The Influence of Goals on Ambiguities in Certain Donkey Sentences

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Overview

In this presentation, I provide an account for the weak/strong ambiguity of donkey anaphora. I argue that the way this ambiguity is resolved depends on the goals of the agents and on a background assumption that the individuals in the model behave rationally.

1 Introduction

- Donkey sentences like (1) are potentially ambiguous at least between *symmetric* (2) and *subject-asymmetric* (3) interpretations. Choosing between these interpretations is the well-known *proportion problem*.[1] In addition, the subject-asymmetric option is itself ambiguous between a so-called *weak* or $\exists$-reading and a *strong* or $\forall$-reading:[2]

  (1) If a farmer owns a donkey, he usually beats it.

  (2) $\mathrm{most}(\{\langle x, y\rangle \mid \mathrm{farmer}(x) \wedge \mathrm{donkey}(y) \wedge \mathrm{own}(x,y)\},$
       $\{\langle x, y\rangle \mid \mathrm{beat}(x,y)\})$
       (SYMMETRIC INTERPRETATION: Counting pairs)

  (3) $\mathrm{most}(\{x \mid \exists y\,[\,\mathrm{farmer}(x) \wedge \mathrm{donkey}(y) \wedge \mathrm{own}(x,y)\,]\},$
       $\{x \mid x \text{ beats } Q_{\in\{all,some\}} \text{ of } x\text{'s donkeys})\})$
       (ASYMMETRIC INTERPRETATIONS: Counting farmers
          "STRONG" or $\forall$-READING: $Q = all$
          "WEAK" or $\exists$-READING: $Q = some$)

- The weak/strong ambiguity can be observed in the following pair (Heim, 1990; Dekker, 1993):

  (4) a. If I have a dime in my pocket, I will put it in the parking meter. (Heim, 1990)
          $\rightarrow$ $\exists$-reading preferred: "it" $\approx$ "at least one of my dimes"
       b. If I have a dime in my pocket, I will keep it. (Dekker, 1993; Kanazawa, 1994b)
          $\rightarrow$ $\forall$-reading preferred: "it" $\approx$ "all of my dimes"[3]

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[1] See e.g. Partee (1984); Kadmon (1987); Rooth (1987); Barker (1993); von Fintel (1994).

[2] See Parsons (1978); Heim (1982); Rooth (1987); Pelletier and Schubert (1989); Chierchia (1995); Geurts (2002) and others.

[3] Dekker (1993) and Kanazawa (1994b) note that (4b) has a nongeneric reading and therefore provide evidence against Pelletier and Schubert (1989)'s claim that only generic donkey sentences can exhibit the $\forall$-reading.

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- Following the example in (4a), the ∃-reading is also called (e.g. Dekker, 1993) the "dime implication".

- **In this talk, I will focus on the correlation between the weak/strong ambiguity and agents' goals.** What might be called *goal effects* show up in independent domains of language. In the following section, I will illustrate goal effects in questions and definite plurals, before coming back to donkey sentences.

2 Goal effects

- Goals influence the interpretation of questions, which vary between a mention-some and a mention-all interpretation in function of the speaker's goal (5) (van Rooy, 2003).

  (5) Where can I buy an Italian newspaper? (van Rooy, 2003)
  Goal 1: *Speaker wants to buy an Italian newspaper*
  → mention-some reading preferred: *Where is a place such that...*
  Goal 2: *Speaker wants to write a guidebook of this city for Italians and include a list of kiosks with Italian newspapers*
  → mention-all reading preferred: *Where are all the places such that...*

- Goal effects also occur with plural definite descriptions (6), which vary between an existential and a universal interpretation (Malamud, 2006).[4]

  (6) The doors are open. (Malamud, 2006)
  Situation 1: *Hearer is about to travel, and wants to ensure his house is safe in his absence.*
  → ∃-reading preferred
  Situation 2: *The local bank has a safe that is accessible only through a hallway with three doors, all of which must be open to reach the safe. Hearer wants to know whether it is possible to break in.* (Krifka, 1996)
  → ∀-reading preferred

