g' \in G, g \prec_{V1} g'\}$

With this technical background laid out, the accommodation principle can be formally stated:

> ## Accommodation principle.
>
> If g is the input assignment to a sentence S, and g does not meet the presuppositions on it imposed by S, g may be replaced with g', the minimal extension of g satisfies the presupposition of S, provided there is such a unique minimal extension of S.

Let's see this principle at play. Consider the sentence in the context of an assignment function g that only maps 1 to Boris Johnson:

(13) Angela Merkel$_7$ is coming.

    a. **assertion:** $g(7)$ is coming

    b. **presupposition:** $7 \in g$ and $g(7)$ = Angela Merkel

g does not meet the presupposition (since 7 is not in g) of (13). By the accommodation principle, we are allowed to consider extensions of g which meet the the presupposition of (13) to find one against which (13) can be interpreted. Consider, as an example, the following extensions of g:

(14) a. $g_1 = [1 \rightarrow \text{Boris Johnson}, 7 \rightarrow \text{Emmanuel Macron}]$

    b. $g_2 = [1 \rightarrow \text{Boris Johnson}, 2 \rightarrow \text{Emmanuel Macron}, 7 \rightarrow \text{Angela Merkel}]$

    c. $g_3 = [1 \rightarrow \text{Boris Johnson}, 7 \rightarrow \text{Angela Merkel}]$

g_1 does not meet the presuppositions of (13), since $g_1(7)$ is not Angela Merkel. Both g_2 and g_3 do. g_2 is not minimal because it is an extension of g_3. On the other hand, g_3 is a minimal extension of g. It is also unique, as is easy to check. So our accommodation procedure predicts upon hearing (13) in assignment g, the hearer may accommodate the assignment function g_3.

More interesting is the case of definites. Consider the following triplet of sentences against an initial context with an empty assignment function g:

(15) a. The king of France$_7$ is coming.
      $\rightsquigarrow$ **pres.:** $7 \in g$ and $g(7)$ is a king of France

    b. The consul of Rome$_7$ is coming.
      $\rightsquigarrow$ **pres.:** $7 \in g$ and $g(7)$ is a consul of Rome

    c. The chancellor of Germany$_7$ is coming.
      $\rightsquigarrow$ **pres.:** $7 \in g$ and $g(7)$ is a chancellor of Germany

The empty assignment function g meets none of the presuppositions of these sentences. For each sentence, we ask: can the accommodation principle provide an assignment to interpret the sentence against? For (15a), the answer is no ; since there is no king of France[4], there can be no assignment

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[4]If the sentence is evaluated in present-day…

function g such that $g(7)$ is a king of France ; no assignment meets the presuppositions of the sentence.

For (15b), the answer is also no. Here, there are many assignment functions (which extend the empty assignment function) that meet the presuppositions of the sentence. So long as $g(7)$ is Caesar or Mark Anthony, g will meet the presuppositions of (15b). The minimal extensions that meet these presuppositions are the ones whose domain is smallest. There are two: $g_1 = [1 \rightarrow$ Caesar] and $g_2 = [1 \rightarrow$ Mark Anthony]. Because there are two minimal extensions that meet the presuppositions of the sentence, the accommodation principle does not apply. (15c) is the only sentence for which the accommodation principle can apply. Because there is only one chancellor of Germany -Angela Merkel-, there is only one minimal extension of the empty assignment function that meets the condition imposed by the sentence: $g_1 = [7 \rightarrow$ Angela Merkel] What we predict then is that only (15c) would be felicitous in an out-of-the-blue context.

What we have accomplished with our accommodation principle, apart from providing an account of discourse-new referential expressions, is to replicate the Fregean presuppositions standardly encoded in the meaning of *the*. This may seem like a roundabout way of achieving that result. However, note that it explains why definites sometimes lack the Fregean presupposition, namely when their index is in the assignment function and no accommodation is needed. This is what we saw with (10), repeated in (16):

(16)   A man and a woman$_6$ talked to my sister in the street. The woman$_6$ told my sister the most incredible stories.
       $\not\rightsquigarrow$ there is a unique woman (in the world/in the street)

As we'll see shortly, there may be a way to tease apart the standard picture where the presupposition is triggered locally by the definite, and one where uniqueness stems from global principles of accommodation, as has been developed here.

By treating pronouns and referential expressions as anaphoric expressions in need of accommodation, we correctly predict that the order of the pronoun and a co-referring referential expression is not subject to an ordering constraints[5]. Indeed, because both (17a) and (17b) both have the same presupposition, they are treated equally by the accommodation rule. To the extent that there is a unique president, both are predicted to be fine, regardless of the order that the pronoun and its antecedent come in.

(17)   a.   The person that interviewed her$_1$ likes the president$_1$.

       b.   The person that interviewed the president$_1$ likes her$_1$.

1.3   Crossed dependencies

Consider now (18), the Bach-Peters sentence seen in the introduction. This sentence was used to demonstrate that no semantically meaningful reordering of constituents delivered a structure where pronouns followed their antecedents:

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[5]Beyond Principle C. It is beyond the scope of the paper to provide an account of this principle.

