Wolfram Hinzen
ICREA & Universitat Pompeu Fabra

ON THE GRAMMAR OF
REFERENTIAL DEPENDENCE

Abstract. All forms of nominal reference, whether quantificational, definite, rigid, deictic, or personal, require that the nominals in question appear in relevant grammatical configurations. Reference is in this sense a grammatical phenomenon. It is never determined lexically or a word-world relation in a purely semantic or causal sense. Here it is further argued that the principles of the grammar of object-reference naturally extend to cases where the reference of one nominal depends on that of another, i.e. the grammar of referential dependence, without any further special grammatical relations such as 'binding' required. This further includes a relation of (referential) identity.

Keywords: reference, referential dependence, anaphora, binding theory, identity.

1. Introduction

Reference is commonly taken to be a 'word-world' (or 'semantic') relation, contrasting with anaphora as a 'word-word' (or 'syntactic') relation. In line with this, the latter have been taken to require a narrow-syntactic 'Binding Theory' (Chomsky, 1981), interacting with interface constraints (Reuland, 2011a,b). Against this dichotomy stands evidence that the particular forms of reference that exist in human language are all regulated grammatically – they depend on a grammar of the right kind on the occasion of their use (Longobardi, 1994, 2005, 2008; Sheehan & Hinzen, 2011; Hinzen & Sheehan, 2013; Martín & Hinzen, 2014). Non-anaphoric reference is thus also not merely 'semantic' in a non-grammatical sense either and it does not reduce to a non-grammatically specified 'word-world' relation. As present evidence stands, furthermore, no such forms of reference are known to exist in non-linguistic beings, hence they are not an aspect of pre-linguistic conceptual-intentional cognitive systems (e.g., Hauser, 1996; Fitch, 2010: 187–194); and they are impaired in humans with developmen-

tal disorders affecting language (Tomasello, 2008, ch. 4). At the same time, these other species or humans clearly also stand in semantic or causal relationships to external objects. This makes generic word-world relationships that we find across species nonexplanatory for the specific forms of reference that we find in our species (when developing normally), and the so-called 'word-world'-relation in language may be 'semantic' only insofar as we speak about a notion of 'meaning' that is grammatically mediated, i.e. 'grammatical meaning'.

The primary purpose of this paper is to provide evidence that, beyond a grammatical theory of reference governing the specific range of ways in which words can be related to the world in language, no further special principles of a narrow syntactic sort are required for another relation, which has been called *word-word*: in short, the grammar that regulates object reference naturally extends to a grammar of referential *dependence*, including a form of 'identity'. In particular, there is no special such grammatical relation as 'binding' defined as in Chomsky (1980; 1981) or Fiengo & May (1994), where *a* is said to 'bind *b*' iff *a* and *b* are coindexed and *a* c-commands *b*. No binding relation obtaining 'at the interface' (Reuland, 2011b) is required, either.

In line with this aim, this paper will revisit classical data that Binding Theory dealt with and seek to explain them without appealing to any such theory. We begin, in the next section, with a brief characterisation of reference in human language as distinct from perception and as based on description. In all cases of referentially used expressions, including that of proper names and indexicals, referentiality is, for a given lexical content, grammatically mediated: No lexical item or indeed phrase determines reference by itself (Section 2). Binding Theory has, by contrast, made lexicalist assumptions, stating binding conditions on the basis of a typology of kinds of lexical expressions (anaphors, pronouns, and R-expressions) and their respective binding properties. But reference is determined grammatically, and there is no relation of 'binding' in grammar (Section 3). Where lexical contents are descriptively too weak to determine reference in the absence of an accompanying deictic gesture, and no such gesture takes place either, the option of referential dependence (constrained by phi-feature agreement) arises, as long as a natural distinctness condition obtains, which interacts with an economy condition. Section 4 argues that there is no logical relation of identity in grammar either, though under certain conditions of structural deficiency, logical identity can be approximated grammatically. As a consequence of this analysis, Frege's puzzle about identity does not exist in natural language. The grammar of iden-

tity, which has been systematically neglected in philosophical discussions of Frege's puzzle, is also the solution of this puzzle. Section 5 briefly turns to reflexives, as a lexical way of forcing a grammatical dependency. Section 6 concludes.

2. Reference and description

A crucial difference between perception, on the one hand, and the referential use we make of words in language, on the other, is that the former co-occurs with a stimulus: Hallucinations aside, we can perceive a given object only if that object physically exists and causally affects us, as and when the act of perception takes place. We cannot help ourselves to a percept of the wall behind us, without actually turning our heads (or using a mirror). Thinking, on the other hand, does not obey this constraint, as my thought of the wall behind me already illustrates. The same applies if I think about Istanbul, where I have never been, or the colour of the sky in Iceland. Such thought is *referential*, in a perfectly intuitive sense: I am thinking *about* (and indeed just referred to) the wall behind me, Istanbul, or the colour of the sky in Iceland, even if I am not causally or perceptually affected by any of the referents in question, as and when my thought occurs and the act of reference succeeds.

But why is this so? If any act of reference using words was grounded in a *concept* of what is being referenced, it would not need to be grounded in the referent itself: grounded (or anchored) in the concept, the co-occurrence of the referent would not be required, without the act of reference being affected by the referent's physical absence. The premise of this reasoning is independently plausible: we refer to things that are *houses*, *persons*, *cities*, *cars*, *colours*, etc., for us. Acts of reference normally involve 'concepts' of what we refer to, and these have a descriptive content. We will assume that no act of reference using words is ever *completely* free of a concept in this sense, and hence of *some* amount of descriptive information involved. Thus, we might utter, in consternation:

(1)   What is *that*?   [pointing to an unidentifiable object]

Here we use 'that' precisely because no descriptive category seems to fit. But in this case, none is needed, and, in line with that, the construction is felicitous *only* if the referent is physically present and perceptually processed as the act takes place. Descriptive information is provided by the perceptual presentation of the referent. Moreover, a demonstrative gesture

accompanying speech is also required in this instance, which of course is not the case when descriptive information is richer, as in (2):

(2)   What is a carburetor?