2.1 Aside: Whose goal?

- Goal effects in plural definites can be agent-oriented (i.e. correlated with the goals of the referent of the thematic agent) rather than speaker- or hearer-oriented:

  (7) Halfway into his holiday trip, John had to return to the house because he thought he had left the doors open.
  → ∃-reading preferred even if hearer doesn't have any relevant goals with respect to John's house

- In imperatives and (more generally) in buletic statements, goal effects seem to be derived from the goals of the person whose desires are described:

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[4]Actually, van Rooy (2003) and Malamud (2006) formalize their insights using decision theory. In their accounts, *decision problems* mediate between goals and sentence interpretations. It is unclear if relevant decision problems can be postulated in the case of donkey sentences, as well as in imperatives such as *Open the doors!* In this presentation, I leave this issue open.

(8) a. Open the doors!
     b. I want you to open the doors.

- In deontic statements, the relevant intent seems to be that of the law itself, which
  suggests a similar treatment of buletic and deontic modalities (compare also German:
  So will es das Gesetz = "The law wants it that way"):

  (9) The law requires halls organizing public events to keep their doors open in the
       case of an emergency.

- Goal effects in donkey sentences (at least in the ones I list below) also seem to be
  generally agent oriented.

- The varying sources of goal effects have (to my knowledge) not been previously noted. I
  leave this topic as it is for now, and go back to donkey sentences.

3 Goal effects in donkey sentences

- Examples like (10) and (11), in which donkey pronouns and plural definite descriptions
  seem to behave in parallel fashion, suggest that the processes underlying the
  interpretation of donkey pronouns and plural definite descriptions are similar.

  (10) a. John keeps the windows in his garage open while he is at home.
       b. Usually, if a man has a window in his garage, he keeps it open while he is at
       home.
       → ∃-*reading preferred*

  (11) a. John keeps the windows in his garage closed while he is away.
       b. Usually, if a man has a window in his garage, he keeps it closed while he is away.
       → ∀-*reading preferred*
       (Based on examples by Yoon (1994))

- This has been originally noticed by Yoon (1994) and further developed by Krifka
  (1996). However, Yoon claims that the effect is due to a lexical effect: *closed* belongs to
  a class of so-called TOTAL predicates, which give rise to ∀-readings, while *open* belongs
  to a class of PARTIAL predicates, which give rise to ∃-readings.[56]

- Her total/partial distinction amounts to stipulating that if a plural sum of doors is
  closed, then all of the doors it contains is closed, but if it is open, then only some of the
  doors it contains need be open.

- However, we have already seen in (6) ("The doors are open") that this approach is not
  only stipulative but actually false for some plural definite descriptions: *open* sometimes

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[5]Whenever a TOTAL predicate holds of a sum S of individuals, then it also holds of every part of S. By
contrast, the fact that a PARTIAL holds of a sum S only implies that it also holds of *some* of the parts of S. Other
examples of total/partial predicates from Yoon (1994); Krifka (1996) are *clean/dirty, healthy/sick, dry/wet,
fail/pass, smooth/rugged,* and *empty/filled.*
[6]She also finds that episodic predicates favor ∃-readings and stative predicates favor ∀-readings.

behaves as a partial and sometimes as a total predicate, depending on context. This was in fact already noted by Krifka (1996).

| Crucially, in donkey sentences, the same effect can be observed: |

(12) a. Usually, if a man has a window in his garage, he keeps it open while he is at home.
→ ∃-*reading preferred*
b. Usually, if a tycoon owns a casino in Las Vegas, he keeps it open 365 days a year.
→ ∀-*reading preferred*

- Concerning (12a), given the choice of keeping exactly one window open and keeping all windows open in a garage while at home, the first alternative is usually more rational.[7]

- Concerning (12b), if there is a reason to keep one casino open, then it makes sense to keep all one's casinos open.

