

# On the Typology of Donkeys: Two Types of Anaphora Resolution

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## Abstract

This paper argues that there are two types of donkey pronouns cross-linguistically: donkey pronouns that require an overt NP antecedent and donkey pronouns that do not require such an antecedent. We argue (in section 2) that English donkey pronouns do not categorically require an overt NP antecedent; in contrast, they are subject to licensing conditions very much like referential pronouns. On the other hand, languages with richer pronominal systems, such as German and Kutchi Gujarati, have both donkey pronouns that require an overt NP antecedent and donkey pronouns without such a requirement (section 3). We propose that the difference is structural: donkey pronouns that require an overt NP antecedent contain an empty NP site that needs to be licensed, whereas pronouns without this requirement do not contain such a site (section 4).

## 1 Overview

*Anaphora* is a phenomenon where the meaning of one expression (e.g. an anaphoric pronoun) depends on the preceding context and cannot be construed context-independently<sup>1</sup>. Typically (but as we will see not necessarily) anaphoric pronouns have an explicit linguistic antecedent, which together with the context determines their meaning. It is generally assumed that anaphoric pronouns can be categorized into (syntactically) bound pronouns, as in (1a), referential pronouns (or *anaphoric referring expressions*), as in (1b), and certain other types that classify as neither, such as so-called “donkey pronouns” (Geach 1962), as in (1c). (We mark anaphors and their antecedents in bold type where applicable.)

- (1) a. **No male lawyer** believes that **he** is stupid.
- b. **John** came to the party. **He** believes that the host is an idiot.
- c. Every linguist who owns **a donkey** thinks that **it** is intelligent.

*Donkey pronouns* (cf. Geach 1962, Evans 1977, Heim 1982) are pronouns (like *it* in (1c)) that co-vary with a quantifier (*a donkey* in (1c)) without being syntactically bound.

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<sup>1</sup> See King (2009) for the most recent entry on *anaphora* in the Stanford Encyclopedia of Philosophy.

Therefore, if the quantifier *every linguist* in (1c) quantifies over the set of *Bill, John* and *Mary*, the sentence means that Bill thinks that his own (Bill's) donkey is intelligent, John thinks that his own (John's) donkey is intelligent and Mary thinks that her own (Mary's) donkey is intelligent.

This paper is concerned with the analysis of such donkey pronouns and with the restrictions that an explanatory analysis should account for. Specifically, it investigates the empirical claim that referential pronouns (as in (1b)) and donkey pronouns (as in (1c)) require an overt NP antecedent, which cannot be sub-part of a word<sup>2</sup>, i.e. that such pronouns have to be syntactically licensed by their antecedent. This claim is discussed in the literature on *anaphoric islands* (focusing on referential pronouns, see Postal 1969, Ward, Sproat & McKoon 1991, Ward 1997), and in the literature on the *formal link* (focusing on donkey pronouns, see Evans 1977, Kadmon 1987, Heim 1990, Chierchia 1992 and Elbourne 2001). The two research traditions are not fully integrated. Our paper aims at unifying these research traditions by arguing that English donkey pronouns are not subject to a *strict formal link condition* (which posits that donkey pronouns without overt NP antecedent are categorically ill-formed), but rather to the type of licensing conditions that we see with referential anaphoric pronouns.

The paper is structured as follows. Section 2 shows that English donkey pronouns do not uniformly require an overt NP antecedent (2.1), and argues that they are subject to the same conditions as referential anaphoric pronouns (2.2). Having thus argued, section 3 shows that cross-linguistically we do, however, find donkey pronouns that are subject to a strict formal link condition. Specifically, we find them in languages that have at least two different pronominal paradigms, such as demonstrative versus personal pronouns in German, and overt versus null pronouns in Kutchi Gujarati. In either language, one set of pronouns (German demonstrative pronouns and Kutchi Gujarati overt pronouns) respects a strict formal link condition, whereas the other (German personal pronouns and Kutchi Gujarati null pronouns) doesn't. We propose an analysis for such languages in section 4 and conclude in section 5.

## 2 Against syntactic licensing of all donkey pronouns

### 2.1 Donkey Pronouns Do Not Uniformly Require Antecedents

Postal (1969) observed (focusing on referential anaphoric pronouns) that an anaphoric pronoun must have an overt NP antecedent, and this antecedent cannot be a (morphological) sub-part of a word (see also Ward, Sproat & McKoon 1991, Ward 1997). He coined the term *anaphoric island*<sup>3</sup> for words that contain potential antecedents (e.g. *McCarthyites* in (2b)) or merely imply them (e.g. *orphan* in (3b), which loosely means *somebody who has lost his/her parents*, and thus implies *parents* as a potential referent).

2 For simplicity, we generally write *donkey pronouns without overt NP antecedent* to mean 'donkey pronouns that either do not have an overt antecedent or have an overt antecedent that is a sub-part of a word'. This abbreviation glosses over the possibility that sub-parts of words are NPs.