In (2), we ask what it is for any object, x, to fall under the description (or the concept) 'carburetor'.

The contention that no act of reference using words is ever free of a description identifying the referent somehow (or as being an object of a certain kind) could be attacked on various grounds. For example, it has been long contended in the philosophy of language that the referent of a proper name is simply its referent – i.e., the reference of a proper name does not have any descriptive content that mediates the reference. But this, of course, as has equally long been noted, is not the case when proper names are used descriptively, or effectively as common nouns, as when they occur in grammatically predicative positions:

(3)   No John is proud of his name.

(4)   He is so John, you know, that he'd never do that.

(5)   I know many Johns.

It is hard to see how all proper names can be used descriptively, as they plainly can be, when occurring in such grammatical positions, if they didn't have any descriptive information associated with them at all. This is because the descriptive uses precisely *exploit* the descriptive information in question: in (3), the fact that the referent of 'John' is called John, so that reference in (3) and (5) is to any x such that this x is called John (or falls under this description). In (4), in turn, we must tap into our lexical ('encyclopedic') knowledge of John, identifying some contextually relevant characteristic, which makes us expect a certain behaviour. In sum, if all lexically proper names have predicative uses, this suggests that they carry a descriptive content, even if a reduced one, and even if that very content is not exploited in *all* of its uses, and not in particular when the items occur in *grammatically referential* positions, unlike what happens in (3–5). Whether it is exploited, and indeed whether a name occurs with a referential or a predicative use, not only depends on the grammar of their use, but it also depends on nothing else. Consider (6–7), where the exact same lexically proper name, 'Napoleon', is used to refer in (6) and to predicate in (7):

(6)   Napoleon is no Hitler.

(7)   Hitler is no Napoleon.

The reason, plainly, is that it occurs, without a determiner, in subject position in (6), which is a grammatically referential one, while it is in the position of the sentential predicate in (7), where it is moreover the NP-complement of a determiner, like any ordinary common noun.[1] More systematic investigation of the grammar of proper name in their referential uses in fact supports the 'topological mapping principle' of Longobardi (1994), according to which object reference in grammar occurs iff there is N-to-D movement (or else a CHAIN, where an expletive determiner is lexically available in a language). If so, the special object-referential properties of proper names (on occasions where they have them) are due to their grammar, not their lexical specifications (e.g., being of 'type $\langle e \rangle$').[2]

Proper names are thus not a counterexample to the generalization that reference in language is never free of descriptive content associated lexically with words, and it also illustrates that the special referential properties of lexical items depend on their grammar on the occasion of their use, rather than being fixed at a lexical level. We will revisit this conclusion below.

What about 'indexicals', however? It is common to understand this term as denoting a *lexical class* of expressions, and to attribute a form of 'direct' reference to these, without any descriptive content entering their semantic content, in line with Kaplan (1977). Yet, the exact same objection applies: *all* so-called indexicals systematically have descriptive uses, depending on the grammar of their occurrence. Again, in order to *have* descriptive uses, they need to have a descriptive content that these uses exploit. Thus, the third person pronoun 'he' can have referential (deictic) uses, but it is perfectly capable of descriptive or predicative ones:

(8)   She is a he.

The speaker of (8) says that a certain referent (referred to as 'she'), happens to have the property of being male. Pronouns, therefore, have a 'minimal' descriptive content, which is exploited in such uses. The same applies to the personal pronouns (1st and 2nd person), as (9) and (10) show:

(9)   I am me (= the sort of guy I am)

(10)   You are so you!

In (10), the very same lexical item functions first referentially, then predicatively, in the very same clause. We wouldn't want to say that it is a different lexical item, any more than we would be inclined to do so in the case of 'Napoleon' as occurring in (6) and (7). Instead, we need to distinguish *lexical*

meaning, which cannot as such distinguish between reference and predication (neither of which exist in the lexicon), from grammatical meaning, which can.

The same applies again to demonstratives, which, too, can function as common nouns, depending on the grammar of their occurrence:

(11)   there was no this and no that [said by a patient describing his personal experience after a period of chronic depression]

(12)   Tell me everything that is a this, and then everything that is a that [said in an English-language class by the teacher]

Therefore: (i) the so-called 'indexicals' do not in fact form a *lexical* class (they are 'indexical' in their use only if the grammar of their occurrence is the right one),[3] (ii) there is, in fact, no such thing as a class of 'lexically referential expressions' at all, and (iii) *all* acts of reference using lexical items with overt lexical content, even where no obvious or rich descriptive content is involved, depend on *some* concept with *some* descriptive information, even if minimal, which characterizes the object of reference as being of a certain kind (being a house, male, or a certain way). This raises an obvious question about lexical items with no overt lexical content, such as PRO or trace, to which we return below.

