

Seven species of specificity and one common ancestor?

Specificity as referential anchoring

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0. Introduction

Fodor & Sag (1982, 355) assume that indefinite noun phrases can be interpreted *referentially* or *quantificationally*. They argue that the referential interpretation has *epistemic* effects as in (1), *scopal* effects as in (2), and gives rise to *de re*-readings, as in (3).

- (1) A student in the syntax class cheated on the final exam.
- (2) Every professor met a student in the syntax class.
- (3) Jones believes that a student in the syntax class was cheating.

They give the following interpretation rules for the quantificational indefinite article and the referential indefinite article (adapted from Heim 1991):

- (4) a. $[[a_{quant} N]] = \lambda Q. \exists x. [N(x) \ \& \ Q(x)]$
b. $[[a_{ref} N]] =$ is defined only if there is a unique individual that the speaker of the sentence has in mind, and this individual is N

The definition (4b) might be adequate for English indefinite *this*, but it has been shown that it is not sufficient to account for various other types of specific indefinites. I argue that the definition needs the following modifications in order to account for specific indefinites as *referentially anchored indefinites*:

- (5) Modification of the original Fodor & Sag (1982) account (= (4b))
 - (i) replacing the uniqueness condition by an explicit anchoring function
 - (ii) allowing for other anchors than the speaker
 - (iii) allowing for different content of the anchoring function
 - (iv) anchor and anchoring functions are free variables, which receive their value from the context under the following conditions
 - a) anchor is speaker / hearer given
 - b) content of anchoring function is hearer-new
- (6) Independent questions
 - (i) Is referential anchoring a semantic or pragmatic operation?
 - (ii) Do we represent indefinites by existential quantifiers or by choice functions?

1. Seven species of specificity

The different types of specificity are characterized as follows: (i) Specificity in opaque contexts (*referential specificity*) expresses a contrast between a reading that allows existential entailment (1a) and a reading that does not (1b); (ii) *scopal specificity* (often also including type (i)) refers to the ability of certain indefinites to escape scope islands like the conditional in (2a), that a universal quantifier cannot escape (2b); (iii) *epistemic specificity* expresses the contrast between speaker's knowledge (3a) and speaker's ignorance (or indifference) (3b) about the referent of the indefinite;

- (1) a Paula believes that Bill talked to *an important politician*. (-> there is an important politician)
 b Paula believes that Bill talked to *an important politician*. (but there is no important politician)
- (2) a If *a friend of mine from Texas* had died in the fire, I would have inherited a fortune. (possible reading: there is a friend of mine and...)
 b If *each friend of mine from Texas* had died in the fire, I would have inherited a fortune. (not possible: for each of my friends, if one of them...)
- (3) a *A student in Syntax I* cheated in the exam. I know him: It is Jim Miller.
 b *A student in Syntax I* cheated in the exam. But I do not know who it is.