3 Anaphoric islandhood was later linked to the idea of lexical integrity (cf. Levi 1978, Pesetsky 1979, Kiparsky 1982, Simpson 1983, Mohanan 1986).

- (2) a. Followers of **McCarthy** are now puzzled by **his** intentions.  
 b. # **McCarthyites** are now puzzled by **his** intentions.  
 (Postal 1969:213)
- (3) a. Max's **parents** are dead and he deeply misses **them**.  
 b. # Max is an orphan and he deeply misses **them**.  
 (orphan = 'a child whose **parents** have died')  
 (Postal 1969:206)

In the literature on donkey pronouns, a similar constraint was postulated, usually referred to as the *formal link* constraint. Almost identical to the definition of the anaphoric island constraint, it states that a donkey pronoun must have an overt NP antecedent, and this antecedent cannot be a sub-part of a word (see Evans 1977, Kadmon 1987, Heim 1990, Chierchia 1992 and Elbourne 2001, among others). In (4b), *donkey* is not a suitable antecedent, as it is a sub-part of *donkey-owner*, whereas in (5b), *wife* is not suitable, as it is merely implied.

- (4) a. [Every man [who owns a **donkey**]] loves **it**.  
 b. # [Every **donkey-owner**] loves **it**.
- (5) a. [Every man [who had a **wife**]] hugged **her**.  
 b. # [Every married man] hugged **her**.  
 (married = 'to have a **wife**')

Starting the discussion of these constraints with the more general literature on anaphoric islandhood (which aims to cover all anaphoric pronouns), Anderson (1971) was the first to observe that anaphoric islandhood is gradient and not categorical, casting doubt on its status as a grammatical constraint<sup>4</sup>. One of the first counter-examples to anaphoric islandhood is quoted in (6), where the antecedent for *it* (i.e. *vomit*) is only implied by the verb *throw up*.

- (6) When Little Johnny threw up, was there any pencil-eraser in **it**?  
 (throw up = 'to emit **vomit**')  
 (Anderson 1971:46)

Further counter-examples to a strict anaphoric island constraint were presented by Ward, Sproat & McKoon (1991:451-452), two of which are quoted in (7) together with the original source. Crucially, *Kal Kan* in (7a) and *Schachter* in (7b) are taken to be sub-parts of the compounds *Kal Kan cat* and *Schachter paper*, respectively.

- (7) a. Patty is a definite **Kal Kan** cat. Every day she waits for **it**.  
 (Television advertisement for Kal Kan; January 28, 1987)  
 b. I refer you to the **Schachter** paper; **he**'s very proud of it ...  
 (Mark Baker in response to a question at NELS; November 12, 1988)

While there is little integration between the literature on the anaphoric island constraint and the literature on donkey pronouns, Ward (1997), in a paper on anaphoric islands, gives three examples of donkey pronouns where the intended antecedent is a sub-part of a word, which he claims to be fully grammatical and acceptable.

4 Others confirmed this gradiency (e.g. Lakoff & Ross 1972, Corum 1973, Browne 1974, Watt 1975).

- (8) a. [Every **academy award** winner] treasures **it** for the rest of his life.  
 b. [Every **pet** owner in our building] takes extremely good care of **it**.  
 c. [Every sadistic **donkey** owner I know] beats **it** for no apparent reason.  
 (Ward 1997:203)

Other counter-examples to a strict and grammatically encoded formal link are given in Jacobson (2001) and Riley (2007).

- (9) a. [Every **Siberian husky** owner] needs to give **it** lots of exercise.  
 (Jacobson 2001)  
 b. If a man owns a horse, he races it; if he owns a mule, he harnesses it up; but [every **donkey** owner] beats **it**.  
 (Riley 2007)

A quick online search reveals further, naturally occurring counter-examples to the formal link condition, which are judged well-formed by native speakers, illustrated in (10)<sup>5</sup>.

- (10) a. Of course [every **iphone** owner] uses it for browsing.  
 (<http://www.afterdawn.com/news/archive/14810.cfm>)  
 b. Studies show that [an average **30' sports fishing boat** owner] uses **it** 10-20 days a year.  
 (<http://www.gladiatorcharters.com/fractional.htm>)  
 c. As a small business owner, I can tell you for a fact that [not every **small business** owner] aspires to sell **it** out to a big company.  
 (<http://www.stltoday.com/blogzone/political-fix/political-fix/2007/12/initiative-against-trash-hauling-districts-to-start-jan-7/>)  
 d. [Each **website** owner] will only see **its** own members.  
 (<http://www.datingsitebuilder.com/how-to-start-your-own-dating-site.asp>)  
 e. At \$525, [no **gold** owner] will use it to buy oil.  
 ([http://www.gold-eagle.com/editorials\\_05/weber010506.html](http://www.gold-eagle.com/editorials_05/weber010506.html))