The foundationally more important and general conclusion, however, is that reference is regulated grammatically in addition to lexically. No lexical item, as such, is ever referential, in the following sense: 'man', as such, does not refer to a particular man, the man I met yesterday, this man as opposed to that, any man, men in general, a stage of a man, mankind, or manhood. As a lexical item, 'man' simply cannot distinguish between these. It is only grammar that can, and grammatical differences accompany interpretational differences, like whether reference is purely generic (14), massquantificational (15), indefinite individual existential (16), indefinite specific quantificational (17), demonstrative referential (18), or to a kind (19):

(13)   I like men

(14)   I had man   [said by a cannibal to someone who had beef]

(15)   I met men

(16)   I met a man

(17)   I met this man

(18)   Man comes from Africa

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Thus, for example, in (14), no determiner can be inserted that preserves the meaning of this expression; in both (15) and (16), a phonologically reduced quantificational determiner 'some' (or 'sm') can be added without a change in meaning. Yet, with or without the quantifier, quantification can only be over a mass in (15) and individuals in (16), in line with the greater grammatical complexity of (16), which species Number on 'men'; (17) goes beyond (16) in having an individual-specific quantificational reading, and that reading requires a 'weak' determiner such as 'a', which has to be lexically overt unlike 'sm' in (15–16); demonstrative reference in (18) grammatically requires both the 'strong' determiner and the common noun to be lexically overt, although, at least with reference to non-human objects, the demonstrative determiner can now crucially occur without the NP-complement, unlike 'some/sm', 'a' or even 'the'. With deictic pronouns, the NP-complement becomes ungrammatical ('he man'). Finally, the (kind-) referential use of 'man' in (19) is inconsistent with the presence of a determiner, exactly as are proper names in their rigid uses or deictic pronouns (*the John; *the he), and there is strong evidence that the noun is, in in this instance, in the position of the determiner, after N-to-D movement (see Hinzen & Sheehan, 2013: 129–30).

It is clear even from this brief review that grammatical differences systematically track (or co-vary with) interpretive possibilities and the use of the same lexical item for purposes of reference, cross-linguistically and also across different lexical categories.[4] If nothing in the lexical specifications of the item 'man' can distinguish between these different ways in which the same lexical item 'man' can be used to refer to the world, and the grammar is systematically different for these distinct referential uses, it makes sense to characterize grammar as a device for regulating how we use words to refer to the world, leaving their lexical contents untouched.

3. Referential dependence

The classical binding conditions are stated so as to apply to particular classes of expressions (see e.g. Reuland, 2011b:379). That is, the set of nominal expressions is partitioned into (i) anaphors, (ii) pronominals, and (iii) R-expressions. Semantic properties are stated for each of these: class (i) (*himself*, etc.) is said to be 'referentially defective' and hence must be bound, in a local domain. Class (ii) (*he*, etc.) may have independent reference, but can be bound, though not in a local domain. Class (iii) (*John*,

the man, etc.) cannot be bound. The binding conditions make this formally explicit, via the notion of a governing category:

(A)   An anaphor is bound in its governing category.

(B)   A pronominal is free in its governing category.

(C)   An R-expression is free.

It is clear from this presentation that while binding is assumed to apply under certain grammatical constraints (like government), it is the lexical status of an expression that determines its binding behaviour. In line with the above claim that referentiality, strictly, is a property of grammar, and no lexical item or even phrase is referential by itself, we proceed in what follows without this assumption.[5] Let us begin by considering the DPs 'this man' and 'that man', which as occurring in (20) are both singularly referential (they pick out specific men):

(19)   this man likes that man

The two men are different individuals in this instance, and no further assumptions, in addition to the ones above, are required to explain this disjointness of reference: the lexical item 'man' is tokened twice, providing the same descriptive content for two distinct acts of reference, in different parts of the derivation and in grammatically different positions. A 'strong' determiner, together with the occurrence of both DPs in canonical argument positions, and two distinct accompanying deictic acts ('demonstrations', in the sense of Kaplan, 1977), makes this lexical item referential in both of its occurrences. If DP is a phase (*sensu* Chomsky, 2007), both DPs are also distinct, complete phases. Nothing other than disjointness of the referents derived at the respective phasal edges is expected. Now, the same applies to 'John' and 'Bill' in (21):

(20)   John likes Bill

But what about (22)?

(21)   John likes him

(21) is crucially ungrammatical without a deictic gesture accompanying 'him'. Further, 'John' and 'him' are both DPs, occurring in canonical argument positions that play distinct thematic roles and are both specified for Case. Hence we do not expect anything other than in (20) or (21): in fact, no new questions arise. Therefore, a co-referential interpretation assigning the same value to 'John' and 'him' does not need to be 'blocked', because the option is not expected to arise, on present assumptions, any more than it does in (20) or (21). If on the other hand we want to *force* a co-referential

interpretation (a single referent), in a context where the grammar entails referential disjointness, we have to do so lexically, by inserting a special formative 'self', which has exactly that function:

(22)   John likes himself.

In other words, we have to override grammar lexically. We return to 'identity' in the next section, and to reflexives in Section 5.

Let us next consider what would traditionally have been described as 'binding' of a pronoun. This relation arises across a complex DP boundary in (23) and across a clausal boundary in (24):

(23)   [DP [DP John's] friends] like him.

(24)   [CP John thinks [CP he is smart]]

If there is a deictic gesture accompanying 'him' in (23), reference between 'John' and 'him' is disjoint, just as in (22). In this case, again, no new questions arise. Without the gesture, reference of 'him' can be resolved to John, resulting in 'co-reference'. Analogously for 'he' and 'John' in (24). Co-reference, viewed as a purely semantic fact, is well known to not in general depend on grammar (e.g., Reuland, 2011b:379–80). Does it, in this case?

