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In Pursuit of Condition C: (non-)coreference in grammar, discourse and processing

Abstract: A substantial literature has shown that Condition C (Lasnik, 1976; Chomsky, 1981) is essentially correct in ruling out cases where a non-pronominal NP is c-commanded by a coreferential pronoun. At the same time, many have noted a number of counterexamples to Condition C (CCCs). These suggest that there may be factors other than syntactic configuration that govern whether two expressions in the same sentence may be used to corefer. In this chapter, we explore the hypothesis that both Condition C effects and CCCs are explained by a conspiracy of three non-syntactic factors: (i) interpretive economy, which favors binding over coreference (Reinhart, 1983; Reuland, 2001), (ii) anti-logophoricity, which we take to be a semantic property of r-expressions (Patel-Grosz, 2012; Yashima, 2015) and (iii) processing complexity, which embodies factors related to the accessibility of discourse referents (Ariel 1990, 2001; Arnold 2010, i.a.).

Keywords: Condition C, coreference, processing complexity, anti-logophoricity, interpretive economy

1 Introduction

Condition C is a constraint that rules out as ungrammatical sequences in which an NP c-commands a coreferential r(eferring)-expression (i.e. a non-pronominal NP) (Culicover 1976; Lasnik 1976; Chomsky 1981). Two different kinds of Condition C violations are given below with the standardly reported judgments:

(1) a. * He$_i$ thinks that Otto$_i$ will win.

  b. * He$_i$ sat in Otto$_i$'s chair.

  c. * I told him$_i$ that Otto$_i$ would win.

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(2) a. * Otto$_i$ thinks that Otto$_i$ will win.

   b. * Otto$_i$ sat in Otto$_i$'s chair.

   c. * I told Otto$_i$ that Otto$_i$ would win.

A substantial literature since the original statement of Condition C has shown that the generalization it embodies is essentially correct for cases like (1): if an r-expression is c-commanded by a pronoun that is intended to be coreferential with it, the sentence is typically judged to be unacceptable. The situation is less clear for (2), where coreference is attempted between two r-expressions (Evans, 1980). It is, however, generally agreed that such cases also exhibit degraded acceptability.

At the same time, a number of counterexamples to Condition C (CCCs) have been noted over the years. To give a flavor of what we are dealing with, consider the attested data in (3):

(3) a. President Boris Yeltsin$_i$ canceled all meetings for this week because of medical tests for his$_i$ upcoming heart surgery. He$_i$ also punished a former bodyguard who said Yeltsin$_i$ was too sick to govern.
      (Honolulu Star-Bulletin, Oct. 28, 1996 cited in O'Grady (2005, 48))

   b. Gödel$_i$ discovered the works of Edmund Husserl in the late 1950s and devoted much of the remainder of his$_i$ life to studying them. He$_i$ felt that Husserl had solved many, if not all, of the metaphysical problems that Gödel$_i$ had set for himself$_i$ [...].
      (Bill Bryson, *Seeing Further*)

Both cases in (3) are fully acceptable sentences in which a pronoun c-commands a coreferential r-expression (*Yeltsin* in (3a) and *Gödel* in (3b)). These and other similar data suggest that there may be factors other than syntactic configuration that govern whether two expressions in the same sentence may be used to corefer – a conclusion that casts doubt on the view that Condition C is part of Universal Grammar (UG) – as proposed by Chomsky (1981, 1986) and Lasnik (1989), i.a..

Our goal in this chapter is to explain what lies at the root of the non-coreference facts that motivate Condition C without appealing to a UG principle. Our task is, therefore, twofold. We must answer both why Condition C captures so much of the data and also why CCCs exist. The latter play a particularly central role in our argument, since they reveal the intervention of independent factors which conspire to yield the judgments that are attributed to Condition C.

We will explore the particular hypothesis that Condition C effects and CCCs are explained by a conspiracy of three non-grammatical factors:

(i) INTERPRETIVE ECONOMY – in particular, a least effort principle which favors binding over coreference, preempting the latter whenever the structural conditions for the former are met (Reinhart 1983; Reuland 2001, i.a.).

(ii) ANTI-LOGOPHORICITY, which restricts the occurrence of non-pronominal NPs in contexts for which their referents count as perspective-bearers (Dubinsky & Hamilton, 1998; Patel-Grosz, 2012; Yashima, 2015). We treat this restriction as a presupposition inherent to the semantics of r-expressions.

(iii) PROCESSING COMPLEXITY, which, in the case of anaphora, favors using NP forms that match the particular *accessibility* status of their intended referents. Accessibility, in this sense, is influenced by factors such as linear order, ambiguity and prosody (Ariel 1990, 2001; Almor 1999, 2000; Arnold 2010, i.a.).

None of these factors are syntactic *per se*, but only the first is sensitive to the structural c-command relation prescribed by Condition C. A consequence of this is that, in a de-contextualized setting, the effects of INTERPRETIVE ECONOMY are often the most discernible ones. This gives the mistaken impression that economy effects are all there is to non-coreference. This is the central limitation of Reinhart's (1983) work, which is otherwise similar in spirit to our own.

The widespread use of isolated examples in the literature imposes biases against accounts which locate the roots of non-coreference judgments outside of sentence grammar (Gordon & Hendrick, 1998). Since we are entertaining the hypothesis that non-structural aspects of the context are causal factors behind such judgments, many of our examples are introduced as parts of a small discourse or dialogue.

This chapter is structured as follows. In section 2, we identify the effects of INTERPRETIVE ECONOMY in non-coreference judgments, showing how the preference for binding over coreference covers the facts that traditionally fall under Condition C, as well as some CCCs. In section 3 we clarify the role of ANTI-LOGOPHORICITY, which overlaps, to some extent, with INTERPRETIVE ECONOMY but which also explains some otherwise puzzling data, including CCCs. Section 4 deals with the sources of PROCESSING COMPLEXITY relevant to NP anaphora. Lastly, in section 5, we sum up the discussion, recapitulating how the relevant factors interact.

2 Interpretive Economy

In this section, we consider the role of INTERPRETIVE ECONOMY (IE) in the explanation of non-coreference judgments. IE embodies the notion that interpretation involves a least effort strategy: if speakers can encode a certain meaning in an economical way, they will not arbitrarily choose a less economical way to do so. We argue that a corollary of IE – which we call BINDING PREFERENCE – covers all of the facts attributed to Condition C while also avoiding some known CCCs.

Our proposal summarizes a hypothesis originally presented in Reinhart (1983) and subsequently revised in Grodzinsky & Reinhart (1993), Fox (2000), Reuland (2001), Koornneef & Reuland (2016) and Krifka (2018). Each of these renditions conceptualizes IE and its relation to non-coreference in a slightly different way. However, they are all variants of the same general idea that we present below.

Following Reinhart (1983), we understand the term 'coreference' to apply only to cases where two NPs happen to pick out the same entity in the discourse, without a syntactic indication of semantic identity. Where reference is determined by the syntactic configuration, sameness of reference is a consequence of BINDING.

The logical notion of binding holds between variables and certain operators (e.g. $\forall$, $\exists$, λ). However, the linguistically relevant concept concerns a relation between a variable and its antecedent. Reinhart (2006, 171) defines the latter in terms of the logical notion as follows:

(4) α BINDS β (in the linguistically relevant sense) iff α is the sister of a λ-predicate whose operator logically binds β.