These counter-examples indicate that there are cases of donkey pronouns without overt NP antecedent that are well-formed, contradicting an understanding of the formal link condition under which donkey pronouns without overt NP antecedent are completely ungrammatical (in the sense in which strong island violations cause ungrammaticality). In recent experiments, Patel et al. (2009) also show that donkey pronouns without an overt NP antecedent are not rated uniformly on a 7-point naturalness scale, but exhibit systematic variation: some cases (such as (11a)) receive higher ratings than others (such as (11b)). The relevant factor that is responsible for the difference between (11a) and (11b) seems to be that *fatherless* is likely to make *father* salient as a potential antecedent for *him*, whereas *friendless* fails to make *friend* salient in the same sense. Patel et al. (2009) conjecture that this might be due to the world knowledge that everyone tends to have one father but typically tends to have more than one friend.

- (11)a. (?) [Every man who was **fatherless**] had lost **him** in the war.  
 b. ?? [Every man who was **friendless**] had lost **him** in the war.  
 (Patel et al. 2009)

5 These websites were last accessed for the purpose of this paper on March 25, 2010.

The conclusion that we can draw from the empirical observations in (8)-(11) is that constructions that violate the formal link conditions are not uniformly bad, but vary in their acceptability. This is exactly what has been observed for anaphoric island violations since Anderson (1971), thus motivating a uniform treatment of donkey pronouns and other types of anaphoric pronouns with respect to the necessity of an overt NP antecedent. Section 2.2 investigates factors that determine the well-formedness of anaphoric expressions without overt antecedents, showing more parallels between donkey pronouns and referential anaphoric pronouns.

## 2.2 Certain Donkey Pronouns are Contextually Resolved

In section 2.1, we have seen that donkey pronouns, on a par with referential anaphoric pronouns, are sometimes licensed without an overt NP antecedent. In this section, we argue that English donkey pronouns are not subject to a strict formal link condition. In contrast, they are subject to constraints on accessibility/saliency of a contextually construed antecedent, as previously posited by Ward, Sproat & McKoon (1991). These constraints are currently poorly understood, but Ward, Sproat & McKoon (1991) argue that the acceptability of referential anaphoric pronouns is affected by at least the following three factors that determine the accessibility/saliency of a possible antecedent in the discourse context: (i) semantic transparency of a word that contains the antecedent, (ii) information-structural status of the intended antecedent, and (iii) syntactic position of a word that contains or implies the antecedent. We will discuss and illustrate these constraints in turn and argue that the same factors are at play in constructions that contain donkey pronouns without overt NP antecedents.

First consider *semantic transparency*; this notion refers to the decomposability of complex words, i.e. the degree of semantic transparency of a complex word corresponds to the degree to which it is semantically decomposed into its parts. To exemplify this idea, the noun *cow-owner* can be decomposed into ‘someone who owns cows’, whereas *cowboy* does not have an analogous decomposition. In this sense, *cow-owner* is more semantically transparent than *cowboy* and *cowboy* is more semantically opaque than *cow-owner*. In recent research, Hay (2001) shows that dictionary definitions of complex words can be used as a simple measure of semantic transparency; she argues that a derived word is more semantically transparent if its base is mentioned in dictionary definitions. She also argues that more semantically transparent words have a lower number of definitions listed in dictionaries. For our present purposes it suffices to point out that *cowboy* has two definitions in Webster's Revised Unabridged Dictionary (1913), none of which contains the word *cow*.

(12) **cowboy**

1. A cattle herder, a drover; specifically, one of an adventurous class of herders and drovers on the plains of the Western and Southwestern United States.
2. One of the marauders who, in the Revolutionary War infested the neutral ground between the American and British lines, and committed depredations on the Americans.

In this sense, Ward, Sproat & McKoon (1991) argue that their example in (13a) is well-formed, because *cocaine use* is semantically decomposed (both the predicate *use* and the argument *cocaine* are lexically accessed), making *cocaine* contextually salient and thus

accessible as a possible antecedent for *it*. In contrast, (13b) is ill-formed, as *cowboy* is semantically opaque and not decomposed into *cow* and *boy*; therefore, *cow(s)* is not accessible as an antecedent for *they*.

- (13) a. Although casual **cocaine** use is down, the number of people using **it** routinely has increased.  
(WCBS 11 O'clock News; December 20, 1990)
- b. Fritz is a **cowboy**. #He says **they** can be difficult to look after.  
(Ward, Sproat & McKoon 1991)

This contrast can be reproduced for donkey pronouns, as shown in the judgments for (14a) and (15a) versus (14b) and (15b). While native speakers might judge (14a) and (15a) to be slightly odd, (14b) and (15b) are significantly worse.

- (14) a. (?) [Many men who were **cow**-owners] sold **them** during the financial crisis.  
b. ??? [Many men who were **cowboys**] sold **them** during the financial crisis.
- (15) a. (?) [Everybody who's a **cow**-owner] knows **they** can be difficult to look after.  
b. ??? [Everybody who's a **cowboy**] knows **they** can be difficult to look after.