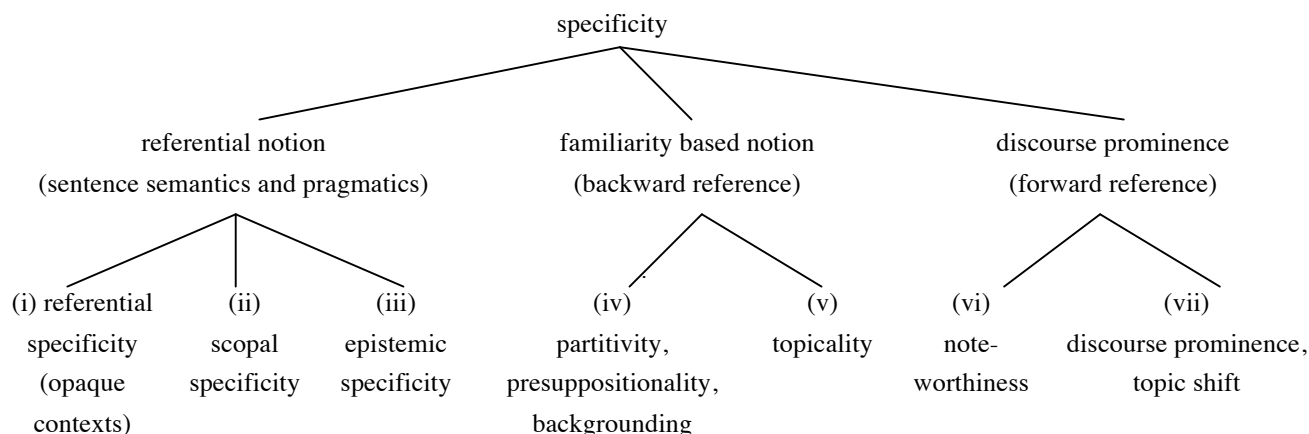
(iv) *specificity* is sometimes associated with different types of *familiarity* such as d-linking, partitivity, and presuppositionality: the indefinite is part of an already introduced set, as in (4a), or not, as in (4b); (v) **specificity is also related to topicality** as in (5a), where the topical element can be understood as a specific expression, while (5b) only expresses an existential claim.

- (4) a 50 students entered the room. I knew *two girls*.
 b 50 students entered the room. They greeted *two girls* (already in the room).
- (5) a *Some ghosts* live in the pantry; others live in the kitchen.
 b There are *some ghosts* in this house.

There are two further notions of specificity that concern the forward referential potential of indefinites: (vi) *specificity as noteworthiness* assumes that the presentative *this* in (6) signals that the speaker intends to assert a noteworthy property of the referent, as in (6a), while (6b) is reported to be infelicitous since no such property is mentioned. (vii) *specificity as discourse prominence*: refers to an aspect of discourse prominence, namely "referential persistence" or "topic shift", i.e. the potential of an indefinite to introduce a referent that will be mentioned again and may even become a topic in the subsequent discourse.

- (6) a He put *a/this 31 cent stamp* on the envelope, and only realized later that it was worth a fortune because it was unperforated.
 b He put *a/#this 31 cent stamp* on the envelope, so he must want it to go airmail.
- (7) a There was a king and the king had a daughter and he loved his daughter ...
 b There was a king and # the season was very short and hot ...

(8) Family tree of specificity



Different position with respect to family-organization

Fodor & Sag (1982)	one notion (i)-(iii) and one representation
Farkas (1995)	independent subtypes, but similar effects: they reduce the restrictor set of the indefinite
Kamp & Bende-Farkas (2006, submitted)	<i>epistemic specificity</i> : (i) + (iii) with effects on (ii)
Prince (1981), Ionin (2006)	indefinite <i>this</i> ; (vi), but also (i)-(iii)
Givón (1984)	ranking in terms of “importance”: discourse prominence > speakers intentions > reference in the “world” diachronic motivation: grammaticalization of articles and other functional elements (<i>pe</i> -marking in Romanian)
this paper	referential anchoring: (i)-(iii), independent of the other notions, but partly aligned with (iv)-(vii)

2. Intermediate scope and functional readings

Fodor & Sag (1982) make two claims:

1. Specific indefinites are able to escape “scope islands”

Scope islands are created by *that*-complements (with lexical heads) as in (9) or by conditionals as in (10):

- (9) a John overheard the rumor that *each of my students* had been called before the dean.
 b John overheard the rumor that *a student of mine* had been called before the dean.
- (10) a If *each friend of mine from Texas* had died in the fire, I would have inherited a fortune.
 b If *a friend of mine from Texas* had died in the fire, I would have inherited a fortune.

2. Indefinites in scope islands do not show intermediate scope

but many examples show that this prediction is wrong: there are intermediate readings (Farkas 1981, Abusch 1994 etc.)

Consider the following sentences

- (11) a Every professor rewarded every student who read *a book on the semantics-pragmatics interface*.
 b Every professor rewarded every student who read *some book on the semantics-pragmatics interface*.
 c Every professor rewarded every student who read *a certain book on the semantics-pragmatics interface*.