This definition does not pertain to narrow syntax, but to the level of logical syntax – i.e. a representation which supports inference and is subject to a model-theoretic interpretation (Reuland, 2011, 34). Binding in logical syntax is typically licensed by syntactic configurations where an antecedent c-commands a pronoun, as in (5).[1] In the absence of adequate structural licensing, only coreference is possible, as evidenced by the unacceptability of non-referential antecedents in (6):

(5)   a. $Otto_i$ thinks that he_i will win.
           Otto ($\lambda x.$ x thinks x will win)

       b. Every $actor_i$ thinks that he_i will win.
           Every actor ($\lambda x.$ x thinks x will win)

(6)   a. People who know $\left\{ \begin{array}{c} Otto_i \\ *every\ actor_i \end{array} \right\}$ say that he_i will win.

       b. People who know him_i say that $\left\{ \begin{array}{c} Otto_i \\ *every\ actor_i \end{array} \right\}$ will win.

Since (4) is parasitic on the logical notion of binding, in order to be bound in the linguistic sense an element must correspond to a variable. From this it follows without stipulation that r-expressions are never bound.[2] This does not prevent

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[1] We will see in section 4 that there are other potential licensing configurations for binding that don't necessarily involve c-command. For more of these examples, see Barker (2012).
[2] By taking the notion of binding to be a semantic one, we are excluding here the syntactic definition of binding that is central to the Binding Theory (Chomsky, 1981), consistent with our argument that there is no need for Condition C *per se* as a syntactic constraint.

them from *coreferring* with other expressions in the discourse. So the problem is to determine the form in which *conditions of non-coreference* for r-expressions should be stated (Lasnik, 1976) – i.e. how to distinguish (6), where coreference is acceptable, from (7), where non-coreference is obligatory:

(7)   a.   * He$_i$ thinks that Otto$_i$ will win.

       b.   * He$_i$ sat in Otto$_i$'s chair.

       c.   * I told him$_i$ that Otto$_i$ would win.

       d.   * I saw him$_i$ in Otto$_i$'s chair.

       e.   * For Otto$_i$'s car, he$_i$ paid less than 20 grand ~~<for Otto$_i$'s car>~~.

     The crucial fact is that these syntactic environments in which Condition C appears to apply are a mirror image of those where binding is licensed (cf. (8)) – both occur when a pronoun and some other NP are in a c-command relationship:

(8)   a.   Otto$_i$ thinks that he$_i$ will win.

       b.   Otto$_i$ sat in his$_i$ chair.

       c.   I told Otto$_i$ that he$_i$ would win.

       d.   I saw Otto$_i$ in his$_i$ chair.

       e.   For his$_i$ car, Otto$_i$ paid less than 20 grand ~~<for his$_i$ car>~~.

     This pattern follows from IE if we assume binding is the most economical way to capture covaluation among NPs. In this view, what blocks coreference when a pronoun c-commands an r-expression (cf. (7)) is the fact that one could have opted for a more economical encoding of the same meaning by having the r-expression c-command the pronoun (cf. (8)), licensing a binding interpretation. In structures where binding is not allowed in principle (e.g. (6)), coreference is free.

     That binding is in fact more economical than coreference can be shown on various grounds (see Grodzinsky & Reinhart 1993; Fox 2000; Reinhart 2006). Unlike Reinhart (1983), we do not hold that binding is more *explicit* than coreference – this view has been argued to be problematic by Lasnik (1989). Instead, we assume that encoding interpretive dependencies in syntax is more economical than reliance on context, as proposed in Koornneef & Reuland (2016) and Krifka (2018).

     In other words, given an interpretation $\mathcal{I}$, a sentence which grammatically encodes $\mathcal{I}$ is more economical than one which does not encode $\mathcal{I}$, but which allows the speaker to contextually infer $\mathcal{I}$. Since the binding interpretation is syntactically defined and the coreference one is the result of a contextual process, IE preempts the latter whenever the structural conditions for the former are met. Speakers who pursue a least effort strategy can only opt for coreference in a structure that allows binding if there is some particular reason to do so – e.g. if the binding interpretation is not the intended one. If this is not the case, non-coreference follows.

We summarize these corollaries of IE as the following principle:

(9)   BINDING PREFERENCE:
    If the syntactic structure allows binding and coreference is interpretively
    indistinguishable from binding, then binding is preferred over coreference.

The structures in (7) allow binding. Since the coreference interpretation for
these examples is interpretively indistinguishable from the binding construal in (8),
only the latter should be acceptable according to BINDING PREFERENCE.

Where coreference is interpretively *distinct* from binding, (9) predicts violations
of Condition C to be possible. This is in fact what happens in the examples below,
which were among the first CCCs discussed in the literature (Evans, 1980):

(10)   a. [Who is this man?] He_i is $Ralph_i$.

       b. Max_i is crazy. Only he_i still thinks that Max_i is a genius.

       c. I know what Ann and $Bill_i$ have in common. She thinks that $Bill_i$ is
           terrific and he_i thinks that $Bill_i$ is terrific too.

A binding interpretation for (10a) would amount to the tautological predication
of self-identity in (11a), which is clearly not the intended reading for this example.
Rather, what (10a) would typically be used to convey is that the contextually
salient individual picked out by *he* has the property of being Ralph – i.e. something
like (11b), where y is the free variable that corresponds to the pronoun.[3]

(11)   a. Ralph $(\lambda x.x = x)$

       b. Ralph$_{\langle e,t \rangle}(y)$

A bound reading is also not equivalent to the coreferential reading actually
intended for (10b), since different properties are ascribed to Max in each of these
cases: binding would ascribe (12a) while coreference ascribes (12b).

(12)   a. $\lambda x.$ x thinks x is a genius

       b. $\lambda x.$ x thinks Max is a genius

These properties yield distinct truth-conditional effects in the presence of a
focus-sensitive operator like *only*. Saying that Max is the sole possessor of the
coreference property in (12b) is compatible with a scenario where other people
think of themselves as geniuses, but not with one where other people might take

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[3] The interpretation in (11b) assumes that proper names can be construed as properties
with meanings of type $\langle e,t \rangle$, as in Fara (2015). A reviewer notes that a property reading
is much harder to obtain for pronouns and definite descriptions. This is why coreference
is ruled out for cases analogous to (10a) such as *$Ralph_i$ is him_i* or *$Ralph_i$ is this man_i*.

Max to be a genius. The opposite obtains for the binding property in (12a). Since coreference is distinct from binding, IE does not impose a preference for the latter.

In the case of (10c), binding and coreference are distinguishable by a rhetorical effect (rather than a truth-conditional one) which hinges on attributing *the same property* to Ann and Bill: namely, the property '$\lambda x.\ x$ thinks Bill is terrific' instead of '$\lambda x.\ x$ thinks x is terrific', which is the property obtainable by binding (Heim, 1998; Safir, 2005). This effect pertains to the level of discourse as a whole. What arguably happens here is that the first sentence in (10c) (*I know what Ann and Bill have in common*) invokes (13a) as a Question Under Discussion (QUD) (Roberts, 2012; Tonhauser, 2012). This QUD can be specifically answered by the property in (13b), which, in turn, becomes the at-issue content of the discourse.[4]

(13)   a. QUD: What do Ann and Bill have in common?

    b. Answer: The property '$\lambda x.\ x$ thinks Bill is terrific'.