In (23), reference in the subject position is, uncontroversially, to John's *friends*, not John (it is said that his friends like him a lot, and nothing is said at all about whether John likes himself). 'John's friends' and 'him' cannot co-refer, given a lack of agreement in phi-features (and even if there was number agreement, the referential disjointness that we find is again what we expect). But there is no such question as whether 'John' and 'him' are disjoint in reference, either, for 'John' is not in a grammatically referential position. Instead, it is in a grammatically predicative position, namely as a part of the descriptive specifications of the referent of the subject DP: the friends we refer to are identified via the description that they are friends *of John*. Not two acts of reference take place within this subject DP, therefore, as they would in a coordinate structure, but only one.[6]

The traditional practice in Binding Theory of co-indexing 'John' and 'him' in such an instance obscures these facts: it associates reference (or objects as semantic values) with *words*, when in fact reference is a grammatical phenomenon, and it ignores the status of 'John' as grammatically referential or predicative. Looked at either in isolation or as a phrase (DP), 'John' of course *is* most paradigmatically used as object-referential. For this reason, the question *seems* to arise as to whether or not 'him' is 'co-referential' with it. But this is to ignore that reference is also regulated through the

grammatical relations in which a given phrase stands. No lexical item or phrase is ever, as such, referential (any definite DP, in particular, can of course be predicative: see e.g. (31–2) below). In (23), we have a complex DP, which embeds another. But reference, in grammar, is always determined at the root, on the basis of a specified description of the referent derived at the root (Arsenijevic & Hinzen, 2012). Hence reference is to the friends, under a description that fixes the referent, which (apart from the lexical content 'friends' itself) includes another DP.

Reference of the subject and object DPs in (23) is thus disjoint in exactly the sense that reference between 'John' and 'him' was in (21). Nonetheless, in (21), a deictic act is grammatically *required* to accompany 'him', and in (23) it is *not*: (23) is meaningful without such an act. Why? The answer that now suggests itself, based on no further assumptions, is: precisely *because* 'John' is not in a grammatically referential position. He has just been *mentioned*, as part of a description that was part of an act of reference to his friends. Since 'him' can refer to *any* male individual that has been mentioned, it can refer to John. Moreover, in the absence of an accompanying act of deixis, reference *can* only be determined via another suitable DP. In (21), this DP is in a referential position, obviating co-reference. In (23), it is not. The exact same reasoning that explains why co-reference in the absence of deixis is possible in (23) also explains why it is possible in *John likes his cat* (where 'his' is in predicative position), while it is impossible in (21) (*John likes him*).

To put this differently, co-reference is possible (without the act of deixis) in (23), but not in (21), because the grammar does not forbid it; and what is not forbidden is allowed: the semantics can roam freely. There are no laws for co-reference in grammar, any more than there are laws for binding: resolving reference of 'him' to John is, in the absence of a deictic gesture, and given phi–agreement, simply an option: due to the predicative occurrence of 'John' in the same clause (or of 'his' in 'John likes his cat'), it is not grammatically ruled out.[7]

We now argue that there is no 'binding' in the bi-clausal (24), under the coreferential interpretation, either. Here, again, 'John' and 'he' are full DPs in argument positions, with thematic roles and Case specified. But now, unlike in (23), none of them occurs in a grammatically predicative position as part of another DP that is in an argument position. We would therefore once again expect, as is indeed the case, that the two DPs will pick out different individuals, or be referentially disjoint, as in (21), as long as a deictic act accompanies 'he'. In the absence of such an act, however, (24), like (23), has a referentially dependent reading, where there is only one

referent. This is unexpected since both DPs are now in grammatically referential positions.

The obvious explanation of this difference between (24) and (23) relates to a grammatical difference between them: in (24), the two nominals are separated by a clause boundary between one finite clause and another. While this states the difference in purely formal terms, the difference in fact directly relates to what we have called the grammar of reference. When we (successfully) refer to objects using language in discourse, we refer to them as playing roles in relation to events. If I were to utter: 'a person called Miriam', you have no idea who I am referring to. But if I say: 'I just met a person called Miriam', you know I am referring to a person called Miriam that was part of an event of meeting that took place just prior to the time of utterance and in a location proximate to it. Acts of reference to objects, in short, are not complete, before the objects are embedded in *events* denoted by verbal phrases, and the events are placed in time, space and discourse in relation to an act of speech, which depends on specifying finiteness in clauses. In (21) (and in 22, 23)), one such event is being referred to. In (24), there are two. In (21), the two referential DPs are thus distinct only in terms of their thematic roles and structural Case. In (24), they are distinct in terms of their thematic roles, Case, *and* the *event* (the clausal phase), of which they are, respectively, parts. In this way it is unsurprising that, in the description of the second event, individuals can be referenced that were mentioned as part of the description of the first – exactly as 'him' could pick up the referent of 'John' after John had been mentioned in (23), and is part of the context already, within which the second event is grammatically configured. In a single event, that is, referential DPs need to be kept distinct by grammar. In two separate events, they need not. Where the descriptive information involved in the use of a word in a referential position is minimal or reduced to phi-features, the reference can – in the absence of an accompanying act of deixis – only be resolved against that of another DP, which is sufficiently distinct. It is sufficiently distinct, if the two DPs are parts of the same clause but one is not in a referential position, or if they are parts of distinct finite clauses which correspond to two referentially complete acts of event reference.

This makes an immediate prediction for cases where the embedded clause is referentially *incomplete*, as in non-finite clauses: referential independence of the event referred to in the embedded clause is then reduced (as referential completeness requires finiteness), and the reference of embedded nominals should be more dependent on event reference in the matrix

or embedding clause. We return to this prediction in Section 4. Finally, consider the disjoint interpretation of 'he' and 'John' in (25):

(25)   He thinks John is smart.