We are interested in the intermediate reading of (11a-c), which is paraphrased in (12a) and its truth conditions are given in (12b). The value of the book co-varies with the value of the professor.

- (12) a intermediate scope: every professor > a book on the s-p-i > every student
 For every professor there is a (possibly different) book on the s-p-i, such that the professor rewarded every student who read that book.
 b $\forall x [\text{professor}(x) \rightarrow \exists x [\text{book-on-s-p-i}(x) \ \& \ x \text{ rewarded every student who read } x]]$

We argue that there are two different readings, (i) a systematic or functional reading and (ii) an unsystematic or pair-list reading (Schwarz 2001, Endriss 2009). Let us assume the following two book lists, and that the systematic co-variation is described by *the book that is on top of his book list*

- | | | | |
|--------|--|---|---------------------------------------|
| (13) a | Book list of Prof. Schiller | b | Book list of Prof. Hegel |
| | 1. <i>Context Dependence</i> | | 1. <i>From Words to Discourse</i> |
| | 2. <i>Meaning: The Dynamic Turn</i> | | 2. <i>Presupposition and Pronouns</i> |
| | 3. <i>Questions in Dynamic Semantics</i> | | 3. <i>Game Theory</i> |

- (14) a Situation A
 Prof. Schiller rewarded every student who read *Context Dependence*.
 Prof. Hegel rewarded every student who read *From Word to Discourse*.
 b Situation B
 Prof. Schiller rewarded every student who read *Meaning: The Dynamic Turn*.
 Prof. Hegel rewarded every student who read *From Word to Discourse*.

The intuition is that the systematic reading (*the book that is on top of the his booklist*) is correct in Situation A, but not in Situation B, while the unsystematic reading is correct in both readings. There are clear intuitions that *a certain* selects for the systematic and *some* for the unsystematic reading. It is controversial, whether *a* allows for both (Kratzer 1998, Endriss 2009) or only for the unsystematic reading (Schwarz 2001, Chierchia 2001). The contrast becomes also evident in downward entailing contexts as in (15):

- (15) a Every professor rewarded every student who read *a book on the semantics-pragmatics interface*.
 b Every professor rewarded every student who read *some book on the semantics-pragmatics interface*.
 c Every professor rewarded every student who read *a certain book on the s-p-i*.

Representations

We compare the following approaches

- a) Under the *long-distance scope shift* approach (dubbed by Schwarz 2001) fewer restrictions are ascribed on movement to the existential quantifier. -> (16a)
- b) In the *existentially closed choice function* approach, scope is derived by assuming that the indefinite article introduces a choice function variable that can be bound freely at different scope sites (Reinhart 1997, Winter 1997). -> (16b)
- c) In the *contextually determined choice function* approach the free choice function variable is contextually determined (Kratzer 1998). The intermediate scope can be forced by
 - (i) a dependent variable in the descriptive content -> (16c) or
 - (ii) by a dependent choice. -> (16d)
- d) Under the *singleton indefinite* or *implicit domain restriction* approach the indefinite is enriched by descriptive material until it expresses a singleton and therefore gives the illusion of wide scope or intermediate scope (Portner 2002, Schwarzschild 2002) -> (16e)
- e) Contextually given Skolem functions assign books to professors (Steedman 2007) -> (16f).