The alternative formulation in (14) implies the binding property '$\lambda x.\ x$ thinks x is terrific', which is not necessarily one that Ann and Bill share in this context.

(14)   I know what Ann and Bill$_i$ have in common. She thinks that Bill$_i$ is terrific and he$_i$ thinks that he$_i$ is terrific too.

This is not to say that using (14) would not provide an answer for the QUD in (13a). As Heim (1998) observes, (14) still conveys information about what Ann and Bill have in common, albeit indirectly. The point is that (10c), in virtue of how its semantic content is structured, addresses (13a) more directly than (14). This directness suspends the Binding Preference which is usually enforced by IE.

There is a lot of overlap between IE and Condition C: both principles do the basic service of blocking coreference when a pronoun c-commands an r-expression. However, examples (10) suggest that, where IE and Condition C differ in their predictions, IE is empirically superior. In these cases, IE licenses CCCs because the meaning expressed by coreference is either *truth-conditionally* or *structurally* distinct from the one obtainable under binding. In the next section, we discuss subtler interpretive differences between binding and coreference which reveal the

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4 Note that the non-coreference effect is much stronger if the context is one where a QUD concerning shared properties does not come up:

(i)   * Ann$_k$ and Bill$_i$ entered the room. She$_k$ started talking to Bill$_i$ while he$_i$ was looking for Bill$_i$'s chair.

The QUD that is raised by the first sentence in (i) is arguably *What happened next?*. This question does not make properties that Ann and Bill share the at-issue content of the mini-discourse in (i).

intervention of other non-grammatical factors on non-coreference, further confirming the inadequacy of Condition C.[5]

3 Anti-logophoricity

In section 2, we argued that INTERPRETIVE ECONOMY (IE) derives most of the predictions of a syntactic non-coreference rule while also avoiding the problems posed by CCCs like (10). However, precisely because its import is so similar to that of Condition C, IE cannot explain what is going on in the contrast below:

(15) Otto$_i$ is very confident.

   a. * He$_i$ believed that Otto$_i$ would win the election.

   b. He$_i$ hadn't heard the rumors that Otto$_i$ would lose the election.

In both of the sentences in (15), a pronoun c-commands a coreferential r-expression, but only (15a) is genuinely unacceptable. Aside from falsifying Condition C, examples like (15b) raise the following question about IE: is this a case where coreference is interpretively indistinguishable from binding? If it is, IE would be violated. We argue that, contrary to appearances, this is not so.

The explanation for these kinds of CCCs involves the notion of PERSPECTIVE. We understand perspective as a relation between the content of a discourse and

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[5] Another advantage of IE is that it offers a potential answer to why the Condition C violation in (ia) is not as bad as the one in (ib) (Evans, 1980):

(i) Otto$_i$ is resting.
   a. ? Otto$_i$ is sitting in Otto$_i$'s chair.
   b. * He$_i$ is sitting in Otto$_i$'s chair.

When a pronoun c-commands an r-expression, the structure is eligible for binding and BINDING PREFERENCE rules out coreference. When only r-expressions are involved, the structure is one where binding is not allowed because none of the relevant NPs corresponds to a variable. So BINDING PREFERENCE does not apply to exclude coreference in (ia). In fact, there are languages such as Thai where structures like (ia) are a standard way to express coreference (Lasnik, 1989; Deen & Timyam, 2018). Even in English, such cases aren't significantly worse than those where r-expressions appear in adjacent sentences (cf. (ii)). This suggests that the degraded acceptability of (ia) is unrelated to syntactic factors.

(ii) ? Otto$_i$ entered the room. Otto$_i$ sat down.

In section 4 we suggest that the oddness of (ia) and (ii) is an instance of the 'repeated name penalty' (Gordon & Hendrick, 1998), which stems from PROCESSING COMPLEXITY.

the entities referred to within that discourse. An entity is PERSPECTIVE-BEARER with respect to a discourse segment if and only if the speaker linguistically assigns to that entity the responsibility for the segment in question – i.e. if the entity is a VALIDATOR of the segment, in the sense of Stirling (1993).[6] Unlike Stirling (1993), we assume that there can be more than one validator per segment.

Following a suggestion by Büring (2005), we represent the set of validators as an additional contextual parameter V in the tuple of the context, which also includes a speaker s, a hearer h and a time t. The speaker is a typical validator in most contexts (i.e. $s \in V$), but other entities may be validators too. Propositional attitude predicates – verbs like *say* and *believe*, as well as nouns like *thought* and *rumor* – lexically specify their Source or Experiencer arguments as validators of their embedded complements. We represent such cases as follows (where X stands for an attitude predicate and θ stands for Source or Experiencer):[7]

(16) $[\![\text{X that S}]\!]^{s,h,t,V} = \lambda y.\lambda e.[\![X]\!](e) \,\&\, \theta(e,y) \,\&\, \text{Theme}(e,[\![\text{S}]\!]^{s,h,t,y\in V})$

Returning to (15), note that, while in (15a) the r-expression is within a propositional attitude which is attributed to Otto (a belief mentioning *Otto* is ascribed to Otto), in (15b), the noun *rumors* implies that the source of the embedded proposition containing *Otto* need not be Otto, but can be someone else. In other words, in (15a), but not in (15b), Otto is specified as a VALIDATOR responsible for the factuality of the proposition in which the r-expression *Otto* appears.

This suggests that the crucial factor which contributes to the anomaly of (15a) is not Condition C or IE, but, in fact, something like the following:

(17)   ANTILOGOPHORICITY:
       An r-expression cannot refer to a validator of the discourse segment in which it appears.[8]

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6 As Stirling (1993, 282-283) notes, "[i]n specific cases it may be most accurate to see this responsibility as being for the truth of a proposition, or the actuality of an eventuality, or the accuracy of the linguistic expressions used in asserting the proposition or describing the event." See Gast (2004) for a more formal characterization of validators.

7 The set of validators is not determined by local linguistic cues alone (e.g. θ-role assignment), but often depends on more holistic properties of the discourse, such as topicality (Hinterwimmer, 2019; Abrusán, 2020). All (16) says is that the y who bears the relevant θ-role of the predicate X will be one of the (possibly many) validators for the embedded S.

8 This principle does not clearly distinguish (15a) from $Otto_i$ *believes that* $Otto_i$ *will win.* What we tentatively propose is that, in the latter case, the use of the first *Otto* establishes the speaker as the validator of the second *Otto*, thereby exempting it from (17). It is also important to note that, since perspective-roles are not at-issue (Sells, 1987; Stirling, 1993; Charnavel, 2019), the status of an entity as validator is unaffected by negation. Thus, (15a) is no worse than He_i *never believed that* $Otto_i$ *would lose the election.*

Many facts that fall under IE are also covered by (17). Both principles conspire to yield non-coreference for (15a). However, it appears that IE also rules out (15b). This isn't a problem in itself because IE, unlike Condition C, is not a universal syntactic constraint. It is possible that its effects could be contextually overridden and that the difference between (15a) and (15b) is simply due to the fact that the former violates one constraint more than the latter. But this is not a view we want to adopt, since it leads to the wrong prediction that (15b) is just as bad as other examples where only IE is violated, such as (18):

(18)   * He$_i$ sat in Otto$_i$'s chair.   (*IE/✓ANTILOGOPHORICITY)