- Once we know what to look for, we find the same effect in most (if not all) examples of the weak/strong ambiguity reported in the literature. Here is a selection:

- The following example has been adapted from Gawron et al. (1991):[8]

(13) If someone catches a medfly, he should bring it to me.
Goal 1: *Speaker is a biologist and collects samples of animal species in the region.*
→ ∃-reading preferred
Goal 2: *Speaker is a health department official and wants to eradicate the medfly from this region.* → ∀-reading preferred

- The following pair has been adapted from Geurts (2002):

(14) a. Most guests who had a credit card used it to pay their hotel bill.
→ ∃-reading preferred: It is not rational to use more than one credit card to pay a single bill
b. Most guests who had a credit card kept it in their wallet.
→ ∀-reading preferred: Assuming the sentence expresses the unwillingness of guests to pay by credit card, it would not be rational for a guest to take even a single one out of their wallet

- The following scenario, credited by Chierchia (1995) to P. Casalegno, causes (1a) ("Every farmer who owns a donkey beats it") to favor an ∃-reading:

"The farmers of Ithaca, N.Y., are stressed out. They fight constantly with each other. Eventually, they decide to go to the local psychotherapist. Her recommendation is that every farmer who has a donkey should beat it, and channel his/her aggressiveness in a way which, while still morally questionable, is arguably less dangerous from a social point of view. The farmers of Ithaca follow this recommendation and things indeed improve."

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[7]Having one window open is generally enough to achieve the goal of airflow.

[8]The relevant goal in deontic donkey sentences seems to be the intent of whoever sets the rule. Of course, in this example, that person is also the speaker.

Yoon (1994) cites this as evidence for a stative-episodic split, but it can also be seen as evidence for a goal effect. The scenario sets up a context in which the goal of each farmer is already met if he/she beats just one donkey.

- The "dime implication" is another case in point:

  (15) a. If I have a dime in my pocket, I will put it in the parking meter. (Heim, 1990)
  → ∃-*reading preferred*
  b. If I have a dime in my pocket, I will keep it.
  → ∀-*reading preferred*

- Once again, the correlation is clear: Putting all your dimes into a parking meter is not rational with respect to the goal of paying the meter, as long as you have more than one. Keeping all your dimes in your pocket, however, is rational with respect to the goal of keeping your money.

- Goal effects also hold with the quantifier *no*.[9] This example is from (Chierchia, 1995), who does not explain the contrast, however.

  (16) a. No one who has an umbrella leaves it home on a day like this.
  → ∀-*reading preferred: a person who owns two umbrellas and leaves one of them home does not falsify the sentence*
  b. No man with a teenage son lets him drive the car on the weekend. (Rooth, 1987; Heim, 1990)
  → ∃-*reading preferred: a father of two sons who lets one of his sons drive the car falsifies the sentence*

- Again, we have a correlation: Leaving most of your umbrellas home is rational with respect to the goal of staying dry, as long as you bring one along. But allowing most, or even one, of your sons to drive your car is not rational with respect to the goal of protecting your sons (or your car).

- **All the (a) examples in this section have in common that it is rational behavior to perform the action denoted by the VP on only some objects but abstain from it on other objects. In all the (b) examples, it is rational to either consistently perform the action, or consistently abstain from it.**

- In the following I will call (a) type examples HETEROGENEOUS and (b) type examples HOMOGENEOUS.

- There is no correlation between heterogeneous and homogeneous examples and ∃-readings vs. ∀-readings, since rightward monotone decreasing quantifiers like *no* "switch" the readings around.[10] Compare:

  In example (15), (a) is the ∃-reading and (b) is the ∀-reading
  In example (16), (a) is the ∀-reading and (b) is the ∃-reading.

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[9]As Chierchia (1995) notes, this falsifies Kanazawa (1994b)'s claim that *no* always gives rise to an ∃-reading.
[10]Barker (1993) fails to see this point, although he expresses a similar generalization otherwise. The term *homogeneous* is intended to evoke his homogeneity presupposition.

4   Towards a formalization

- I follow Barker (1993) in positing that the weak/strong ambiguity is due to *domain narrowing*, i.e. contextual restrictions. As an example of domain narrrowing, *Every tree is laden with apples*, uttered in an orchard, is interpreted as *Every tree in this orchard is laden with apples* (see e.g. Kratzer, 1989).