On a more subtle level, it is commonly assumed that compounds (e.g. N-*owner* compounds) are more semantically transparent than words formed by means of derivational affixes such as *-less*<sup>6,7</sup>. This is illustrated by the (weaker) contrast in (16a) and (16b).

- (16) a. (?) [Every researcher that was a **computer**-owner] had to shut **it** down during the thunderstorm.  
b. ?? [Many graduate students that arrived **computerless**] had forgotten **it** at home in a hurry.

The fact that semantic transparency of the antecedent-containing word correlates with acceptability of the donkey sentence can be taken as a first argument for the following conclusion: If donkey pronouns without overt NP antecedents are felicitous, they are contextually resolved, in the same sense in which referential pronouns are contextually resolved.

A second factor that Ward, Sproat & McKoon (1991) explore is the discourse functional status of intended antecedents for an anaphoric pronoun. They argue that discourse entities are more accessible (and thus make better antecedents) when they are in contrastive opposition to other discourse entities. They assume that (17a) and (17b) can be successfully resolved, because *syntax* and *business* are contrastively stressed. (Examples in (17) are quoted from Ward, Sproat & McKoon 1991.)

- (17) a. For a **SYNTAX** slot I'd rather see someone with more extensive coursework in **it**.  
(Judith Levi discussing various subdisciplines of linguistics; January 18, 1987)

6 Thanks to Alec Marantz for pointing this out to us.

7 To illustrate the relatively low semantic transparency of complex words derived by *-less*, consider semantically opaque words, such as *listless*. In Webster's Revised Unabridged Dictionary (1913) *listless* is defined as "having no desire or inclination; indifferent; heedless; spiritless" and thus does not seem to have any semantic relationship to *list*, as opposed to the compound *list-owner*.

- b. Cliff Barnes: Well, to what do I owe this pleasure?  
 Ms Cryder: Actually, this is a **BUSINESS** call, and I'd like to get right down to **it**.  
 ('Dallas', 1987)

They also report on an experimental study, which shows that the text in (18) has lower reading times if the topic of conversation has been on activities such as hunting, shooting and fishing, rather than if it has been on skiing or mountain climbing. They attribute this to the idea that the intended antecedent *deer* is more easily accessible if it is already implicitly present in the discourse (i.e. "topical" in Ward, Sproat & McKoon's terminology).

- (18) Lately he's taken up **deer** hunting. And he thinks that **they** are really exciting to track.  
 (Ward, Sproat & McKoon 1991:457)

Evidence that such information-structural properties of intended antecedents also matter for donkey sentences stems from Riley (2007), who contrasts the well-formed (19a) with the (classical) deviant example in (19b), which is strictly speaking a sub-part of (19a).

- (19) a. If a man owns a horse, he races it; if he owns a mule, he harnesses it up; but every **donkey** owner beats it!  
 (Riley 2007)  
 b. # Every **donkey** owner beats it.  
 (Heim 1982, Chierchia 1992)

The observation that information-structural status of an intended antecedent matters for the resolution of donkey pronouns can be taken as another argument that felicitous donkey pronouns without overt NP antecedents are contextually resolved.

Finally, Ward, Sproat & McKoon (1991) propose that the syntactic position of an antecedent-containing element might matter for the accessibility of the antecedent<sup>8</sup>. They argue for such a constraint based on unpublished work by McKoon et al. (1990) which indicates that prenominal (attributive) adjectives (*intolerable* in (20a) and *hostile* in (20b)) are less accessible in subsequent memory tests than postnominal (predicative) adjectives (*hostile* in (20a) and *intolerable* in (20b)).

- (20) a. His intolerable aunt is hostile.  
 b. His hostile aunt is intolerable.  
 (Ward, Sproat & McKoon 1991:455)

While Ward, Sproat & McKoon (1991) contrast phrases such as the VP *hunting deer* and the compound *deer hunting*, which introduces confounding factors that are not controlled for, our own experimental research (currently in progress) indicates that this constraint on accessibility/saliency affects the acceptability of donkey sentences as predicted: The relevant finding is that native speakers rate (21b) as significantly worse than (21a)<sup>9</sup>.

- (21) a. (?) [Every man who was **fatherless**] had lost **him** in the war.  
 b. ?? [Every **fatherless** man] had lost **him** in the war.

8 They attribute this observation to Wilson & Sperber (1979).

9 Thanks to Sabine Iatridou for being the first one to point out this contrast.

In analogy, even an implied antecedent seems to be more accessible if the NP that implies it is in a predicative position than if it is in a modifier position.

- (22) a. (?) [Many men who were **married**] needed years to find out what **her** favorite breakfast was.  
 b. ?? [Many **married** men] needed years to find out what **her** favorite breakfast was.