In order to understand why some cases that don't violate ANTILOGOPHORICITY are exempted from IE it is necessary to ask where (17) comes from. We propose that ANTILOGOPHORICITY is a semantic presupposition associated with referential determiners. Our idea is that all such determiners exclude validators from the set of entities which their property complement applies to. So a description like *the man* denotes the most contextually salient entity among non-validators who is a man. The meaning of *the* on this account would be something like (19):

(19) $[\![\text{the}]\!]^{s,h,t,V} = \lambda P_{\langle e,t\rangle}.\iota x : x \notin V.P(x)$

For proper names, we assume a basic property meaning of type $\langle e,t\rangle$, whose referential use requires the presence of a definite determiner equivalent to (19), as argued by Fara (2015). This determiner is covert in English, but it is overtly pronounced in languages like Southern German, Armenian and Brazilian Portuguese (Ferreira & Correia, 2016). The name *Otto*, on this view, denotes the most contextually salient entity named *Otto*, excluding any validator, as in (20):

(20) $[\![\emptyset_{the}\ \text{Otto}]\!]^{s,h,t,V} = \iota x : x \notin V.\text{Otto}_{\langle e,t\rangle}(x)$

When r-expressions are used in contexts where their referents are liberated from being validators (*non*-logophoric contexts like (15b)), they are potentially more informative than pronouns. They can add, to the non-logophoric context, the extra-implication of *anti*logophoricity: i.e. that the person they denote is *in fact* not among the validators of the discourse at hand. So we see a subtle interpretive difference between (21a) (adapted from (15b)) and (21b):

(21)   Otto$_i$ is embarrassed.
        a.   He$_i$ heard the rumors that Otto$_i$'s idiot father won the election.
        b.   Otto$_i$ heard the rumors that his$_i$ idiot father won the election.

In virtue of ANTILOGOPHORICITY being built into the meaning of *Otto*, (21a) implies that Otto has no responsibility for the rumors – i.e. that the N-complement

clause is not a reflection of Otto's subjective viewpoint. This *antilogophoric implication* is manifested in the fact that the perspective-sensitive evaluative term *idiot* is more plausibly attributed to Otto in (21b) than in (21a): i.e. it is more likely that Otto finds his father an idiot in (21b) than in (21a) (Lasersohn, 2005; Charnavel, 2019). The intention to communicate the antilogophoric implication in (21a) (which is absent from (21b)) justifies using coreference in a structure where binding is also possible, bypassing the effects of IE.

Our prediction is that whenever an r-expression is used in a context where its referent is exempted from being a validator, coreference is potentially more informative than binding due to the antilogophoric implication.[9] When this implication is relevant, IE allows coreference, giving rise to CCCs. This is precisely what occurs in (15b), as well as in (3a), repeated below as (22):

(22)   President Boris Yeltsin$_i$ canceled all meetings for this week because of medical tests for his$_i$ upcoming heart surgery. He$_i$ also punished a former bodyguard who said Yeltsin$_i$ was too sick to govern.

In (22), *Yeltsin* does not violate ANTILOGOPHORICITY due to the presence of the attitude verb *say*, which only requires that *a former bodyguard* be among the validators of its embedded complement. So using *Yeltsin* is more informative than a pronoun. A similar mechanism explains the contrasts in (23)-(25):

(23)   Otto$_i$ is sad.

    a. * It was clearly believed by him$_i$ that Otto$_i$ would never succeed.

    b.   It was generally believed of him$_i$ that Otto$_i$ would never succeed.

(24)   a. * Otto$_i$ is sneaky. He$_i$ started the rumors that Otto$_i$ would be arrested.

    b.   Otto$_i$ is upset. He$_i$ heard the rumors that Otto$_i$ would be arrested.

(25)   Otto$_i$ came home late from the office. He$_i$ seemed to be a little drunk.

    a. * But he$_i$ was shocked by the realization that Otto$_i$ and his friends weren't behaving properly.

    b.   But he$_i$ was offended by the suggestion that Otto$_i$ and his friends weren't behaving properly.

The examples above also contain attitude predicates. In (23a)/(24a)/(25a), the r-expressions refer to the validators these predicates assign to their embedded

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9 This does not happen in a plain violation of IE like (18) because there is no linguistic cue (e.g. an attitude predicate) explicitly exempting *Otto* from being a validator. Moreover, it is not clear whether an antilogophoric implication would be at all relevant for such cases.

complements (violating ANTILOGOPHORICITY), while in (23b)/(24b)/(25b) they need not do so (cf. Yashima (2015, 142-144) for more cases like these).

ANTILOGOPHORICITY also explains why CCCs occur in appositives as opposed to restrictive relative clauses:

(26)   Oedipus$_i$ is in trouble.

    a.   * He$_i$ discovered that the queen who was Oedipus'$_i$ mother wants to marry him$_i$.

    b.   He$_i$ discovered that the queen, who was Oedipus'$_i$ mother, wants to marry him$_i$.

Yashima (2015, 144) proposes that appositives function as "an inserted comment by the speaker". A way to implement this idea in our terms is to set up a construction-specific rule by which appositives are assigned the semantic status of independent utterances – *supplements*, as in Potts (2005) – which are, by default, attributed to the speaker. This insulates the validators of appositive contexts from whichever set of validators is assigned to the matrix sentence – a set which contains Oedipus in (26b), in virtue of the semantics of *discover* (cf. (16)).[10]

This entails that the referents of r-expressions contained within appositives are not obliged to count as validators (unless they refer to the speaker of the utterance). ANTILOGOPHORICITY accordingly predicts (26b) to be better than (26a): only (26b) allows the referent of the r-expression to be distinct from a validator of its context. A naturally occurring example that illustrates the same point is (27):

(27)   Chmielewski$_i$ said in an interview that he$_i$ also had a conference call Monday with the U.S. Office of Special Counsel, which is investigating claims by Chmielewski$_i$ and others that they experienced retaliation after objecting to the ways Pruitt ran the EPA.

                                                (WaPo 7/10/18)

As with (26b), the c-commanded r-expression in (27) is within an appositive relative clause, whose content is, by default, attributed to the speaker and not to its referent (namely, Chmielewski).

An unexpected result of ANTILOGOPHORICITY is the licensing of CCCs whenever the referents of r-expressions are inanimate. Since inanimates are incapable

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10 As evidence that this suggestion is on the right track, consider the contrasting inferences licensed by each of the sentences in (26). Only in (26a) is the proposition contained in the relative clause (namely, that the queen was Oedipus' mother) actually attributed to Oedipus, who is the lexically assigned validator of the embedded complement. In (26b), this proposition is interpreted as a separate assertion validated by the speaker. The basic idea here follows the outlines of the detailed formal proposal of Arnold (2007).

of taking responsibility for propositions, they are not possible validators of any discourse, unless they are anthropomorphized in some way (Golde, 1999; Minkoff, 2004; Charnavel, 2019; Varaschin, 2020). This prediction seems to be correct, as the following examples collected from the web show:

(28)   a. If you read the company's code of conduct, it$_i$ says violations of the code$_i$ by any management personnel is cause for discipline up to release from employment.

   b. I was wondering whether your computer can lock if you log off. I did it and when I typed in the password it$_i$ said that the computer$_i$ is locked down.