- Barker essentially claims that only the $\forall$-reading (the homogeneous case) is real and that the (heterogeneous) $\exists$-reading is an illusion that results because domain narrowing excludes certain variable assignments. For example, in the dime implication (heterogeneous case), every dime starting with the second is excluded from consideration. Barker's rationale for this narrowing is that the state of the parking meter changes after the first coin is entered.

  However, his approach does not work well with sentences such as (16), repeated below as (17).

  (17) a. No one who has an umbrella leaves it home on a day like this.
  $\rightarrow$ $\forall$-*reading preferred*
  b. No man with a teenage son lets him drive the car on the weekend. (Rooth, 1987; Heim, 1990)
  $\rightarrow$ $\exists$-*reading preferred*

  As seen above, in these sentences it is the $\exists$-reading that corresponds to the homogeneous case. So it can't be derived from the $\forall$-reading. If anything, it should be the other way round. But it is unclear how the notion of state change could be applied to these examples.

- I posit a background assumption that agents are *rational.*

- Agents need not be rational with respect to all aspects of life. For example, typically people will make some irrational choices that have nothing to do with the current task (e.g. smoking could be considered irrational, yet we don't want to quantify only over nonsmokers.). So let us restrict *rational* to the task at hand, i.e. *rational* is a two-place relation between an agent and a goal. We can again assume that the goal is contextually given.

- We import some off-the-shelf account (e.g. Kanazawa (1994a); Krifka (1996) that generates both readings. We take these two readings plus the contextual restriction as the input of our computation. The two potential LFs of (18) will come out roughly like (19). (For convenience, the "winning candidate" is indicated with a checkmark.)

  (18) Every man who has a dime in his pocket will put it into the meter.

  (19) a. ✓Every man who has a dime, and who is rational with respect to paying parking meters, will put one of his dimes into the meter.
  b. Every man who has a dime, and who is rational with respect to paying parking meters, will put all his dimes into the meter.

- The background assumption (or contextual restriction) here is that a rational person will throw one dime into the meter rather than throwing all one's dimes into the meter.

- Together with this assumption these LFs will license the two following inferences (20a) and (20b), respectively:

  (20) a. ✓Every man who has a dime, and who will never throw more than one dime into the parking meter, will put one of his dimes into the meter.
  b. Every man who has a dime, and who will never throw more than one dime into the parking meter, will put all his dimes into the meter.

- At this point, the potential LF (20b) is obviously contradictory and can be ruled out e.g. by Gricean reasoning.

- This also works with the quantifier *no*:

  (21) No man who has an umbrella leaves it home on a day like this.

- The background assumption here is that it is more rational to take one umbrella along than to take more than one. The relevant inferences are these:

  (22) a. ✓No man who has an umbrella, and who will never take more than one umbrella along, leaves all (=∀) his umbrellas home on a day like this.
  b. No man who has an umbrella, and who will never take more than one umbrella along, leaves any (=∃) umbrella home on a day like this.

- In the homogeneous case, both readings collapse onto the ∀-reading:

  (23) Most guests who had a credit card kept it in their wallet.

- Background assumption: Assuming the sentence expresses the unwillingness of guests to pay by credit card, it is more rational for a guest to keep all credit cards in his/her wallet than just one of them.

  (24) a. ✓Most guests who had a credit card, and who would not take even one of them out of their wallet, did indeed keep all of them in their wallet.
  b. ✓Most guests who had a credit card, and who would not take even one of them out of their wallet, kept (at least) one of them in their wallet.

- As long as the default assumption holds that guests were indeed able to act according to their desires, the two readings describe identical situations.

- Unlike Barker (1993), the present account treats ∃-reading and ∀-reading entirely symmetrically and does not regard the ∃-reading as an illusion created by domain narrowing. Therefore a genuine ∃-reading can surface in sentences like (25):

  (25) No man with a teenage son lets him drive the car on the weekend.