(18) [The pilot who shot at it$_2$ from above]$_1$ took down [the MIG that was chasing him$_1$]$_2$.

    a. $g(1)$ is a pilot

    b. $g(2)$ is a MIG

    c. $g(1)$ shot at $g(2)$

    d. $g(2)$ was chasing $g(1)$

In this sentence, the presuppositions on discourse referent 1 and discourse referent 2 are not in-dependent, but mixed. By our accommodation principle, the accommodation procedure is only possible when the pair uniqueness condition in (19) holds. As long as these conditions in (19) hold in the common ground, the sentence can be uttered by speakers

(19) Accommodation takes place if there exists a unique pair (x, y) such that:

    a. x is a pilot

    b. y is a MIG

    c. x shot at y

    d. y was chasing x

The first takeaway from this example is that with accommodation, crossed dependencies do not raise particular issues, contrary to what an order-sensitive mechanism like Dynamic Semantics may predict.

    The second takeaway from this example is that it allows us to tease apart the standard picture of definites, where uniqueness is encoded in the meaning of the definite from the accommodation system presented here. Under the standard picture indeed, there are two definites. Each of them triggers a uniqueness presupposition. The presuppositions are expected to be something along the following lines:

(20) (18) is defined iff

    a. there is a unique pilot who shot at $g(2)$

    b. there is a unique MIG that was chasing $g(1)$

It is straightforward to see that no matter what the values of $g(1)$ and $g(2)$ are, the presuppositions of (20) are not equivalent to the felicity conditions of (19). Thus, the standard account and the current account of the presuppositions of definite make diverging predictions. Annoyingly, there is no consensus in the literature as to what the felicity conditions of (18) are (see all claims in Jacobson (2000)) so we must leave the question open.

2 Functional anaphors

The logic of our account is now established: referential expressions, being themselves anaphoric, never truly antecede pronouns. Rather, they co-refer with them. Wherever they seem to act as antecedents, they merely help guide the accommodation process to introduce a discourse referent.

For that reason, they need not be in any particular order with respect to the pronoun that they co-refer with. No ordering constraint is expected

In this section, I explore the fine-grained consequences of this account for functional anaphors. One such consequence is a derivation of paycheck pronouns and the subordination constraint. The subordination constraint is the second case where referential antecedents systematically differ from quantificational antecedents.

2.1 The subordination constraint

We are interested in subordination configurations, configurations where a pronoun and its antecedent are in the scope of different quantifiers that they co-vary with (or more generally, in different scope domains). The examples in (21) show that both referential and quantificational antecedents may occur in that configuration.

(21) $\mathcal{Q}$ [...antecedent$_i$ ...] ...$\mathcal{Q}'$ [...pro$_i$ ...]

    a. Every child got [the toy she wanted]$_8$ but some got it$_8$ late.

    b. Every child got [a toy]$_8$ but some got it$_8$ late.

Subordination is quite general. In particular, it is also felicitous when the embedding quantifiers $\mathcal{Q}$ and $\mathcal{Q}'$ are modals (Roberts, 1987), as the (22) shows:

(22) a. Susan might get [the toy she wanted]$_8$. She might even get it$_8$ as early as Tuesday.

    b. Susan might get [a toy]$_8$. She might even get it$_8$ as early as Tuesday.

In all the examples above, the second quantifier (i.e. $\mathcal{Q}'$ in the abstract representation of (21)) quantifies over a subset of the witnesses to the second quantifier. In (21), "*some*" quantifies over children (not cats, not dogs). In (22), the second "*might*" quantifies over worlds where Susan gets a toy/the toy she wanted.

An interesting discrepancy arises when one looks at cases where this constraint does not hold. In (23), the sets of French and English tourists do not overlap. Only referential antecedents are allowed in that configuration.

(23) a. **Referential antecedents**
      Every French tourist visited her favourite museum.
      Every English tourist surprisingly avoided it.

    b. **Quantificational antecedents**
      Every French tourist visited a museum she liked.
    # Every English tourist surprisingly avoided it.

The same holds of modals, although modals' lack of an overt restriction makes this more difficult to test. However, the relevant examples can be constructed if we use incompatible descriptions. In (24), the second *might* may not quantify over the set of worlds where the president is a Republican, without incurring a contradiction[6].

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[6] Also note that the sentences must be read De Dicto. Otherwise, we are not dealing with the subordination constraint.

(24) a. [The president]$_8$ might be a Republican. But she$_8$ might not. (✓ De Dicto)

  b. [An unexpected candidate]$_8$ may win the election. But she$_8$ may not. (# De Dicto)

Formally, we find that quantificational antecedents in subordination configuration are subject to the following constraint:

Surbordination Constraint

In a configuration like :
$$\mathscr{Q}(\ldots \text{ant}_i \ldots)\ldots \mathscr{Q}'(\ldots \text{pro}_i \ldots)$$

If *ant*$_i$ is quantificational, then it must be that **Witness**$(\mathscr{Q}) \subset$ **Restr**$(\mathscr{Q}')$, i.e. $\mathscr{Q}$ is subordinated to $\mathscr{Q}'$.

As we saw, the same does not hold of referential antecedents. Can the present theory - which makes a principled distinction between the two types of antecedent - predict this discrepancy?

2.2 Extension for functional anaphors

Functional indices. Before we can answer that question, we must settle on one way to account for functional anaphors, the like of which are found in subordination configurations. I assume simply, following Schlenker (2009), that assignment function may sometimes store functions from individuals to individuals. Thus, g_0 from example (25) is a licit assignment function. It contains an individual at index 1 and a (partial) function at index 2 mapping Billy, Angela and Jenny to Mario, Puddle and Lego respectively.