Here 'he' is in a paradigmatically referential position, and since there is no other option, a deictic act is required. In line with this, co-reference becomes possible again with 'His mother thinks John is smart', since 'his' is in this latter case *not* in a referential position, requires no accompanying deictic act, and need not have been referentially evaluated by the time 'John' is processed. In (25), when 'John' is processed, 'he' has already been evaluated. So we expect 'John', which is in referential position, to be mapped to a different referent. But why can 'John', when it is referentially evaluated in the embedded clause in (25), not be resolved to whatever referent has already been assigned by the processor to 'he' (on the basis of the accompanying deixis)?[8]

   Given the fact that anaphoric reference of the second 'he' *is* possible in 'He thinks he is smart', the answer must relate to a difference in the descriptive richness of 'John' and 'he'. An economy principle is involved in how much descriptive information is provided in acts of reference. Where 'that man' suffices, we wouldn't use 'that man in the corner', or 'that man in the corner who drinks a Martini and talks to Sam and likes his mother'. In short, the description describes the referent as much as is needed for the act to succeed: a 'least effort' principle. If a proper name is used, rather than a pronoun, therefore, this is not meaningless: a proper name has a richer descriptive content than a pronoun. Minimally, it carries both the information that the referent is male and that he is called 'John'. The pronoun is lacking the latter part. Therefore, when it comes to determining the referent of the second referential DP in (25) in online processing, the increase in descriptive content from 'he' to 'John' leads to assuming a distinct and novel referent. Again, then, no special syntactic principles are required to rule out the interpretation of (25) based on co-reference of 'he' and 'John', any more than it is required to rule in the referential dependence of 'he' on 'John' in (24), or 'him' and 'John' in (23), when a deictic act is absent.

   Throughout this section, we have explained facts that could intuitively be described as ones of 'binding' (or the lack of it), on the basis of a single assumption, in addition to the economy principle just mentioned. The assumption is that grammar generates referential expressions from given lexical contents. No lexical item is referential, without becoming part of a DP, which, if DPs are phases in the sense of Chomsky (2007), can be thought of as the 'first phase', given that all 'second phases', i.e. *v*Ps, contain DPs

as proper parts. CP then is the 'third phase', necessarily including both others, much as the number 3 includes both the numbers 2 and 1 as an aspect of its recursive architecture (Arsenijevic & Hinzen, 2012). As three phases are completed, a fully referential expression, corresponding to a truth value, is completed. In some cases, the relative weakness of the lexical descriptive contents involved requires an accompanying deictic act to complete the first phase. In the absence of such an act, the reference can only be resolved in relation to a referent that is already part of the context, correspond to a DP that has already been evaluated – either in the same clause, as part of another first phase, or in another.

Note that in the logic of this account, none of the expressions we have looked at do in fact have two 'readings', one involving disjoint reference and one involving referential dependence: there is ambiguity, for example in (24), *only if* we abstract from possible *uses* of (24), i.e. if we do not actually regard it as an *expression* – a lexical item together with a use. The fact remains that 'he' in (24), when used with the disjoint reading, *must* be accompanied by a deictic gesture of some sort. Therefore, (24) is the 'same expression', with different 'readings', only if we do not consider certain features such as demonstrations as *part* of the expression. These, however, are intrinsic to, or necessary for, some of the readings in question. We can of course always choose to *abstract* from any such feature, and then (24) will be 'ambiguous'. Yet, the fact remains that in language use (abstracting from writing), (24) is never ambiguous. If there is a deictic act to some contextually given individual that accompanies 'he', there is one reading. If there isn't, there is another reading.

The economy principle we have invoked compares referential DPs across such acts in terms of their comparative descriptive richness. It, too, implicitly appeals to expressions viewed as *public* acts, rather than as abstract phrase structural geometries. This makes sense insofar as the use of words to refer to the world is a real-world phenomenon that takes place at particular moments in time and space, against a given background of information, and is carried out by rational agents that expand least effort in what they do. Reference does not happen in the privacy of our own minds, or in a kind of Cartesian space or theatre. To know what 'John' refers to, we need to know who uses it, when, and where: you and I know different people called 'John', and even I know several, and hence the one I refer to may differ at different moments in time and space. Often gestural information is required. A full account of grammaticality needs to appeal to full acts of language use, as taking place linearly in space, time, and discourse, with accompanying gestures. Richly structured subcomponents in grammar, such as Binding

Theory in GB, may seem to become necessary only if we abstract from the richness of the information that is contained in such acts.

4. Approximating 'identity'

None of the examples we have considered so far suggest that, among the grammatical relations, we should include binding. What about identity? Consider (26):[9]

(26)   John was Bill.

(26) can be used at a costume party where several people have been introduced to the speaker under various names, including the name 'Bill'. The speaker is wondering who his friend John was, and he conjectures (26). Given the above, this reading is entirely expected and the explanation is this: 'John' is used in a grammatically referential position (that of grammatical subject). His identity is presupposed; that of 'Bill' is revealed. Unless we assume a radically different sentence-structure for (26) than for other, non-copular, sentences (which we should only do if forced to do so by data), 'was Bill' is the sentential predicate, which as such picks out a certain property, applying to the referent of the subject. 'Bill' then is part of the description that picks out this property. Since there is no other part of it with any descriptive content, whatever descriptive content 'Bill' has must therefore *suffice* to pick out (or identify) this property. The descriptive information available is that the referent of 'Bill' is called 'Bill'. Hence the reading of (26) is exactly the one we get: the person referred to, i.e. John, was (among the persons present) the one called 'Bill'. No problems, therefore, arise for (26). What now about the famous (27)?

(27)   Hesperus is Phosphorus.

Much of the history of the philosophy of language can be written as consisting in responses to the question of how (27) can be both true and informative, i.e. different in meaning from (28):

(28)   Hesperus is Hesperus.

But the problem only arises on the following assumption: reference is a lexical property of the DPs involved. That is, it is assumed that, as a *matter of lexical fact* (i.e. disregarding the *grammar* of its occurrence), 'Hesperus' (viewed logically as functioning like a constant) picks out a certain planet, and so does 'Phosphorus'. Given this assumption, it now follows that the

meaning of (27) and (28) are predicted to be the same. But this does not cohere with intuitions. If we can block the assumption, the problem may not arise. But it is now clear that we *must* and *can* block it, in fact for independent and principled reasons: referentiality is *never* a lexical property. It depends on the grammar of a given lexical item's occurrence. In (27), 'Hesperus' is in a grammatically referential position. The sentential predicate is 'is Phosphorus', analogously to (26). This predicate needs to pick out a property to apply to the subject. For this, it needs to exploit any descriptive information available. The only one available is: 'being called Phosphorus'. The only one available in (28) is: 'being called Hesperus'. But these two descriptions are of course different ones, and hence *different properties* are predicated of the subjects of (27) and (28), respectively. No problem, therefore – no 'puzzle of identity' – arises.