Besides accounting for CCCs, ANTILOGOPHORICITY also predicts contrasts which go beyond the scope of the traditional Condition C:

(29)   a. ?? The knowledge that Fred$_i$ will be unpopular doesn't bother him$_i$.

   b.   The possibility that Fred$_i$ will be unpopular doesn't bother him$_i$.

(Ross 1969, 195)

(30)   a. ?? That John$_i$ would win was expected by him$_i$.

   b.   That John$_i$ would win was expected of him$_i$.

(based on Kuno & Kaburaki 1977, 658)

(31)   a. ?? His$_i$ fear is that John$_i$ might lose the election.

   b.   His$_i$ fear led me to believe that John$_i$ might lose the election.

(based on Yashima 2015, 116,119)

In none of the pairs above the pronouns c-command the r-expressions. However, in the anomalous (29a)/(30a)/(31a) the r-expressions do refer to validators of their clauses, in violation of ANTILOGOPHORICITY. E.g. in (29a), the knowledge about Fred's unpopularity is (typically) ascribed to Fred, in (30a), the expectation that John would win is ascribed to John and so on.[11] In the acceptable cases (29b)/(30b)/(31b), the set of entities held responsible for the description in which the r-expressions appear don't (necessarily) include the referents of the r-expressions.

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11 A case similar to (29) was analyzed by Chomsky (1986, 168-169) as containing a null PRO subject coindexed to *John*. If PRO subjects are introduced, (29a) would be garden-variety Condition C violation, as PRO would c-command *John* inside the NP. There seems to be no motivation for this analysis beyond the fact that it encodes, in syntactic terms, the semantic intuition that John is a validator for the embedded proposition in (29a).

Lastly, note that since the speaker is a *default* validator for every context, Antilogophoricity predicts that self-reference with r-expressions should be disfavored (unless the speaker intends the discourse to be interpreted as someone else's). This is correct, and it does not follow from Condition C in any way:

(32) [Context: John, the syntax professor, is speaking:]

    a. ?? John is happy.

    b. ?? John's mother is happy.

    c. ?? The syntax professor is happy.

(Schlenker 2005, 394)

To summarize, this section showed that a semantic property of r-expressions – Antilogophoricity – explains a wide range of (non-)coreference judgments. This property goes beyond the scope of Condition C in accounting for non-coreference facts that don't involve the presence of a c-commanding NP antecedent at all (cf. (29)-(32)), as well as for many CCCs (cf. (15)/(22)-(26)). We argued that these CCCs licensed by Antilogophoricity do not, in fact, contradict IE. In the next section, however, we will see that there are cases where the preference for binding imposed by IE is genuinely overridden by other factors. This also means that merely replacing Condition C with an IE-based strategy is insufficient – a fact Reinhart (1983, 174) explicitly acknowledges.

4 Processing Complexity

In this section, we argue that factors related to Processing Complexity play a substantive role in the explanation of (non-)coreference, giving rise to many CCCs. Processing Complexity is a measure of the resources required to compute the correspondences between form and meaning. We show that when coreference between two NPs keeps complexity within a reasonable threshold, resulting structures are judged to be acceptable – even when they violate IE and Antilogophoricity. All that matters, as far as Processing Complexity is concerned, is that speakers provide adequate cues for identifying discourse referents in accordance with their relative degree of *accessibility* in the discourse (Ariel, 1988, 1990, 2001; Almor, 1999, 2000; von Heusinger, 2007; Arnold & Griffin, 2007; Arnold, 2010).

By accessibility we mean a property of non-linguistic representations of referents that makes them easier to retrieve in real-time processing. This is plausibly a consequence of *predictability*: i.e. a referent is more accessible to the extent that it is more likely to be mentioned in the context at hand (Givón, 1983; Arnold, 2010; Arnold & Tanenhaus, 2011). As an illustration, consider the contrast in (33):

(33) a. Otto and Franz finished watching a movie. Otto was the one who picked it out. He didn't like it.

  b. ?? Otto and Franz finished watching a movie. He didn't like it.

In (33a), the pronoun *he* can successfully refer to Otto, because it implies uniqueness and Otto is the single most accessible (i.e. most predictable) referent compatible with the pronoun's semantic features (Arnold, 2010, 193). This is a case where Processing Complexity stays within a tolerable level, resulting in acceptability.

This does not happen in (33b). In that case, the pronoun *he* introduces excessive complexity, because both Otto and Franz are equally accessible in the context of the second clause. This results in unacceptability. For a similar reason, it would also be odd for a speaker to intend the pronoun to refer to Franz in (33a). The lower accessibility of Franz in (33a) would justify repeating his name if reference to him was intended. Repetition of *Otto* in (33a), on the other hand, would have been redundant and would, thus, contribute to increase Processing Complexity.

This brief discussion indicates that, in order to communicate successfully, speakers must provide hearers with just enough cues to identify which discourse referent they intend to pick out. This is made possible by the fact that different types of NP function as specialized markers for different degrees of accessibility (Ariel, 1988, 1990, 2001). That is, there is a correlation between particular NP forms and the accessibility status of referents, which instructs hearers in the task of referential processing. For our purposes, we assume the following correlation, based on the distributional findings of Ariel (1990):[12]

(34) Form-Accessibility Correlation (FAC) :

stressed name	deaccented name	stressed pronoun	deaccented pronoun

$\longleftrightarrow$

Low Accessibility   High Accessibility

The FAC is a manifestation of the pressure to reduce Processing Complexity in the domain of NP anaphora. It predicts two basic kinds of biases: one against using low accessibility markers for highly accessible referents, and another against using high accessibility markers for referents that have a low degree of accessibility. The first bias covers cases like (35a) below, which is an instance of the 'repeated name penalty' (Gordon et al., 1993; Gordon & Hendrick, 1998). The second bias accounts for the degraded acceptability of (35b), given that, at the point *he* is

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12 We assume, also following Ariel (1990), that the relative position of NPs in the FAC is determined by their informativity and prosodic salience (as defined by stress or length).

encountered, there is no accessible referent in the context. It also explains why the pronoun cannot refer back to Franz in (33a) above.

(35) a. ? Otto$_i$ entered the room. Otto$_i$ sat down.

  b. ? He$_i$ entered the room. Otto$_i$ sat down.

Aside from explaining these well-documented data, the FAC concurs with IE in yielding many of the standard non-coreference facts imputed to Condition C:

(36) (Otto$_i$ looks relaxed.)

  a. * He$_i$ sat in Otto$_i$'s chair.

  b. * I saw him$_i$ in Otto$_i$'s chair.

These sentences all violate IE. But note that, if there is no prior mention of Otto, the sentences in (36) also violate the FAC for the same reason as (35b). If there *is* prior mention of Otto, the scenario is the same as in (35a): the speaker uses a low accessibility marker (the name *Otto*) for a highly accessible entity. Cases where an r-expression c-commands another are disfavored for the same reason. The difference in judgment between (35) and (36) is due to IE, which imposes a further bias only against the latter.

Besides accounting for these standard judgments, the simple ideas expounded here predict many CCCs which are also problematic for approaches based exclusively on IE. We now turn to a few of such cases.