(25) $g_0 = \left[1 \to \text{Billy}, 2 \to \left\{ \begin{array}{l} \text{Billy} \mapsto \text{Mario} \\ \text{Angela} \mapsto \text{Puddle} \\ \text{Jenny} \mapsto \text{Lego} \end{array} \right\} \right]$

We must know specify how to access these enriched assignment functions. Following Schlenker (2009); Sudo (2014), I assume functional indices. If i is an index pointing to a function f, j an index pointing to an individual x, the functional index $i(j)$ points to $f(x)$:

(26) $[\![\text{pro}_{i(j)}]\!]^g = g(i)[g(j)]$

As an example, an anaphoric element *pro*$_{2(1)}$ in the context of (25) would denote $g_0(2)(\text{Billy}) =$ Mario.

New notion of extension. Functional anaphors allows us to understand some subordination cases. Intuitively, in the sequence of (27), we want (27a) to trigger accommodation of a function (at index 8) that maps children to the toy they wanted. This way, we can use that function in the next utterance to refer back to the toy.

(27) a. Every child λ_1 got [the toy she wanted]$_{8(1)}$ ...

  b. ...but some λ_1 got it$_{8(1)}$ late.

Our theory of accommodation does not predict this however. Specifically, the sentence in (27a) triggers the following presuppositions on the assignment function:

(28) a. $8 \in g$

  b. $\forall x, (x$ is a child$) \rightarrow (x$ is in the domain of $g(8))$

  c. $\forall x, (x$ is a child$) \rightarrow (g(8)(x)$ is a toy that x wanted$)$

Assume for simplicity that the sentences in (27a) is uttered against an empty assignment function and that every child wants just one toy. Even under these assumptions, there will be many many minimal extensions of the empty assignment functions, which meet the conditions in (28). This is because the conditions impose no requirement on what $g(8)$ maps non-children to. Thus, the g_0 of (29a) is just as good as the g_1 of (29b) in meeting the conditions of (28). Because neither g_0 extends g_1 nor g_1 extends g_2 (both have the same domain), both are minimal extensions (of the empty assignment function), which satisfy the presuppositions of the utterance. Our principle of accommodation can't apply since there is no unique minimal extension.

(29) a. $g_0 = [8 \rightarrow f]$
      where f is defined on children and maps x to a largest toy that x wants

  b. $g_1 = [8 \rightarrow f']$
      where f' is defined on children and Angela Merkel
      and maps x to the largest toy that x wants and Angela Merkel to her ankle.

The shape of the problem is familiar. The notion of minimal extensions was introduced so that accommodation of referents would not result in irrelevant referents being added to the assignment function; if the sentence only requires a referent at index 9, our accommodation principle should not introduce referents at any index but 9.

  Similarly here, the function f' has in its domain an individual -Angela Merkel-, which is irrelevant to the interpretation of the sentence. Thus g_1 is less "*parsimonious*" than g_0. We can capture this intuition of parsimony by refining our definition of extension:

Extension.

g_2 extends g_1 iff $\mathbf{dom}(g_1) \subset \mathbf{dom}(g_2)$
and for every i, either $g_1(i) = g_2(i)$
or $g_2(i)|_{\mathbf{dom}(g_1)} = g_1(i)$

  Under this new notion of extension, both g_1 and g_2 extends g_0 in the example below; g_1 because it is defined over more referents; g_2 because the function it stores at index 2 is defined over more referents.

(30) a. $g_0 = \left[1 \rightarrow \text{Billy}, 2 \rightarrow \left\{ \begin{array}{l} \text{Billy} \rightarrowtail \text{Mario} \\ \text{Jenny} \rightarrowtail \text{Lego} \end{array} \right. \right]$

   b. $g_1 = \left[1 \rightarrow \text{Billy}, 2 \rightarrow \left\{ \begin{array}{l} \text{Billy} \rightarrowtail \text{Mario} \\ \text{Jenny} \rightarrowtail \text{Lego} \end{array} \right. , \mathbf{3 \rightarrow Boris\ Johnson} \right]$

   c. $g_2 = \left[1 \rightarrow \text{Billy}, 2 \rightarrow \left\{ \begin{array}{l} \text{Billy} \rightarrowtail \text{Mario} \\ \mathbf{Angela \rightarrowtail Puddle} \\ \text{Jenny} \rightarrowtail \text{Lego} \end{array} \right. \right]$

This new order over assignments entails a new notion of minimality: a minimal extension will be one whose domain is the smallest (just like version 1), but also one whose functions have the smallest domain.

   With this modification, the problem raised by (27), repeated in (31), vanishes. With our old definition of extension, both g_0 and g_1 (defined in (29)) were minimal and the uniqueness condition of the accommodation principle failed. With our new definition, g_1 extends g_0 and is therefore not minimal. Consequently, if every child wants just one toy, g_0 will be the sole minimal extension. By our principle, it will be accommodated as the new assignment function.

(31) a. Every child λ_1 got [the toy she wanted]$_{8(1)}$ …

   b. …but some λ_1 got it$_{8(1)}$ late.