- The reasoning is analogous to the previous example.

5 Further work and open problems

5.1 Formalization

- Ideally, a formal account along the lines proposed would provide a unified account of agent-oriented goal effects in donkey sentences and in other phenomena like questions and plural definite descriptions. It remains to be seen whether decision theory can be the basis of this framework.

- The nature of the background assumption needs to be clarified. I've treated it as a contextual restriction here, but it might also be considered e.g. a presupposition. This would be in line with Rooth (1987)'s observation that informants give "varied and guarded judgements" (p. 254) when asked to judge homogeneous donkey sentences in scenarios where farmers are not consistent about their donkey-beating. I'm not aware that anybody has applied the standard presupposition diagnostics to such donkey sentences. Due to the complexity of the scenarios involved, this would need to be done very carefully.

- The sentences considered here are all asymmetric with respect to the proportion problem (since the weak/strong ambiguity only occurs in asymmetric sentences). As for sentences with symmetric readings, Rooth (1987) reports that people are *not* reluctant to give judgments even in scenarios where farmers are not consistent. Under the present account, this is unexpected.

5.2 Whose goals? (again)

- Lance Nathan (p.c.) pointed me towards sentences like the following:

  (26) If a man has a quarter, he will give it to the IRS.

  This favors the $\forall$-reading even on the non-deontic interpretation. One might reply that a man's goal is not just his desire (e.g. to keep his money) but simply whichever action provides the higher utility – including the possibility of being fined for tax evasion.

5.3 Monotone increasing quantifiers

- Kanazawa (1994b) notes that quantifiers which are both leftward and rightward monotone increasing ($\uparrow MON \uparrow$) only permit the $\exists$-reading. Examples are *a, some, several, at least n, many* (see (27)). This is unexpected on our account.

  (27) Some farmers who own a donkey beat it.
       Several farmers who own a donkey beat it.

  (28) Pedro owns a donkey. He beats it.

- Similarly, a discourse like (28) is not rendered false (or infelicitous) if Pedro owns a second donkey that he doesn't beat.

- A possible explanation might invoke Gricean reasoning: $\uparrow MON \uparrow$ quantifiers of the form QAB are *intersective* (they can be verified by inspecting just $A \cap B$), so they do not presuppose that the speaker knows the complete facts about A. Thus they might implicate that the speaker does not know enough to be certain whether *Beating all donkeys is more rational than beating one donkey* holds in the domain.[11]

5.4 A questionnaire study of the weak/strong ambiguity

- Geurts (2002) considers examples such as (29), taken as descriptions of pictures depicting boys and railroads etc. Note that in these cases, there is no salient goal and so we are not making any predictions about these cases.

  (29) a. Every boy that stands next to a girl holds her hand.
     $\rightarrow$ *$\exists$-reading preferred*
     b. Every railway line that crosses a road goes over it.
     $\rightarrow$ *$\forall$-reading preferred*

- On the basis of a questionnaire study, Geurts reports that – in his terms – prototypical individuals (like children) favor $\exists$-readings, but marginal individuals (like railway lines) favor $\forall$-readings.

- However, he only considers sentences with quantifiers *every, not every, some, and no*. In such sentences, the weak/strong ambiguity and the proportion ambiguity collapse. So it might be that what Geurts is observing is the proportion ambiguity after all. For example, (29b) might be interpreted with a symmetric reading as "Every time a railway line crosses a road, it goes over it." It would be interesting to reproduce his results, controlling for this factor.

6 Conclusion

- **Goal effects correlate with the weak/strong ambiguity of donkey anaphora, similarly to the correlation of ambiguities in questions and definite plurals. A formal account has been sketched that relies on contextual restriction to rational agents and extends to sentences involving the quantifier *no*.**

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[11] Geurts (2002) offers a related explanation, but he refers to psychologically plausible verifying strategies rather than Gricean reasoning and communicative intent. Kanazawa (1994b) offers an explanation in terms of dynamic conservativity, but his explanation incorrectly predicts that $\forall$-readings should be unavailable for *no*.

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