We conclude that the modifier/predicate distinction is indeed linked to the acceptability of donkey sentences without overt NP antecedent. We argue that such an asymmetry also follows from the fact that donkey pronouns without overt NP antecedent must be contextually resolved.

In sum, we have argued that the acceptability of donkey pronouns without overt NP antecedent is linked to a variety of factors that determine the saliency/accessibility of an intended antecedent, namely: semantic transparency of a word that contains the intended antecedent (examples (14)-(16)), information-structural status of an intended antecedent (example (19)) and syntactic position of a word that contains or implies the intended antecedent (examples (21)-(22)). We conclude that donkey pronouns that are felicitous without an overt NP antecedent retrieve their meaning from the context, in the same way in which a referential anaphoric pronoun (e.g. (23)) has its meaning contextually assigned.

- (23) **John** gave a bottle of red wine to Mary. **He** thought she didn't like white wine.

Note that our claim that donkey sentences without overt NP antecedent can be well-formed does not entail that such sentences must be well-formed. As we have demonstrated above, there are various reasons for which such sentences might still end up being ill-formed (mainly because no suitable antecedent can be made salient/accessible). Our proposal also does not entail that the presence or absence of an overt NP antecedent is completely irrelevant for the acceptability of sentences with donkey pronouns. Au contraire, there are good reasons to believe that an explicitly expressed overt NP is automatically much more accessible/salient than a possible antecedent that is either on the sub-word level or merely implied (see also Ward, Sproat & McKoon 1991). We therefore predict that sentences containing donkey pronouns are generally more acceptable if they do contain an overt NP antecedent than if they do not.

### 3 A case for syntactic licensing of some donkey pronouns

In section 2, we discussed English data, arguing that donkey pronouns without overt NP antecedents are not uniformly bad, but rather subject to constraints on accessibility/saliency of an intended antecedent. We thus argued for a uniform analysis of referential anaphoric pronouns (cf. (24a), repeated from (6)) and donkey pronouns (cf. (24b), repeated from (9a)), which are both subject to this type of constraint.

- (24) a. When Little Johnny threw up, was there any pencil-eraser in **it**?  
 (throw up = 'to emit **vomit**')  
 (Anderson 1971:46)  
 b. [Every **Siberian husky** owner] needs to give **it** lots of exercise.  
 (Jacobson 2001)



However, there is evidence that a strict formal link condition does exist in languages with richer pronominal systems. While English does not make an explicit distinction between different types of pronouns, such a distinction can be observed in other languages. Specifically, German distinguishes between demonstrative pronouns (or *d-type* pronouns, see Wiltschko 1998) and personal pronouns; and other languages, like Kutchi Gujarati, distinguish between overt pronouns and null pronouns. For these two languages, the two pronominal pairs can be shown to be equivalent, at least on the surface, based on the following three data points.

First, when unbound, German personal pronouns and Kutchi Gujarati null pronouns in subject position prefer to refer to topical elements, such as the subject of the preceding sentence (the hash mark in parentheses, ‘(#)’, indicates ‘dispreferred’ in the following examples, whereas the hash mark, ‘#’, indicates ‘unavailable reading’).

- (25) a. **Hans**<sub>3</sub>wollte mit Paul<sub>7</sub> joggen, aber **er**<sub>3/(#)7</sub> war krank.  
 H. wanted with P. jog but he was sick  
 ‘Hans wanted to go jogging with Paul, but he (= Hans) was sick.’  
 (adapted from Bosch et al. 2003)
- b. **John**<sub>3</sub>-ne Paul<sub>7</sub> saathedorva javu thu, pun **pro**<sub>3/(#)7</sub> thandithi aavi thi  
 J.-dat P. with run.inf go aux but 3.sg.nom cold came aux  
 ‘John wanted to go running with Paul, but he (= John) had a cold.’

On the other hand, German demonstrative pronouns and Kutchi Gujarati overt pronouns cannot refer to topical elements.

- (26) a. Hans<sub>3</sub> wollte mit **Paul**<sub>7</sub> joggen, aber **der**<sub>7/#3</sub> war krank.  
 H. wanted with P. jog but that.one was sick  
 ‘Hans wanted to go jogging with Paul, but he (= Paul) was sick.’  
 (adapted from Bosch et al. 2003)
- b. John<sub>3</sub>-ne **Paul**<sub>7</sub> saathedorva javu thu, pun **i**<sub>7/#3</sub> thandithi aavi thi  
 J.-dat P. with run.inf go aux but 3.sg.nom cold came aux  
 ‘John wanted to go running with Paul, but he (= Paul) had a cold.’

It also seems that German demonstrative pronouns and Kutchi Gujarati overt pronouns cannot be syntactically bound by a quantifier in subject position.