(32) a. $g_0 = [8 \rightarrow f]$ where f is defined on children and maps x to a largest toy that x wants

   b. $g_1 = [8 \rightarrow f']$ where f' is defined on children and Angela Merkel and maps x to the largest toy that x wants and Angela Merkel to her ankle.

g_0 is accommodated and the function at index 8 may be used by subsequent sentences, such as the one in (31b), to refer back to the toy that a child wanted.

   This concludes the account of the *subordinated* case. We must now turn to non-subordinated cases where the second quantifier does not range over witnesses of the first. In this configuration, as we saw, pronouns with referential antecedents are licensed, unlike pronouns with quantificational antecedents.

2.3   Constraints on paycheck pronouns

Here too, our account needs to be patched up too. Take (33): by the same reasoning as in the previous section, (33a) will lead to accommodation of a function at index 8 defined on French tourists and mapping them to their favorite museum. This function can't be used in the second sentence on input of the English tourists. Thus, under the account above, (33b) cannot be a possible continuation of (33a).

(33) a. Every French λ_1 tourist visited [her favourite museum]$_{8(1)}$…

   b. …every English tourist λ_1 surprisingly avoided it$_{8(1)}$.

What we seem to predict then is that referential expressions do obey the subordination constraint, the exact opposite of what we want. However, I argue that there is a loophole. In fact, it is by and

large true that referential expressions obey the subordination constraint; in all the cases I presented where they don't, they happen to be under some form of contrast, as is visibly the case in (33).

This crucial observation is made and defended in Keshet (2011). He points out, based on many examples, that in cases where contrast is independently blocked, the functional anaphor is banned. Striking is the case where the two sentences do not bear the same aspect. For instance, (34) cannot bear the contrast intonation[7]:

(34) a. [Stuart]$_F$ [deposits]$_F$ his paycheck.

  b. *[Emily]$_F$ [spent]$_F$ her paycheck.

(35) a. [Stuart]$_F$ [deposits]$_F$ his paycheck.

  b. [Emily]$_F$ [sends]$_F$ her paycheck.

This is attributed to the fact that *deposits* is a generic present, while *spent* is a episodic perfective past. Note that the sequence is not out of question, with a different intonation:

(36) Because Stuart deposits his paycheck, the very contrarian newcomer spent$_F$ hers.

However, the paycheck version of these examples is quite degraded, under the relevant reading.

(37) #Because Stuart deposits his paycheck, the very contrarian newcomer spent$_F$ it.

2.4   Contrast circumvents the subordination constraint

(38) a. Every French λ_1 tourist visited [her favourite museum]$_{8(1)}$…

  b. …every English tourist λ_1 surprisingly avoided it$_{8(1)}$.

Given the discussion of the previous section, the reason why our account fails to capture non-subordinated cases like (38) is because have been ignoring the role of contrast. The LF of (38) we consider should include some operator that encodes contrast. I adopt Rooth's ~ operator whole-sale[8].

(39) $\llbracket \sim i\ S \rrbracket^g = \llbracket S \rrbracket^g$ if $g(i) \subset \llbracket S \rrbracket_f^g$ and $\llbracket S \rrbracket^g \in g(i)$
  where $\llbracket \cdot \rrbracket_f$ is the focus semantic value.

Rooth's operator presupposes that the sentence it dominates belongs to a contextually salient set of proposition -*the contrast set*- and that this contrast set is a subset of the focus-value of the sentence. Informally, the general shape of contrast set can be read off the sentence with its F-marking.

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[7]The gloss of the following sentences is not accurate: the subjects must bear constrastive topic intonation, the verbs simple focus. For simplicity, I treat constrastive topic as foci.

[8]Contrary to Keshet (2011), we will not need to modify the denotation of the ~ operator so that it can make changes to the assignment function

The contribution of Rooth's operator to the LF of our sentence in (40) is to introduce presuppositions on the sentence. More presuppositions, from the perspective of accommodation, means more information to identify the functional referent at index 8.

Let us know reconsider (38) with the contribution of Rooth's contrast operator, as in (40).

(40) a. ~ 5 Every French$_F$ λ_1 tourist visited$_F$ [her favourite museum]$_{8(1)}$...

     b. ~ 5 every English$_F$ tourist λ_1 avoided$_F$ it$_{8(1)}$.

The sentence carries presupposition coming from multiple sources. First, the pronoun and definite contribute the presuppositions in (41a) and (41b). Next, Rooth's $\sim$ operator contributes additional constraint on (41c-d).

(41) a. **presupposition of the definite in (40a):**
$8 \in g$
for all x, (x is a French tourist) $\rightarrow$ (x is in the domain of $g(8)$)
for all x, (x is an French tourist) $\rightarrow$ ($g(8)(x)$ is a favourite museum of x)

     b. **presupposition of the pronoun in (40a):**
$8 \in g$
for all x, (x is an English tourist) $\rightarrow$ (x is in the domain of $g(8)$)

     c. **presupposition of $\sim$ in (40a):**
$\left[\lambda w. \forall x, \; x \text{ is a French tourist and } p(x) \text{ in } w \rightarrow x \text{ visited } g(8)(x)\right] \in g(5)$
$$g(5) \subset \left\{ \begin{array}{l} \lambda w: \quad \forall x, x \text{ is a tourist and } p(x) \text{ in } w \rightarrow g(8)(x) \text{ is a favourite museum of } x. \\ \qquad \forall x, \; x \text{ is a tourist and } p(x) \text{ in } w \rightarrow R(x, g(8)(x)) \end{array} \right. \left| \begin{array}{l} p \in D_{et} \\ R \in D_{eet} \end{array} \right\}$$