How *did* the problem arise, historically? By *misinterpreting* referentiality and predicativity as properties that attach to words *lexically*, when these are aspects of interpretation that are regulated only *grammatically*. But there is no other known system except grammar that regulates them. Hence grammar matters to meaning – but other aspects of meaning are regulated grammatically than are regulated lexically. If meaning is not only determined lexically but also grammatically, the grammatical meaning needs to be taken into account when addressing apparent puzzles like Frege's. Part of the grammatical meaning in the cases of (27) and (28) is that different grammatical predicates are involved. Hence different things are predicated of the subjects concerned. Therefore, no one would *expect* that (27) should mean (28), which indeed it doesn't.

This reasoning can be objected to by suggesting that 'is' here is a sign of identity (equivalent to '=' in logic). In this case, there is no sentential predicate 'is Phosphorus' in (27), and our reasoning does not go through. Natural language has no equality sign, however, as already the fact suggests that 'is' in (26) can be tensed, like any normal verb. That 'is' is the equality sign is thus barely an empirical hypothesis.[10] As an empirical hypothesis, it needs to be justified, by those who make this assumption, that 'is' means something else in (27) than it does in (26) or (29), below:

(29)   John is smart.

But the empirical grammatical difference between (27) and (29) is a difference in the parts of speech involved (adjective vs. nominal). But we know independently that nominals *can* be predicates, as e.g. in (30) or (31):

(30)   John is a man

(31)   John is the porter

Independent tests confirm that 'the mayor' is indeed the predicate in these constructions. Thus, in Catalan, where the nominal is cliticized, the predicative/neuter clitic is chosen, not the personal one, exactly as it would be where the sentential predicate is garden-variety adjectival predicate (data from Martín & Hinzen, 2013):

(32)

a.
En	Pere	és	**el**	**porter**		**CAT**
The	Peter	is	the	porter		

'Peter is the porter'

b.
En	Pere	**ho**	/	*el	És
The	Peter	NEUT		ACC.3M	is

'John is (the porter)'

Moreover, a novel lexical hypothesis concerning the meaning of 'is' cannot be the key to our problem, when the very same construction, with the same predicative relations, can occur in the absence of 'is', as in (34) or (35):

(34)   I consider [John Bill]

(35)   I consider [John [the mayor]]

Here, in the embedded small clause there surely cannot be an equality sign. Discussions of socalled 'identity sentences', therefore, cause no further problems. They do so only on a lexicalist (mis-) understanding of reference and predication.

Grammar, however, allows, to an extent, for a kind of identity – just not in the form of sentences like those considered so far. The proper place to look for identity in grammar is in bi-phasal constructions with reduced embedded clauses lacking finiteness, and obligatory control of a lexical PRO nominal in particular. Thus in (36), John is hoping that he himself will win, whereas, in (37), disjoint reference remains an option, as noted:

(36)   John hopes PRO to win

(37)   John hopes that he will win

In raising constructions like (38), or in constructions with even more reduced complements, as in (39), non-identity of matrix and embedded subjects is equally not an option:

(38)   John seems *t* to win.

(39)   John likes PRO winning.

Three questions arise: (i) why is non-identity not an option in obligatory control and raising, where the controlled or moved DP has no lexical con-

tent, (ii) why does it become an option when the embedded DP is lexically reduced (37), and (iii) why does it disappear again if it gets lexically richer, as in epithets (40) or in (41), below (where either two different persons called John are being referenced, or the same person, but the second use of 'John' will then be intonationally different or stressed)?

(40)   John hopes the bastard will win (no co-reference available)

(41)   John hopes John will win

But all of the answers are clear by now: reduced embedded clauses lacking finiteness like (36), (38) and (39) are not projected enough to become referentially independent phases, in the above terms, licensing their own referentially independent subject marked through Case and based on independent lexical material.[11] Moreover, the richer a referential DP is in terms of the lexical descriptive content specified in it, the more referential independence or autonomy it is expected to have. Therefore, disjoint reference is expected to become more available, as a DP acquires *some* lexical independence (PRO) (36), as opposed to being no independent lexical item at all (i.e, trace), or becoming a full definite description, as in the epithets (on the prediction that controlled PRO will allow for slightly more referential independence than trace, see shortly).

Viewed in this fashion, identity (apart from being forced lexically through the formative 'self'), insofar as it is a relation made available grammatically, is the 'limit' to which grammar can push the notion of referential dependence. The latter becomes possible grammatically (given constraints of economy above) when the descriptive content of lexical items is reduced to phi-features, as in pronouns. If even phi-features are overtly absent, as in PRO and trace, reference of two (pro-) nominals can collapse into one single referent and there is no disjointness. The above qualification 'insofar as', however, is critical. Never does identity become quite the logical '=' – a notion, again, that does not seem to figure in natural language. Thus, 'John' in (36) is, in fact, first a hoper and then a winner. While being the same *person*, that is, he is crucially not the same *agent*, insofar as agents are individuated in relation to the events in which they play their respective thematic roles (i.e., as eventparticipants). In line with this, we can obtain so-called proxy-readings in this instance, as in (42) (cf. Haddad, 2012):

(42)   Ringo wants PRO to stand there.