4.1 CCCs and Linear Order

In order to be accessible at all, referents must first be introduced into the discourse by particular NPs. Forms that are higher on the FAC (e.g. r-expressions) are more likely to invoke new referents while forms that are lower on the FAC (e.g. pronouns) are more likely to express coreference with previously mentioned entities (cf. Schlenker 2005, Arnold 2010). This has the following consequence:

(37) Linear order generalization:
  Once an r-expression (re)introduces an entity into the discourse, subsequent reference to that entity is preferably accomplished with a pronoun, independently of structural factors.

Though this simple observation overlaps with IE in many cases (cf. (36)), it is, in fact, a separate factor, which explains otherwise puzzling contrasts like (38). CCCs like (38a) occur whenever a pronoun c-commands an invisible copy of a constituent (containing an r-expression) which is moved to an A$'$-position – a phenomenon known as *antireconstruction.*

(38)　a.　Which novel that Otto$_i$ wrote did he$_i$ destroy ⟨~~which novel that Otto$_i$ wrote~~⟩?

　　　b.　*He$_i$ destroyed this novel that Otto$_i$ wrote.

Conventional derivational accounts crucially rely on the claim that the antireconstruction effect occurs only when the r-expression is contained within an adjunct.[13] However, for most speakers the distinction between arguments and adjuncts with respect to antireconstruction is not robust, and there is substantial literature that confirms that the distinction is not a valid one (Heycock 1995; Culicover 1997; Fox 1999; Fischer 2002; Lasnik 2003; Safir 2004; Adger et al. 2017). The following contrasts illustrate the antireconstruction effect with arguments:

(39)　a.　Otto$_i$'s latest book, he$_i$ is very proud of ⟨~~Otto$_i$'s latest book~~⟩.

　　　b.　*He$_i$ is very proud of Otto$_i$'s recent book.

(40)　a.　That John$_i$ had seen the movie, he$_i$ never admitted for some strange reason ⟨~~that John$_i$ had seen the movie~~⟩.

　　　b.　*He$_i$ never admitted that John$_i$ had seen the movie.

Besides contradicting Condition C, these contrasts also pose a serious problem for IE. Binding is possible not only in the typical c-command configurations in (38b)/(39b)/(40b) but also in (38a)/(39a)/(40a), given that pronouns in these latter contexts can be dependent on non-referential quantified antecedents, as (41) shows (Sternefeld, 2000; Jacobson, 2002; Sportiche, 2006). Since binding is compatible with all of the structures in (38)-(40), IE should ban coreference in *all* of these cases alike – but (38a)/(39a)/(40a) are fine.

(41)　a.　Which novel that he$_i$ wrote did every writer$_i$ destroy ⟨~~which novel that he$_i$ wrote~~⟩?　　　　　　　　　(possible answer: his first novel)

　　　b.　His$_i$ latest book, every writer$_i$ is very proud of ⟨~~his$_i$ latest book~~⟩.

　　　c.　That he$_i$ had seen the movie, no actor$_i$ admitted for some strange reason ⟨~~that he$_i$ had seen the movie~~⟩.

A similar class of counterexamples to IE involves stylistic inversion around *be*. These cases differ from antireconstruction only in that the initial constituent is not in an A′ position, as shown by the possibility of subject Aux inversion (cf. (42b)) and raising (cf. (42c)) (Culicover & Levine, 2001):

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13 The idea is that, if the constituent containing the r-expression is an adjunct, it can be inserted into the derivation 'late', in a position where it is not c-commanded by the pronoun (Lebeaux, 1988; Chomsky, 1995). Hence, (38a) would not violate Condition C.

(42)   Otto$_i$ doesn't miss his cat. But . . .

    a.   Otto$_i$'s dog is what he$_i$ really misses.

    b.   Is Otto$_i$'s dog what he$_i$ really misses?

    c.   Otto$_i$'s dog seems to be what he$_i$ really misses.

    d.   * What he$_i$ really misses is Otto$_i$'s dog.

    e.   * Is what he$_i$ really misses Otto$_i$'s dog?

As with (38)-(40), IE prevents coreference in *all* of the structures above: despite the lack of c-command, binding is possible for all cases in (42) once the order of NPs is reversed (cf. the examples with non-referential antecedents in (43)). But only (42d-e) are genuinely bad.[14] Moreover, in these cases, as well as in (38)-(40), there is no reason to assume the chosen coreference interpretation is any different from binding – e.g. (42a) means the same as *His$_i$ dog is what Otto$_i$ really misses.*

(43)   a.   His$_i$ dog is what every man$_i$ really misses.

    b.   What every man$_i$ really misses is his$_i$ dog.

The upshot is that none of the contrasts in (38)-(42) follows in any way from Condition C or the Binding Preference imposed by IE. The most obvious variable that changes within each of these contrasts is the linear ordering of the r-expression with respect to the pronoun: coreference is only acceptable in the cases where the r-expression precedes the pronoun.

We suggest, therefore, that linear order is the crucial factor responsible for licensing (38a)/(39a)/(40a)/(42a-c).[15] This follows from Processing Complexity, insofar as the FAC predicts that pronouns are preferred over r-expressions for the expression of reference to highly accessible antecedents – regardless of the fact that an opposite order would yield a binding configuration. The processing-based option for using pronouns to retrieve previously introduced referents speaks louder than the preference for binding imposed by IE. Or, in other words, compliance to the linear order generalization in (37) serves as an excuse to violate IE. When (37) is not obeyed, IE applies normally, ruling out (38b)/(39b)/(40b)/(42d-e).

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14 These cases are also problematic for Condition C, but for an opposite reason: insofar as Condition C only excludes coreference under c-command, it (correctly) allows cases like (42a-c), but fails to rule out cases like (42d-e). For an account of how binding is licensed in (43) despite the absence of c-command, see Sternefeld (2000) and Jacobson (2002).

15 Antilogophoricity also might play a secondary role, which is parasitic on linear order. We suggested above that the first mention of an r-expression establishes the speaker as the main validator of the context. This prevents a case like (40a) (but not (40b)) from violating Antilogophoricity. However, in most of the other pairs, this point is irrelevant because the referent of the r-expression is not a validator in either case.

4.2 CCCs and deaccenting

There are, however, some well-known counterexamples to the linear order general-ization in (37). Prime among these are strong crossover data discussed by Lakoff (1968), Postal (1971) and Wasow (1972):

(44) a. * Otto$_i$, he$_i$ thinks nobody likes ⟨O̶t̶t̶o̶$_{\overline{i}}$⟩.

   b. * In John$_i$'s apartment$_i$, he$_i$ smoked pot ⟨i̶n̶ ̶J̶o̶h̶n̶$_i$'s̶ ̶a̶p̶a̶r̶t̶m̶e̶n̶t̶⟩.

   c. * For John$_i$'s car, he$_i$ managed to get over two grand ⟨f̶o̶r̶ ̶J̶o̶h̶n̶$_i$'s̶ ̶c̶a̶r̶⟩.

   d. * Near John$_i$, he$_i$ saw a snake ⟨n̶e̶a̶r̶ ̶J̶o̶h̶n̶$_{\overline{i}}$⟩.

In the examples above, the preference for the order *r-expression$_i$>pronoun$_i$* favored by PROCESSING COMPLEXITY does not seem to be enough to override the preference for binding imposed by IE.