     d. **presupposition of $\sim$ in (40b):**
$\left[\lambda w. \forall x, \; x \text{ is a English tourist and } p(x) \text{ in } w \rightarrow x \text{ avoided } g(8)(x)\right] \in g(5)$
$$g(5) \subset \left\{ \lambda w. \; \forall x, \; x \text{ is a tourist and } p(x) \text{ in } w \rightarrow R(x, g(8)(x)) \left| \begin{array}{l} p \in D_{et} \\ R \in D_{eet} \end{array} \right. \right\}$$

The critical observation to make is that there seems to be a conflict between (42c) and (42d). On the one hand, (42c) demands that the contrast set $g(5)$ be part of a set, call it S, of propositions of the form "*every p-tourist R'ed $g(8)(x)$*" which furthermore presuppose that for all p-tourist x $g(8)(x)$ is the favourite museum of x. (42d) demands that the contrast set be part of a similar set of propositions, *presuppositions excluded*, call it S'.

S and S' contain *logically* non-identical propositions, how can the same contrast set $g(5)$ be a subset of both? However, what matters for contrast is not that S and S' contain logically identical propositions but contextually identical propositions. This is exemplified by the following example from ; contrast can be met in (42), even if *calling X a republican* is not logically equivalent to *insulting them*, so long as they are contextually equivalent[9]

(42) John$_F$ called Mary$_F$ a Republican and then she$_F$ insulted him$_F$

---

[9]Equivalence is too strong, since there may be other ways in the context to *insult* someone, besides *calling them a Republican*. Contextual entailment seems to be the right notion. Replacing equivalence with entailments does not affect the upcoming reasoning.

With this observation in mind, we can go back to our original example. For the contrast set $g(5)$ to belong to both S and S', it has to be that for any proposition of the form "*every p-tourist R'ed $g(8)(x)$*" is *contextually* equivalent to the same proposition with the added presupposition that for all p-tourist x $g(8)(x)$ is the favorite museum of x. This holds if the context supports the latter presupposition. In other words, if it makes true that for all p-tourist x, $g(8)(x)$ is "*a*" favorite museum of x. Because of the presupposition of ~, we also know that the contrast set contains at least the two propositions "*every French tourist x visited $g(8)(x)$*" and "*every English tourist x avoided $g(8)(x)$*". What this means is that in order to meet the whole proposition of ~, it has to be that $g(8)$ maps French and English tourists to *a* favourite museum of theirs.

As you can see, the contribution of ~ considerably restrains what $g(8)$ can be. In particular, it must be a function defined on at least French and English tourists mapping them to a favourite museum of theirs and mapping any p-tourist in the contrast set to a favourite museum of theirs. Before ~, the presupposition simply imposed English tourists to be mapped to a favourite museum of theirs. By the principle of accommodation, the hearer can accommodate the referent $g(8)$ so long as any p-tourist in the contrast set (including the French and the English tourists) has a unique favourite museum.

The only way that the same contrast set satisfy

Summary   In this section, I adapted the accommodation principle to the case of functional anaphors to referential expressions. This requires modifying our notion of extension on contexts and correspondingly adjusting our notion of minimal accommodation. I showed that in typical cases, the accommodation principle predicts that functional anaphors to referential expressions would obey the subordination principle. However, because the accommodation procedure is sensitive to contextual information provided by such phenomena as contrast, it may, in cases where the antecedent and the pronoun find themselves in contrasting sentences, allow for exceptions to the subordination principle. Contrast, I propose, is the key factor in the acceptability of paycheck sentences (Keshet, 2011).

3   Extensions and loose ends

In this section, I discuss extensions on the basic proposal as well as some problems to the proposal, which need further investigation.

3.1   Maximal informativity accommodation

The particular rule for extension (repeated below) that I have argued for is quite baroque.

> ## Extension.
>
> g_2 extends g_1 iff $\mathbf{dom}(g_1) \subset \mathbf{dom}(g_2)$
> and for every i, either $g_1(i) = g_2(i)$
> or $g_2(i)|_{\mathbf{dom}(g_1)} = g_1(i)$

The rule can get even more idiosyncratic, if we turn to plural definites:

(43) a. The members of the triumvirat$_2$ are nice.

  b. $[\![(43a)]\!]^g = g(2)$ are nice [$g(2)$ are members of the triumvirat]

Suppose the three members of the triumvirat are *Julius*, *Pompey* and *Cassius*. Given these facts, there are many candidate extensions of g that satisfy the presuppositions of (43a): $g[2 \rightarrow \text{Julius} \oplus \text{Pompey}]$, $g[2 \rightarrow \text{Pompey} \oplus \text{Cassius}]$, $g[2 \rightarrow \text{Julius} \oplus \text{Pompey} \oplus \text{Cassius}]$, etc. None of these candidates extend any of the other, as per our definition of extension, so there will be no minimal extension. Accommodation cannot proceed. To guarantee that the right extension is accommodated - namely $g[2 \rightarrow \text{Julius} \oplus \text{Pompey} \oplus \text{Cassius}]$-, we would need further tweaking of our definition of extension to break the symmetry between the candidates. This can be done, but are we missing some systematic generalization?