Said in a wax museum, PRO can refer to Ringo's statue. Moreover, note that the embedded clause in (36), despite being non-finite, can also exhibit temporal independence, as shown by the fact that John can hope (today)

to win (tomorrow). So different stages of John can be involved, too, and be referenced, in obligatory control. Such temporal independence is unavailable in the raising case (38), suggesting that it is indeed different, involving identity in a stricter sense, in line with the fact that its embedded clause lacks its own subject and is referentially more dependent: given its matrix predicate, which does not exhibit the lexical richness of 'hopes', it is no properly bi-clausal structure, with distinct subjects in the two clauses. Moreover, no two different thematic roles are involved in this case. The traditional view of PRO as a distinct lexical item different from trace, accords with these observations.[12]

5. 'Self'

The special formative 'self', too, which forces referentially dependent readings, doesn't yield identity in a logical sense. Thus, we obtain the contrast in (43)–(44):

(43)   ?*I hate me

(44)   I hate myself

Why this contrast? One explanation would be that for (44) to be coherent (and for mental health to prevail), the referents of 'I' and of 'myself' must, in some sense, also be *distinct.* They are, in (44), in terms of phi-features. My 'self' is grammatically a 3rd person referent, not a 1st person one. This also predicts why mymuttering *I hate you* to myself is fully grammatical, unlike (43). In short, the perspective with which I refer to myself in the subject position and in the object position, respectively, are not the same in (44), and reference is different in this sense. Related reasons allow for (45) not to be a case of 'strict' co-reference, analogously to (42):

(45)   Ringo saw himself [said in Madame Tussaud's]

So while 'self' encodes a referential dependency lexically rather than grammatically, the referent is the same in one sense but not another. In the same way, (46) presupposes that I can also not be (or indeed was not) myself:

(46)   I am myself (again, now).

This is what we expect if the 'self' morpheme is, as it were, a 'lexical trick' for solving a problem that the grammar does not really allow us to solve: strict identity between two DPs in referential positions, when both are lexically

overt. If identity does not exist as a relation, grammatically, we cannot force it, lexically.

As Wittgenstein pointed out in the *Tractatus* (1922), identity is an incoherent notion: if there are two objects, it is false to say they are identical; if there is only one, it is senseless. This would rationalize how grammar appears to deal with the notion: there is referential dependence, but where it is maximally strict, the lexical content of the dependent DP is also knocked out. In this way grammar prevents us from the incoherence that Wittgenstein pointed out.

6. Conclusions

The above suggests that what has been called the 'grammar of reference' (Longobardi, 2005; Sheehan & Hinzen, 2011; Hinzen & Sheehan, 2013; Martín & Hinzen, 2013) can be extended to what we may call the *grammar of referential dependence*. Such dependence requires no special syntactic principles, over and above a general theory of referentiality as essentially grammatical. Lexical content as such, while presumably largely linked to the world perceptually (as particularly a large neurolinguistic evidence base now suggests, see e.g. Kemmerer, 2014: ch.9), neither governs nor predicts the forms of referentiality that we seem to find in all human languages, or wherever we find grammar. No non-human, and no human but non-grammatical system appears to exhibit the same forms. It makes sense, therefore, to credit grammar with organizing the forms of referential meaning (and ipso facto of predication) that exist in this species (assuming that all non-human reference is restricted to functional reference: see e.g. Hauser, 1995; Fitch, 2010). This system of grammatical reference, accompanied by non-linguistic (gestural) forms of deixis as required in certain instances, allows for forms of referential dependence, but no new principles are called for to explain the latter. All sapiens-specific forms of intentional reference based on the use of words require or are anchored in a lexical concept with a descriptive content. We expect from this that where a DP in a referential position is lexically reduced or null, and hence the lexical content that anchors such acts is not rich enough to allow referential autonomy, referential dependence and even a form of identity can arise under certain conditions (as long as the lexically reduced DP is not 'reinforced' by a non-linguistic pointing gesture). Such dependence approximates logical identity in cases of Control and raising, where the referentially dependent DP is lexically null, and it can also be lexically forced through

a special reflexive formative. Yet it is never the identity of logic. In the absence of the assumptions that grammar is a deficient system for expressing logic, and that the lexicon includes the equality sign, the puzzle of identity disappears.

There are further consequences, of a more theoretical and architectural nature. The most important of these relates to the fact that the current 'Minimalist' architecture of the language faculty still assumes a so-called semantic 'interface': a point in the derivation where a 'merely syntactic' representation has been generated, which is then 'read' or 'interpreted' by 'semantic' systems on the 'other' (non-linguistic) side of this interface ('C-I systems'). If the forms of reference are organized grammatically, there is nothing in this regard for these putative and language-external systems to accomplish. They do not constrain the grammatical system. Instead, the grammar itself organizes the forms of reference in question. A conception of the architecture of grammar, on which there is no interface (Hinzen, 2006; see also Chomsky, 2007), then makes more sense. The same follows from the above observation that the forms of reference in question are completely absent in non-grammatical beings, a contention on which there is surprisingly little disagreement in the comparative literature. In fact, even prelinguistic declarative pointing gestures, found universally in infants around the first birthday (Tomasello, 2008), are unique to our species, and develop only when language develops normally as well – hence not, for example, in autistic children, where such gestures are often absent or impaired. At this point in development, the full system of grammaticalized deixis will take another 18 months to develop fully and with no errors, showing that the relevant forms of reference only arise as grammar does as well.

N O T E S

[1] For another striking example (G. Longobardi, p.c.), note that in the following two examples, the relevant noun phrases are lexically but not grammatically identical, and only the first has the grammar that triggers a rigid reading:

(i) **Napoleon the first** was born in Ajaccio.
(ii) **The first Napoleon** (counted in the Bonaparte dynasty) was born in Ajaccio.