- (26) a. **Jeder Mann** behauptet, dass **er** / \***der** intelligent ist.  
 every man claims that he that.one intelligent is  
 ‘Every man claims that he is intelligent.’  
 (cf. Wiltschko 1998 for similar examples)
- b. **Batha manas** kidhu ke **pro** / \***i** hosiyar che.  
 every man says that 3.sg.nom 3.sg.nom intelligent is  
 ‘Every man said that he was intelligent.’

We can thus conclude that German demonstrative pronouns and Kutchi Gujarati overt pronouns form one category (which we will call “strong pronouns”), whereas German personal pronouns and Kutchi Gujarati null pronouns form another category (which we will call “weak pronouns”)<sup>10</sup>. We can treat the binary contrasts between demonstrative pronoun

<sup>10</sup> The idea that weak pronouns have a different structure and semantics from strong pronouns was also explored in Cardinaletti & Starke (1999) with a different empirical scope.

and personal pronoun and between overt (personal) pronoun and null pronoun as sub-parts of a scale, as shown in (28). Note that German does not have null pronouns and Kutchi Gujarati does not have demonstrative pronouns of the German type.

- (28) null pronoun < (overt) personal pronoun < demonstrative pronoun  
weakest strongest

In the remainder of this section, we show that there is a crucial asymmetry between the two types of pronouns with respect to their requirement for an overt NP antecedent. Specifically, the strong pronouns exhibit a strict formal link condition.

Consider first German, which has three paradigms of strong (demonstrative) pronouns (*der*, *dieser* and *jener*), one of which (the *der* paradigm) corresponds to the definite determiner *der* ‘the’. All German demonstrative pronouns can be used anaphorically, as donkey pronouns in donkey sentences, as shown in (29) (see also Wiltschko 1998).

- (29) Jede Linguistin, die einen **Esel** hat, liebt **ihn** / **den** / **diesen** / **jenen**.  
every linguist who a donkey has loves it the this that  
‘Every linguist who owns a donkey loves it / that donkey.’

However, demonstrative pronouns can only serve as donkey pronouns if there is an overt NP antecedent, whereas personal pronouns are not restricted in this way. While the personal pronoun *ihn* ‘him’ is somewhat marked in (30), due to the absence of an overt antecedent, the demonstrative pronouns *den* ‘the’, *diesen* ‘this’ and *jenen* ‘that’ are drastically worse.

- (30) Jede Linguistin, die eine **Eselbesitzerin** ist, füttert (?)**ihn** / **\*den** / **\*diesen**  
every linguist who a donkey-owner is feeds it the this  
/ **\*jenen** meistens erst spät am Abend.  
that usually only late at.the evening  
‘Every linguist who’s a donkey-owner usually feeds it late at night.’

German thus seems to make a case for a strict formal link condition with strong donkey pronouns. This observation also holds for cases where the antecedent is not even a sub-part of a word, but merely implied, as in example (31), from Roelofsen (2008).

- (31) Some men have been married for more than twenty years and still don’t know what **her** favorite breakfast is.  
(married = ‘to have a **wife**’)  
(Roelofsen 2008:122)

Again, this is possible with a German personal pronoun, but not with a demonstrative pronoun, as shown in (32).

- (32) Manche Männer sind schon für mehr als zwanzig Jahre verheiratet, und  
some men are already for more than twenty years married and  
wissen noch immer nicht, was **ihr** / **\*deren** Lieblingsfrühstück ist.  
know still always not what her that.one’s favorite.breakfast is  
‘Some men have been married for more than twenty years and still don’t know what her favorite breakfast is.’

This contrasts with example (33), where the presence of an overt antecedent licenses the genitive-marked demonstrative pronoun *deren*.

- (33) Manche Männer haben schon für mehr als zwanzig Jahre eine **Frau**, und  
 some men have already for more than twenty years a wife and  
 wissen noch immer nicht, was **ihr / deren** Lieblingsfrühstück ist.  
 know still always not what her that.one's favorite.breakfast is  
 'Some men have had a wife for more than twenty years and still don't know what  
 her favorite breakfast is.'

We can conclude that there is a categorical difference between German demonstrative pronouns and German personal pronouns with respect to the need for an overt NP antecedent. Personal pronouns can be licensed without such an antecedent, whereas demonstrative pronouns do require it.

The same contrast can be observed between Kutchi Gujarati overt pronouns and Kutchi Gujarati null pronouns: The overt ("strong") pronoun can occur in a donkey sentence with overt NP antecedent, and is in fact preferred over a weak (null) pronoun<sup>11</sup>.

- (34) *ji manas jena passe pathni che, gare aave, tho pro*  
 if man who poss wife is home comes then 3.sg.nom  
**ene / ?pro** bak bharave.  
 3.sg.acc 3.sg.acc hug makes  
 'If any man who has a wife comes home, he hugs her.'

Like the personal pronoun in German, the null donkey pronoun is possible in a donkey sentence that lacks an overt NP antecedent, whereas the overt pronoun *ene* 'him/her' cannot occur, on a par with the German demonstrative pronoun.