The notion we need is that of maximal informativity. Maximal informativity has been used in many works (Beck and Rullmann, 1999; Iatridou et al., 2014) to rank objects in a structure-conscious manner. As we see, the set of candidate of extensions has some structure to it: if some candidate g' maps the index 2 to some plurality x, then there will be a candidate g'' that maps 2 to a subplurality of x, because *members of the triumvirate* is distributive. The presence of g' in the set *entails* the presence of g''. In other words, g' is more informative than g''. The most informative candidate assignment will thus be the one that contains the biggest plurality ; in other words, the desired assignment $g[2 \rightarrow \text{Julius} \oplus \text{Pompey} \oplus \text{Cassius}]$.

Before we can incorporate maximal informativity, we need to add worlds to our fragment. We simply mark the world dependencies that we have been ignoring:

(44) a. The members of the triumvirat$_2$ are nice.

  b. $[\![(43a)]\!]^{g,w} = g(2)$ are nice in w [$g(2)$ are members of the triumvirat in w]

Given a world w and a sentence S, let's call $\textsc{Candidates}_{S,G}(w)$ the set of assignment functions which 1) coincide with g wherever g is defined, 2) satisfy the presuppositions of S. The object $\textsc{Candidates}_{S,G}$ is thus of type sgt, where g is the type of assignment functions. This is equivalent to the type gst, the type of properties of assignment functions, up to reordering of the arguments. We can define maximal informativity on such properties, just as one would for degree or individual properties:

(45) $\textsc{Max-Inf}(\textsc{Candidates}_{S,G}) =$
  $\lambda w. \lambda g.\, \textsc{Candidates}_{S,G}(w)(g) \wedge$
  $\forall g' \neq g, \textsc{Candidates}_{S,G}(w)(g') \rightarrow \big(\lambda w.\textsc{Candidates}_{S,G}(w)(g')\big) \not\Rightarrow \big(\lambda w.\textsc{Candidates}_{S,G}(w)(g)\big)$

The maximal informativity operator sieves out from the set of candidates, those assignments whose presence in the set can be deduced from the presence of other assignments in the set. Thus, in our triumvirat example, $g[2 \rightarrow \text{Pompey} \oplus \text{Cassius}]$ would not be in the set of maximally informative candidates because the mere presence of $g[2 \rightarrow \text{Julius} \oplus \text{Pompey} \oplus \text{Cassius}]$ entails that $g[2 \rightarrow \text{Pompey} \oplus \text{Cassius}]$ is a candidate too.

Accounting for both maximal informativity and world dependency, we can rephrase our accommodation principle as follows:

> ## Accommodation principle.
>
> If g is the input assignment to a sentence S and w the world of evaluation, and g does not meet the presuppositions on it imposed by S in world w, g may be replaced with g', the maximally informative assignment of $\text{CANDIDATES}_{S,\,G}(\text{w})$, provided there is such a unique maximally informative assignment.

We can now revisit all the cases that have motivated our increasingly complex notion of extension and show that they fall under the more general paradigm of maximal informativity.

In the simple singular cases like (46a), the set of candidates is as in (46)c. It contains minimal extensions that only add *Merkel* to the assignment function. But it also contains assignment functions with irrelevant individuals at index 3. However, the presence of these assignment functions with spurious individuals is entailed by the presence of $g[2 \rightarrow \text{Merkel}]$; they are not maximally informative. The maximally informative assignment function is the one that adds no individuals irrelevant to the satisfaction of the presupposition

(46) a. The chancellor of Germany$_2$ is nice.

    b. $[\![(43a)]\!]^g = g(2)$ is nice [$g(2)$ is chancellor of Germany]

    c. $\text{CANDIDATES}_{S,\,G}(w_0) = \big\{ g[2 \rightarrow \text{Merkel}], g[2 \rightarrow \text{Merkel}, 3 \rightarrow \text{Macron}], \ldots \big\}$
        where w_0 is a world of the common ground.

As we saw, the case of functional anaphors like (47a) brings about another kind of irrelevant individuals, individuals that are in the domain of the accommodated function but do not contribute to satisfy the presupposition of the sentence, e.g. Angela Merkel in g_1. Maximal informativity helps sieve out these irrelevant individuals as well. Indeed, if an assignment $[8 \rightarrow f]$ satisfies the presupposition of (47) in some world, one can immediately conclude that $[8 \rightarrow f']$ will too where f' is defined over more individuals. So the presence of g_1 in the set of candidates is entailed by the presence of g_0 in that set; it is not maximally informative.

(47) a. Every child λ_1 got [the toy she wanted]$_{8(1)}$

    b. $[\![(47a)]\!]^g = \forall x \in \texttt{child}', x$ got $g(8)(x)$ [$\forall x \in \texttt{child}', g(8)(x)$ is the toy x wanted]

    c. $\text{CANDIDATES}_{S,\,G}(w_0) = \big\{ g_0, g_1, \ldots \big\}$
        where w_0 is a world of the common ground
        and g_0 and g_1 is as defined in (47).