However, PROCESSING COMPLEXITY is influenced by more than just linear order. Note that subtle manipulations of the structures in (44) yield very different judgments (see Akmajian & Jackendoff (1970, 126) and Reinhart (1983, 80)):

(45) a. Otto$_i$ is a rather unpleasant character. He$_i$ thinks no one likes him$_i$. Otto$_i$'s MOTHer, on the other hand, he$_i$ thinks that EVeryone likes <O̶t̶t̶o̶$_i$'s̶ ̶m̶o̶t̶h̶e̶r̶>.

   b. In John$_i$'s newly renovated apartment on 5th Avenue, he$_i$ smoked pot ⟨i̶n̶ ̶J̶o̶h̶n̶$_i$'s̶ ̶n̶e̶w̶l̶y̶ ̶r̶e̶n̶o̶v̶a̶t̶e̶d̶ ̶a̶p̶a̶r̶t̶m̶e̶n̶t̶⟩.

   c. For John$_i$'s badly battered old jalopy, he$_i$ managed to get over two grand ⟨f̶o̶r̶ ̶J̶o̶h̶n̶$_i$s̶ ̶b̶a̶d̶l̶y̶ ̶b̶a̶t̶t̶e̶r̶e̶d̶ ̶o̶l̶d̶ ̶j̶a̶l̶o̶p̶y̶⟩.

   d. Near the tent where John$_i$ would sleep, he$_i$ saw a snake ⟨n̶e̶a̶r̶ ̶t̶h̶e̶ ̶t̶e̶n̶t̶ ̶w̶h̶e̶r̶e̶ ̶J̶o̶h̶n̶$_i$ ̶w̶o̶u̶l̶d̶ ̶s̶l̶e̶e̶p̶⟩.

These examples illustrate that adding more linguistic material and embedding the antecedent more deeply facilitates the interpretation of coreference. There are two ways in which this follows from PROCESSING COMPLEXITY.

First, simply increasing the distance between a pronoun and the r-expression within the gap reduces the accessibility of the referent of the pronoun at the point in which the gap is encountered. This favors the use of an r-expression, due to considerations of clarity. We return to this point in 4.3.

Second, degree of embedding, along with the immediate phonological environ-ment, also determines where nuclear accent falls (Culicover & Rochemont, 1983; Cinque, 1993; Zubizarreta, 1998). Nuclear accent, in turn, defines where deaccenting can take place. Deaccented NPs are markers of higher degrees of accessibility than non-deaccented NPs and are, therefore, less likely to trigger the invocation of a new entity into the discourse – i.e. they are interpreted as Given (Rochemont, 2016).

The role of deaccenting in licensing coreference is recognized as early as Akmajian & Jackendoff (1970), Hinds & Okada (1975) and Culicover (1976).

In all of the sentences in (45), the r-expression is further away from the pronoun than in (44). The r-expressions in (45) are also less prosodically prominent (with respect to the clauses containing them) than in (44). So the contrast between (44) and (45) is fully expected from the point of view of PROCESSING COMPLEXITY.

Many examples that are taken to be explained by Condition C/IE turn out to be conditioned by whether deaccenting is possible or not. When it is not, it is more difficult to overcome the postulation of a new entity into the discourse, due to the FAC. Consider the example in (46):

(46) (Tell me something about Ben_i.)
  ??In Ben_i's garAGE, he smokes pot.

The nuclear accent on the second syllable of *garage* requires an accent on *Ben*, which makes it infelicitous in this context. The phonological environment forces *Ben* to be a low accessibility marker (i.e. a non-deaccented name) for independent prosodic reasons, and this makes it more prone to invoke a new entity into the discourse. But if we replace *garage* with *carport*, or *Ben* with *Hannity*, the accent on the possessive is weaker (this actually avoids a stress clash in (47a)):

(47) a. (Tell me something about Ben_i.)
      In Ben_i's CARport, he_i smokes pot.
    b. (Tell me something about $Hannity_i$.)
      In $Hannity_i$'s garAGE, he_i smokes pot.
                          (Examples suggested by Mary Beckman (p.c.))

So prosody allows deaccenting in these cases. Deaccenting *Ben* in (47a) and *Hannity* in (47b) is interpreted as signaling that the referent of the NP is already present in the immediate discourse, which favors coreference. Similar considerations appear to be responsible for distinctions noted by Bolinger (1979, 301):

(48) a. He_i was just a little boy when I first saw $John_i$.
    b. *He_i was a little boy when I saw $John_i$.

In (48a), the accent falls on *saw*, thereby deaccenting *John*, implying that it is Given (i.e. a marker of high accessibility in the FAC). This makes the example acceptable, despite the IE violation. But in (48b) the accent falls by default on *John*, which triggers the invocation of a new entity into the discourse. So (48b) violates PROCESSING COMPLEXITY (in addition to IE) because it uses a marker of low accessibility for a highly accessible entity.

Recognizing the contribution of deaccenting in reducing Processing Complexity for these cases also allows us to explain backwards pronominalization data like (49) (cf. Akmajian & Jackendoff 1970, 124):

(49)   Otto$_i$ lives a good life.

    a.   * After HE$_i$ wakes up, Otto$_i$ eats waffles ⟨after ~~HE$_i$ wakes up~~⟩.

    b.   * After he$_i$ wakes up, OTTO$_i$ eats waffles ⟨after ~~he$_i$ wakes up~~⟩.

    c.   After he$_i$ wakes up, Otto$_i$ eats waffles ⟨after ~~he$_i$ wakes up~~⟩.

All of these structures obey IE, since they all employ binding, which is licensed because the r-expression c-commands a copy of the pronoun. The difference in judgments must, therefore, be explained by Processing Complexity alone.

In (49a-b), stressing *he/Otto* implies that referents of these NPs have a very low degree of accessibility, which is not the case in the context in which these expressions occur. So both cases count as severe violations of the FAC.

In (49c), on the other hand, both *he* and *Otto* are deaccented. The fact that the name *Otto* occurs twice (counting the occurrence in *Otto$_i$ lives a good life*) constitutes a mild violation of the FAC (akin to the repeated name case in (35a)). This increases complexity, but it is not enough to render the example unacceptable. What distinguishes (49c) from cases like (50) is the fact that the latter, in addition to violating the FAC, also violates IE.[16]

(50)   * Otto$_i$ lives a good life. He$_i$ eats Otto$_i$'s favorite dish every day.

The upshot is that Processing Complexity does not *always* exclude structures where pronouns precede coreferential r-expressions. It only excludes such structures if neither the pronoun nor the r-expression are deaccented.

4.3 CCCs and low accessibility referents

The previous section showed that the preference for expressing covaluation with pronouns – which is favored by IE and Processing Complexity alike – can be avoided by deaccenting, which pushes NPs downward in the FAC, repeated below as (51). Another circumstance in which this occurs is when the entity the speaker intends to refer to has a particularly low degree of accessibility.

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16 The fact that *he* is in a subordinate clause in (49c) possibly makes its referent slightly less accessible than in (50), thus favoring the use of a (deaccented) name in the former case on processing grounds alone. Subordination has this effect because it expresses backgrounded or non-at-issue content. This is roughly the account of the difference between (49) and (50) in Ambridge et al. (2014).

(51) Form-Accessibility Correlation (FAC) :

stressed name	deaccented name	stressed pronoun	deaccented pronoun

Low Accessibility ⟶ High Accessibility

R-expressions are low accessibility markers. This means that, if the interpretation of a pronoun as coreferential or bound by an antecedent is too difficult to compute (due to the low accessibility of the antecedent's referent), the order $pronoun_i > r\text{-}expression_i$ can be favored as a way to avoid Processing Complexity – *even* in a configuration where binding is allowed. In other words, the FAC predicts that r-expressions may be preferred over pronouns for expressing covaluation (*pace* IE and (37)), as long as their referents are sufficiently low in accessibility.