- (35) *ji penelo manas gare aave, tho i pro / \*ene*  
 if married man home comes then 3.sg.nom 3.sg.acc 3.sg.acc  
 bak bharave.  
 hug makes  
 'If any married man comes home, he hugs [his wife].'

In the spirit of integrating the literature on donkey pronouns and the literature on anaphoric islands, it can be shown that referential anaphoric pronouns also exhibit the same pattern. Weak pronouns (illustrated for German personal pronouns) are licensed without an overt antecedent, whereas strong pronouns (illustrated for German demonstrative pronouns) are impossible.

- (36) a. Wenn ich schwanger werde, werde ich **es / \*das / \*dieses** auf  
 if I pregnant become will I it it this in  
 jeden Fall behalten.  
 any case keep  
 'If I get pregnant, I'll definitely keep it.'  
 (pregnant = 'to be having a **baby**')  
 (based on Roelofsen 2008:92)

11 We are glossing over the fact that Kutchi Gujarati generally seems to require subject and object pronouns to not be both overt or both null. Note also that it was not possible to construct minimal pairs for comparing German and Kutchi Gujarati, due to independent reasons.

- b. Hans hat so sehr geblutet, dass **es** / \***das** / \***dieses** durch den  
 H. has so much bled that it it this through the  
 Verbandgedrungen ist und sein Hemd verschmutzt hat.  
 bandages soaked is and his shirt stained has  
 ‘Hans bled so much it soaked through his bandages and stained his shirt.’  
 (bleed = ‘to emit **blood**’)  
 (based on Anderson 1971:46)

We can conclude from the data in (29)-(36) that strong pronouns must be syntactically licensed by an overt NP antecedent, whereas weak pronouns are not subject to such a strict licensing requirement. As we have seen, this is the case for donkey pronouns (examples (29)-(35)) and for referential anaphoric pronouns (example (36)) alike. This contrast between weak and strong pronouns is reminiscent of the distinction between (pragmatically controlled) deep anaphora like *do it* and (syntactically licensed) surface anaphora like *do so*, cf. Sag & Hankamer (1984).

#### 4 Analysis: Two types of anaphora resolution

To account for the facts in German and Kutchi Gujarati, we propose that strong pronouns and weak pronouns have a different structure; our analysis is based on Wiltschko (1998), who assumes that German personal pronouns have less structure than demonstrative pronouns, as sketched in (37)<sup>12</sup>. We adopt her proposal and assume that strong pronouns (i.e. German demonstratives and Kutchi Gujarati overt pronouns) contain an empty NP site, whereas weak pronouns (i.e. German personal pronouns and Kutchi Gujarati null pronouns) do not.

- (37) a. German demonstrative pronoun: [<sub>DP</sub> *d-* [<sub>φP</sub> *er* [<sub>NP</sub>  $\emptyset$ ]]]  
 b. German personal pronoun: [<sub>φP</sub> *er*]

We assume that the empty NP site of demonstrative pronouns must be licensed in the syntax by an overt NP antecedent, shown in (38) and (39). Our analysis of strong donkey pronouns is thus a syntactic analysis in the spirit of Parsons (1978), Heim (1990) and Elbourne (2001).

- (38) a. Jede Linguistin, die einen **Esel** hat, liebt **den**.  
 every linguist who a donkey owns loves that  
 ‘Every linguist who owns a donkey loves that donkey.’  
 b. LF: Jede Linguistin, die einen **Esel** hat, liebt [<sub>DP</sub> *d-* [<sub>φP</sub> *en* [<sub>NP</sub> *Esel*]]].  
 ───  
 licensing of NP-deletion

- (39) a. \* Jede Linguistin, die eine **Eselbesitzerin** ist, liebt **den**.  
 every linguist who a donkey.owner is loves that  
 ‘Every linguist who is a donkey-owner.’  
 b. LF: Jede Linguistin, die eine **Eselbesitzerin** ist, liebt [<sub>DP</sub> *d-* [<sub>φP</sub> *en* [<sub>NP</sub> *Esel*]]].  
 ───  
 licensing of NP-deletion fails

<sup>12</sup> We use the label  $\phi$ P from Déchaine & Wiltschko (2002) instead of Wiltschko’s (1998) AgrDP.

We assume an Elbourne (2001) style semantics for (38). Every minimal situation in which a female linguist owns a donkey can be expanded into a situation in which the unique linguist loves the unique donkey in that situation.

In contrast, given that their licensing requirements are less rigid, we propose that the meaning of personal pronouns is construed from the context, as illustrated in (40). This is in the spirit of pragmatic / contextual analyses, such as the definite description analysis of Cooper (1979), Heim & Kratzer (1998) and Buring (2005).