(48) a. $g_0 = [8 \rightarrow f]$ where f is defined on children and maps x to a largest toy that x wants

    b. $g_1 = [8 \rightarrow f']$ where f' is defined on children and Angela Merkel and maps x to the largest toy that x wants and Angela Merkel to her ankle.

In a nutshell, the notion of maximal informativity allow us to unify the disparate notions of extensions that I have been positing through the course of the paper. This greatly reduces the amount of stipulations of the system as a whole.

3.2 Exceptional scope distributivity

We have seen two differences between referential and quantificational expressions in their anaphoric potential. Referential antecedents are order-insensitive and not subject to the subordination constraint. Quantificational antecedents are order-sensitive and subject to this constraint.

In Chatain (2019), I present yet another difference which is not related to anaphora. The difference lies in the availability of so-called exceptional scope distributive reading (wide-scope distributivity in the words of Chatain (2019)). It has been observed that even with wide-scope indefinites, the scope of distributivity operators is systematically bound by scope islands. Thus, (49) cannot have the meaning in (49b):

(49)   If three relatives of mine die, I will inherit a house.

    a. **Possible reading:**
        There are three relative of mine such that if all of them die, I will inherit a house.

    b. **Exceptional scope distributive reading:**
        *There are three relatives of mine such that for each x of them, if x dies, I will inherit a house.

Chatain (2019) observes that the same restriction does not obtain for referential expressions:

(50)   **Context:** *the employees arrive at different times*

    a. When these employees arrived this morning, Alex smiled.

    b. **Exceptional scope distributive reading:**
        ✓ for each x of these employees, when x arrived, Alex smiled.

Using dependent plurals as a diagnostic, Chatain (2019) provides evidence for a covert index-based distributivity operator. This operator uses indices to track down the pluralities it needs to distribute over and therefore does not need to take a plurality as a semantic argument to yield the correct reading.

(51)   ALL$_i$ [when these employees$_i$ arrived this morning, Alex smiled]

To function properly, this operator needs the assignment function to have a value at the index i. In the sentence (51), it means that already at the root of the sentence, where ALL$_i$ composes, the index i contains a reference to *these employees*. If *these employees*$_i$ were responsible for introducing a discourse referent at index i, we would have a problem: *these employees* occur in the scope of ALL and ALL will not be able to see the discourse referent it introduces. On the story developed here by contrast, *these employees* is referential and its referent is accommodated. This means that the input assignment function to the whole sentence is modified to accommodate the missing referent of *these employees*. ALL, which occurs at the root of the sentence, will be able to access the accommodated referent.

In short, the two proposals complement each other. Descriptively, the availability of exceptional scope distributive readings with referential expressions only adds to evidence that this class should be distinguished in some way in the dynamics of discourse. Analytically, the theory of accommodation presented here completes the operator theory proposed in Chatain (2019).

3.3 And the dynamics?

The account of the current paper was aimed at solving the problem of referential antecedents in dynamic theories of meaning. To keep the presentation simple, I presented my solution in a static set-up. Embedding it in a dynamic system does not raise particular difficulties. In a DPL framework, e.g. (Groenendijk and Stokhof, 1991), sentences denote partial functions from assignments to sets of assignments (type ggt); we use partial functions to represent presuppositions. So (52a) is interpreted as (52b):

(52) a. The girl$_2$ saw a^7 gerbil.

    b. $[\![(52a)]\!] = \lambda g.\lambda g'.\ \exists x,\ x$ is a gerbil and $g = g[7 \to x]$ (**pres.:** $g(2)$ is a girl)

If an input assignment g_0 is not in the domain of the function denoted by (52a), reference failure ensues. The same accommodation principle as in the static case can replace g_0 with a larger assignment that meets the presupposition of the sentence. This is not the end of the story though. There are interesting interaction between the dynamics of the sentence and the accommodation procedure presented here. The simplest case of this is when an indefinite binds into a definite description:

(53) a. A^7 child broke [the toy they$_7$ wanted]$_2$.

    b. $[\![(52a)]\!] = \lambda g.\lambda g'.\exists x,\ x$ is a child that broke $g(2)$ and $g = g[7 \to x]$ (**pres.:** $g(2)$ is a toy $g'(7)$ wanted)

Here, the presuppositions constrains both the input and the output assignment functions. Our accommodation procedure does not give us the tools to deal with such cases. There are many ways one could go about solving this problem. I want to leave this issue open to future research but I will suggest one route. One lesson from Dynamic Semantics is that in terms of anaphoras, there is no difference between embedded clauses and sentential clauses. Any change to the context that can happen at the cross-sentential level can also happen in embedded positions. Thus the acceptability contrast in (54) is not to be treated differently from the acceptability contrast in (55).