This accounts for attested CCCs like (3b), repeated below along with a similar example from Schlenker (2005, 387):

(52)   a. John Smith$_i$ was so devoid of any moral sense that he$_i$ forced Peter Smith to hire **John**$_i$'s girlfriend in his lab.

     b. Gödel$_i$ discovered the works of Edmund Husserl in the late 1950s [. . .]. He$_i$ felt that Husserl had solved many, if not all, of the metaphysical problems that **Gödel**$_i$ had set for himself$_i$ [. . .].

The factor that is responsible for licensing Condition C/IE violations in (52) is ambiguity. If either of these examples had a pronoun instead of the highlighted r-expressions (as required by IE), the sentences would be ambiguous: it would be unclear whose girlfriend John forced Peter to hire in (52a) and who had set problems for himself in (52a). We assume, following experimental work by Arnold & Griffin (2007), that the presence of equally salient competitors reduces the accessibility of discourse referents, and, thus, favors r-expressions (*qua* low accessibility markers) over pronouns (*qua* high accessibility markers).

Even though the CCCs in (53) don't involve ambiguity in a strict sense (since the accessible referents fail to match the pronoun's gender specifications), we suggest that they fall under a similar explanation:

(53)   Otto$_i$ was talking to Sally about Mary's attempt to arrest Susan.

     a. He$_i$ told Sally that Susan threatened to kill a woman who Mary met in **Otto**$_i$'s house.

     b. He$_i$ said that Sally should show Mary the confession that Susan had made that **Otto**$_i$ had just heard about.

Using the highlighted r-expressions in (53) is motivated by the need for *clarity*, which emerges because there are too many similar r-expressions between the name and the pronoun that c-commands it. Long stretches of intervening discourse reduce

the accessibility of discourse referents for exactly the same reason as the presence of equally salient competitors does (Ariel, 1988, 1990, 2001; Arnold & Griffin, 2007). Therefore, at the point where the highlighted occurrences of the r-expressions are encountered in (53), their referent (i.e. Otto) has a very low degree of accessibility. So, as in (52), the FAC favors the use of low accessibility markers (e.g. names) for these contexts, despite the fact that the resulting structures are ones where both Condition C and IE are violated. Note, furthermore, that these examples (as well as (52b)) also count as violations of Antilogophoricity, insofar as the r-expressions therein appear in discourse contexts whose contents are attributed to their referents (*via* the semantics of the matrix attitude verbs).

In sum, these and most of the examples examined in this section demonstrate that neither configuration-sensitive principles like IE, nor purely semantic ones like Antilogophoricity are necessary conditions on speakers' coreference judgments. All of these principles can be violated if doing so results in a reduction of Processing Complexity – i.e. if it allows speakers to achieve a better fit between their NP choice and the particular degree of accessibility of the referent they want to invoke, as specified in the FAC. This suggests that processing considerations are stronger than semantic or least-effort kinds of constraints on anaphora.[17]

5 How it all hangs together

Following the approach inaugurated by Reinhart (1983), we have proposed that non-grammatical factors offer a better account of (non-)coreference judgments than a purely syntactic approach based on Condition C. Our argument crucially involved explanations for different kinds of Counterexamples to Condition C (CCCs).

In section 2, we discussed Interpretive Economy (IE), which embodies a least effort principle favoring the explicit encoding of interpretive dependencies in syntax over reliance in context. By assuming that coreference is the result of a contextual process and binding interpretations are syntactically licensed (e.g. by c-command), we predicted the former to be obviated whenever the structural conditions for the latter are met. This yields a Binding Preference whose empirical import is almost equivalent to Condition C. Where the two principles differ, we find CCCs that favor IE over Condition C.

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17 It should be possible to formalize and refine the hypotheses we made about Processing Complexity in a way that makes them more empirically testable in experimental settings of various kinds. We leave this exercise for future work.

Unlike Reinhart, who attributes non-coreference judgments entirely to IE, we argued that two other biases are needed as well. First, there is ANTILOGOPHORICITY, which we discussed in section 3. This is a semantic constraint which prohibits r-expressions from referring to the validators of their discourse contexts. Though this factor is independently motivated – i.e. it explains non-coreference effects that don't follow from IE – its role in accounting for CCCs is subordinate to IE. Since ANTILOGOPHORICITY is a semantic property of referential determiners, in certain contexts – namely, *non*-logophoric contexts – using r-expressions to express coreference can be more informative than using pronouns to express binding. When this happens, complying with ANTILOGOPHORICITY also means obeying IE.

Lastly, in section 4, we discussed how reducing PROCESSING COMPLEXITY gives rise to different kinds of CCCs. We followed the literature on referential processing in claiming that entities invoked in the discourse are ranked in accordance with their accessibility (Ariel 1988, 1990, 2001; Almor 1999, 2000; Arnold 2010, i.a.). Identifying these entities in real-time processing is facilitated by the fact that the form of referring expressions guides hearers in the retrieval of referents by indicating to them how accessible a given referent is in the context at hand – this is, in essence, what the FAC in (51) is all about. If speakers are successful in achieving a match between their NP choice and the particular degree of accessibility of the referent they want to invoke, coreference is, in principle, allowed.

Surprisingly, this happens even in configurations where IE and ANTILO-GOPHORICITY are violated. That is, given suitable conditions, r-expressions can be used for the purpose of expressing coreference in contexts where using a pronoun would yield an ANTILOGOPHORICITY-compliant binding interpretation (e.g. in contexts where r-expressions are c-commanded by their antecedents). So the pressure to reduce PROCESSING COMPLEXITY is more important than both economy considerations and ANTILOGOPHORICITY.

This plausibly happens because, in the task of conjuring a quick interpretation for utterances in real-time, hearers often resort to a 'good enough' processing strategy (Ferreira & Patson, 2007; Karimi & Ferreira, 2016), which trumps both the fine-grained semantics of the lexical items (i.e. ANTILOGOPHORICITY) and structure-sensitive economy reasoning (i.e. IE, which often implies computationally costly transderivational comparisons). If this is correct, the effects of IE and ANTILOGOPHORICITY would be most perceptible in de-contextualized settings, where the pressure to come up with quick interpretations is not particularly pressing. This is precisely the kind of situation theorists find themselves in while devising structural hypotheses about (non-)coreference.

This argument for treating non-coreference judgments as the consequence of non-syntactic factors is similar to the argument for island constraints as the consequence of complexity (Hawkins 2004; Hofmeister & Sag 2010; Culicover

2013; Culicover & Winkler 2018). Island configurations are configurations against which there are strong extra-grammatical biases, and so they become excluded. The judgments of unacceptability are due to the non-occurrence of the offending configurations along with the strong competition from the preferred alternatives.

In the end, we believe that this is a way to have universals without Universal Grammar. The universals are not biological, they are social, in the sense that they live in the networks of speakers, all of whom share the same biases and avoid the same configurations. Thus, it is not necessary to assume that Condition C is part of the human endowment for language. But it does follow from plausibly universal principles governing the interpretation and processing of reference in discourse

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