Plainly, these facts cannot be explained by substituting different lexical semantic values for the same lexical item 'Napoleon' when it refers to a property (ii) or a man (i). No referential intentions, for example, co-vary with the above distinction, and semantically exactly the same person is denoted.

[2] For expositions, extensions, typological evidence, and foundational discussion of Longobardi's (1994) theory see Longobardi (2001, 2005, 2008), Hinzen (2007:ch.5), Sheehan & Hinzen (2011), nnd Hinzen (2015). See also Section 3 below.

³ This could be concluded independently from a long tradition in linguistics showing that so-called indexicals do not form a uniform class lexically, and in fact the whole range of referential options that exist in language, from predicative to quantificational to referential to rigid to deitic to personal. See e.g. Cardinaletti and Starke (1999), Déchaine and Wiltschko (2002), Martín (2012), and Martín & Hinzen (2013).

⁴ For reference in the nominal domain, including typological evidence, see classical work by Longobardi (1994, 2001, 2005, 2008). For a recent extension to the verbal/clausal case, see Sheehan & Hinzen (2011).

⁵ This anti-lexicalist stance appears analogous to Reuland's (2011a:384) conclusion that 'being an anaphor or being a pronominal are not primitive properties, but derived ones. (...) one and the same element may behave differently in different syntactic environments (...)'. For Reuland, this will depend on the micro-syntactic feature specifications of the element in question. His account, however, unlike the present one, preserves binding as a relation, as distinct from co-reference, although it is said to take place 'at the interface', rather than in narrow syntax. Given Reuland's focus on logical syntax, which formalizes the relevant binding relation, neither the gestural component in pronominal reference nor the grammar of reference, in the present sense, are systematically considered. Logical syntax is also not assumed in the present framework. Considerations of comparative cognition suggests the non-existence of any such system in non-linguistic cognition (Conceptual-Intentional systems), as distinct from grammar. Logical syntax cannot explain aspects of grammar if the former depends on the latter, even if it can formalize the explananda. It is not employed here in an explanatory role, along with the logical notion of a 'variable'. Neither turns out to be required, at least for the empirical facts covered here.

⁶ Note that the predicativity in the sense of this passage is an indication of grammatical role, and is carried by any word only relationally. Viewed non-relationally or as a phrasal constituent, the DP 'John' is of course paradigmatically an expression that can be used referentially. Picking out an object, when viewed on its own, is not a notion that is in contradiction with playing a predicative role, when occurring grammatically subordinated within another referential DP.

⁷ Why, by contrast to (24), is 'John's friends like himself' out? Because the reflexive forces coreference lexically with the only other local referential expression available, namely 'John's friends', which does not agree in phi-features.

⁸ While the grammar rules in favour of disjoint reference in this instance, the semantics of course does not: co-reference can be accidental, as when the speaker refers to a person as 'he' who in fact happens to be John.

⁹ The following analysis extends to 'This is Bill' as well, called 'identificational sentences' in Moltmann (2013), who denies that this are instances of predication. Moltmann applies a battery of tests to show that the pronominal subjects of such sentences are not 'referential'. However, none of these tests show this. Thus it is a general constraint on 'this' that it is applied to an inanimate object, or at least an object conceptualized in this fashion. Thus 'This is tanned' could not be said to a person coming from the beach. This constraint alone seems to explain why '*Mary and that are a beautiful couple' is out, since 'Mary' is animate, and it rightly predicts that 'This stone and that are granite' is in. The same factor would explain why '*That, whom I first did not recognize, was John' is out, as Moltmann rightly claims, and correctly predict that 'That, what/which I now can see, is John' is in. The same applies to the contrast between '*Everyone except that came to the party' and 'Everything except that wasn't granite'. With regards to 'This is Mary, isn't it?', Moltmann claims that such examples show that no 'particular referent for 'this'' is presupposed. Yet one could equally say: it is not presupposed that a particular property does indeed apply to what 'this' refers to – and hence the tag. Moltmann also claims a difference in modality (deontic vs. epistemic) between 'Peter must be a student' and 'This must be a student'. While these data are not clear, the intuition

in question may well be triggered by the stronger epistemic involvement of the speaker when an element of deixis is involved. Moltmann also claims that the 'be' in 'This is Bill' is not 'the be of predication', giving as evidence that (i) the same kind of pronouns can never appear without be (cf. 'I saw that' (looking at a man), which is out with 'that' referring to a person), and (ii) they can be the subjects of small clauses. But (i) follows from the same animacy constraint above, and (ii) is incorrect when the animacy constraint is factored out: cf. 'I consider this granite', or even 'I consider this Bill', said by a person identifying barely recognizable corpses in the morgue. Moreover, the same small clause test would undermine the claim that 'Bill' is referential, as Moltmann wants to claim, since *I consider Bill this is also out. Moltmann also rightly claims that That is beautiful (looking at a woman) is out, but again this is due to the animacy constraint, as the contrast with That is beautiful (looking at a sunset) shows. There are differences between 'That is Bill' and 'That is red', but they follow from the difference in the parts of speech involved.

[10] For discussion of the myth of the so-called '"is" of identity', from a linguistic point of view, see Moro (1997), appendix.

[11] We can ignore here the issue of 'Null Case'.

[12] It is less easy to reconcile the observations of this section with Boeckx & Hornstein's (2007) contention that argument movement is a means to syntactically encode identity (cf. Hornstein, 2001). Obligatory controlled PRO does not guarantee strict forms of identity, as noted in the text. Take intoxicated John, watching in chair a war hero on TV, which is unbeknownst to John, himself. An amused bystander could now comment, perhaps in a somewhat ironic tone: 'John expects PRO to get a medal'. This can have a pure *de re* reading, and does not require the kind of identity involved in the *de se*.

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