(54) a. A^7 child came. He$_7$ smiled

    b. ?He$_7$ came. A child^7 smiled

(55) a. If a^7 child came and he$_7$ smiled, I would know that I made an impression

    b. ?If he$_7$ came and a^7 child smiled, I would know that I made an impression

Adapting this philosophy to our accommodation principle, I submit that accommodation doesn't just happen at the sentential level but also at embedded positions. Let us denote the operation of accommodation with the operator $\mathscr{A}$. Then the case in (56) can be resolved if accommodation happens between the update corresponding to the indefinite and the update corresponding to the definite. If so, the referent for the indefinite is already introduced and the presupposition of the update that $\mathscr{A}$ only depends on the input assignment function:

(56) a. [A^7 child] $\mathscr{A}$ broke [the toy they$_7$ wanted]$_2$.

    b. $[\![(52a)]\!] = \lambda g.\lambda g'.g(7)$ broke $g(2)$ (**pres.:** $g(2)$ is a toy $g'(7)$ wanted)

3.4 Do presuppositions genuinely help referent accommodation?

In this final section, I want to turn to a glaring issue in the analysis: observe how the account here relies on the presupposition of definites to direct referent accommodation. In the way the system is set up however, any presupposition may guide referent accommodation. This is contrary to fact, as (57) shows:

(57) Pedro knows [the instrument in our shed]$_8$ is a theodolite.

    a. **Presuppositions:**
       $8 \in g$
       $g(8)$ is an instrument in our shed
       $g(8)$ is a theodolite

    b. **At-issue:**
       Pedro believes that $g(8)$ is a theodolite

Given the current statement of the accommodation procedure, (57) is predicted to be felicitous in a context where there is a unique theodolite in our shed. This is too weak ; speakers feel that (57) requires there to be a unique instrument in our shed. To put the problem differently, our account predicts (57) and (58) to be felicitous and true in the same contexts:

(58) Pedro knows that the theodolite in our shed is a theodolite.

So it seems that standard presuppositions trigger do not help accommodation of referents. This assertion has to be nuanced ; Hackl (2019) presents evidence that presuppositions sometimes guide referent accommodation and suggests that this could be the key to understanding Haddock definites. Whatever the case may be, I owe an account of why this case is the exception rather than the norm, as the current account seems to predict.

    The only escape for the current account is to split presuppositions into two classes: the first class contain those presuppositions that can feed the accommodation procedure, let's call them *referential constraints*, following Onea (2013). Given the account I have presented, this class must contain the presuppositions of definites and the presupposition of ~. The second class contain all other presuppositions that do not help referent accommodation (factives, etc.). We'll refer to them as *standard presuppositions*. That distinction being made, we could hard-wire the accommodation procedure to be sensitive to one class but not the other. This is technically feasible but raises conceptual questions: what is the nature of this distinction? even if the distinction can be grounded, why can't hearers use all information from the common ground to identify a referent? why are they restricted to using *referential constraints*? This is a hard challenge to the current proposal that I cannot provide a full answer to. I will simply leave the reader with a speculation on that issue.

    I think the literature on presuppositions contains converging lines of evidence that the standard presupposition triggers, e.g. *know*, *stop*, etc., do not initially constrain the common ground. In short, most presuppositions are not immediately "*pre-supposed*". This is motivated by the *triggering problem* (Schlenker (2019) and references therein). There is an observation that across languages, words that give rise to the same truth-conditions seem to give rise to the same presuppositions. Pushing it to the extreme, as Schlenker (2019) does, this suggests that these words are entirely determined by their bivalent meaning. It does not from its semantics alone impose any constraints on the common ground. There has to be a later step when some of the inferences of a presupposition

trigger become "*backgrounded*" ; the nature of that step is not the object of a consensus but for our purposes, it just need to exists. Contrary to standard presupposition triggers, pronouns and other anaphoric elements, like definites, cannot be given a purely bivalent meaning. If their index is not mapped to a referent by the assignment function, they fail to refer and the sentence cannot be interpreted. Similarly, the entire contribution of ~ is presuppositional ; it cannot be assigned a non-trivial bivalent meaning, from which its presupposition would be recovered. This provides a principled distinction between *referential constraints* and *standard presupposition*

Conjoining these speculations together, one can say this much: a) there is a stage where the "*standard presuppositions*" (in the sense above) are part of the assertive content of an utterance, b) there is a step where some of the inferences of an utterance or a lexical item are backgrounded, c) there is a step where referents are accommodated. If the step described in c) happens before the step in b), then presuppositions from the second class - the *standard presupposition* - will not be visible to the accommodation procedure (because they haven't been distinguished from at-issue content yet). This is precisely what we observe. Why should the order c) before b) obtain and not the opposite one? Given the uncertainty surrounding the nature of step b), this answer cannot for now be answered.

4   Conclusion

Referential expression are distinguished from quantificational expressions in more than one way. First, they do not obey order constraints and freely occur after or before a pronoun they antecede. Second, they do not obey the subordination constraint for functional anaphors. An extreme version of this form of liberty is illustrated by the well-known case of paycheck pronouns. In this paper, I have given more flesh to the proposal of Heim (1982). I assumed that all referential expressions are anaphoric and constrain the values of the assignment function. Discourse-new referential expressions must be accommodated. We saw that accommodation could provide an explanation for why the order constraints and the subordination constraints did not obtain for referential expressions.

Since referential expressions are anaphoric, they never truly antecede pronouns ; rather, they co-refer with them. So long as accommodation of the referent happens before all the anaphoric expressions -definite and pronominal- appear in the sentence, there are no restrictions on the order that these expressions have to appear in. Accommodation also explains the absence of subordination constraint for functional referential antecedents: to satisfy the requirements of contrastive intonation, an accommodated functional referent may have a wider domain than the subordinating quantifier. While appealing, this story unsatisfactorily seems to predict that presuppositions could quite generally guide the accommodation process. This is a serious drawback that follow-ups on this work will need to tackle.

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