- (40) a. Jede Linguistin, die eine **Eselbesitzerin** ist, liebt **ihn**.  
 every linguist who a donkey.owner is loves it  
 ‘Every linguist who is a donkey-owner.’  
 b. LF: Jede Linguistin, die eine Eselbesitzerin ist, liebt [<sub>ϕP</sub> ihn].  
 c. if successfully resolved, the following meaning is construed for *ihn*:  
 [<sub>ϕP</sub> ihn] → *the donkey owned by x (s.t. x is bound by the universal quantifier)*

For concreteness sake, we implement this pragmatic resolution in terms of Chierchia’s (1992) functions of type  $\langle e, e \rangle$ <sup>13,14</sup>.

- (41) a. John doesn’t have a **car** anymore. He sold **it** last month.  
 b. LF: John doesn’t have a car anymore. He sold  $f(\text{John})$  last month.  
 $f_{\langle e, e \rangle}$ : a function from people into the car they used to have

However, given the contrast between weak and strong pronouns discussed above, we do not share Chierchia’s assumption of a structural formal link between the donkey pronoun and an overt NP antecedent (which he implements in terms of a coindexation restriction on donkey pronouns that we do not assume, Chierchia 1992:159). In order to account for the matching in  $\phi$ -features between a donkey pronoun and its intended antecedent, e.g. gender and number as in (42), we assume that  $\phi$  features are syntactically represented in the  $\phi$ P and interpreted by the semantics as presupposition triggers (Cooper 1983, Heim 1991, Sauerland 2004, Kratzer 2009).

- (42) a. Every man who was **fatherless** had lost [<sub>ϕP</sub> **him**] in the war.  
 b. LF: Every man<sub>2</sub> who was fatherless had lost [<sub>ϕP</sub> [sg] [masc]  $f(x_2)$ ] in the war.  
 $f_{\langle e, e \rangle}$ : a function from people into the father they used to have  
 c. truth conditions:  
 ||(42b)|| is defined iff || $f(x_2)$ || is singular and masculine; if defined,  
 ||(42b)|| is true iff every man who was fatherless had lost his father in the war

Our analysis assumes that the relevant function  $f$  is purely construed from the linguistic and non-linguistic context, and the acceptability of weak donkey pronouns without overt antecedents depends on how easily and unambiguously the correct function  $f$  can be accessed. In section 3, we showed that the split between weak pronouns and strong pronouns applies equally to donkey pronouns and referential pronouns, motivating a unified analysis of weak donkey pronouns and weak referential pronouns. This indicates that the factors that

13 Chierchia’s proposal is based on Cooper (1979) and Engdahl (1986), and also makes reference to Heim (1990) who rejects such a proposal.

14 Chierchia (1992) assumes a “mixed account for anaphora” much in the spirit of the current proposal. He assumes three types of semantically bound pronouns, (i) syntactically bound pronouns, (ii) dynamically bound pronouns, and (iii) donkey pronouns that are pragmatically resolved.

come into play when construing an  $\langle e, e \rangle$  type function  $f$  for the interpretation of donkey pronouns are the same factors that determine whether a referential anaphoric pronoun can be interpreted.

The question at this stage is how English donkey pronouns fit into a system that covers the binary distribution of pronouns in German and Kutchi Gujarati. While English does not have a weak/strong distinction, it appears that English must have “weak” donkey pronouns, as there does not seem to be a strict formal link condition in English. An open question at this point is whether English donkey pronouns are always weak, or whether they are either ambiguous between strong and weak pronouns, or have a hybrid status.

## 5 Conclusion

In this paper, we argued that there are two types of donkey pronouns, which must receive two different analyses: There are “strong” donkey pronouns (like German demonstrative pronouns and Kutchi Gujarati overt pronouns) and “weak” donkey pronouns (like German personal pronouns and Kutchi Gujarati null pronouns). We have shown that only the strong ones are subject to a rigid requirement for an overt NP antecedent, whereas the weak pronouns are often felicitous without such an overt antecedent, depending on how salient/accessible a suitable (potentially unexpressed) antecedent is in the context. We proposed to analyze the two types of pronouns as having different syntactic structures. Specifically, strong pronouns contain an empty NP site, which must be structurally licensed, whereas weak pronouns do not involve NP deletion and are purely contextually resolved. In a sense, the distinction between strong pronouns and weak pronouns is reminiscent of the distinction between surface anaphora and deep anaphora.

It follows from our analysis that the formal link condition (‘donkey pronouns must have an overt NP antecedent’) is not a uniform phenomenon, but an epiphenomenon tied to different syntactic and semantic configurations. In the case of strong pronouns it reflects the syntactic licensing requirements on NP ellipsis, whereas in the case of weak pronouns it reflects salience/accessibility of an intended antecedent. This means that the formal link condition will always be a rigid constraint in the case of strong pronouns, but much less rigid in the case of weak pronouns. For the former, an overt NP antecedent is always obligatory. In contrast, for the latter, the presence of an overt NP antecedent might well be the best and most straightforward way of providing a suitable, contextually accessible/salient antecedent, but it is crucially not the only way of doing so.

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