- (16)
- a $\forall x [\text{professor}(x) \rightarrow \exists y [\text{book-on-s-p-i}(y) \ \& \ x \text{ rewarded every student who read } y]]$
 - b $\forall x [\text{professor}(x) \rightarrow \exists f [\text{ch}(f) \ \& \ x \text{ rewarded every student who read } f(\text{book-on-s-p-i})]]$
 - c $\forall x [\text{professor}(x) \rightarrow [x \text{ rewarded every student who read } f(\text{book-on-s-p-i} \text{ that } x \text{ recommended})]]$
 - d $\forall x [\text{professor}(x) \rightarrow [x \text{ rewarded every student who read } f(x)(\text{book on the s-p-i})]]$ with f assigning choice functions to professors such that the choice function selects a book on the s-p-i that the professor has recommended
 - e $\forall x [\text{professor}(x) \rightarrow [x \text{ rewarded every student who read a book on the s-p-i that was on top of the reading list of } x.]]$
 - f $\forall x [\text{professor}(x) \rightarrow [x \text{ rewarded every student who read } f_{sk}(x)]]$ with f_{sk} assigning books to professors such that the professor has recommended the book

The *long-distance scope shift* approach and the *existentially closed choice function* approach represent the unsystematic or genuine intermediate scope reading, while the *contextually determined choice function* approach, the *singleton indefinite* approach and the Skolem-approach represent the systematic co-variation case (functional reading).

What kind of function?

The so-called *functional* or *systematic* reading is constraint to functions with certain characteristics: *familiar and simple* (Hintikka 1986), *nameable* (Ebert & Endriss 2007), *natural functions* (Chierchia 2001), *procedural defined* (Jacobson 1999).

Functional definites

Functional definites require the content of the function to be explicitly expressed in the discourse.

- (17)
- a Every professor rewarded every student who read the book on the semantics-pragmatics interface that is the first on his booklist.
 - b $\forall x [\text{professor}(x) \rightarrow [x \text{ rewarded every student who read } f(\text{book-on-s-p-i} \text{ that is on the top of the booklist of } x)]]$ with f as type shifter, e.g.: iota operator or choice function

Evaluation of Fodor & Sag's (1982) claims

Claim 1: *Only* specific indefinites escape scope islands:

- wrong: - specific indefinite do, but
 - other indefinite do, too (see unsystematic intermediate scope readings)

Claim 2: specific indefinite do not have intermediate scope readings:

- correct: - there are intermediate readings, but these are either
 (i) functional wide scope readings with apparent intermediate scope or
 (ii) genuine intermediate readings from non-specific readings

Conclusion

- we need other mechanisms for exceptional scope readings (topic, information structure etc.)
- we still have to account for the contrast of specific vs. non-specific readings since scope is not a reliable test

Assumptions: Specific readings correspond to

- (i) referential readings in the original Fodor & Sag understanding
 - (ii) functional readings – the content of the function must be contextually given
- > both together: referential anchoring

3. Referential anchoring

3.1. *Specificity and “referential intention”*

Specificity is a semantic-pragmatic notion that distinguishes between different uses or interpretations of indefinite noun phrases. It is often related to the communicative or pragmatic notion of “referential intention”.

3.2 *modification of the Fodor and Sag*

- (14) a. $[[a_{quant} N]] = \lambda Q. \exists x. [N(x) \ \& \ Q(x)]$
 b. $[[a_{ref} N]] =$ is defined only if there is a unique individual that the speaker of the sentence has in mind, and this individual is N

The definition (14b) might be adequate for English indefinite *this*, but it has been shown that it is not sufficient to account for various other types of specific indefinites. I argue that the definition needs the following modifications in order to account for specific indefinites as *referentially anchored indefinites*:

- (15) Modification of the original Fodor & Sag (1982) account (= (4b))
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 - b) content of anchoring function is hearer-new

3.3 Explicit anchoring relation

In the approach presented here, the uniqueness condition in the definition (14b) is captured by a function from the anchor to the referent: $f(\text{anchor}) = \text{referent}$, different versions of which we discuss below.

3.4 Potential anchors

The first modification concerns potential anchors. It has been observed that besides the speaker other attitude holders can also be anchors for the specific indefinite.

- (16) Paula believes that Bill talked to an important politician.
- (17) a George: "I met a certain student of mine today."
b Jack: "George said that he met a certain student of his today."

3.5 Content of the anchoring relation

However, the anchor need not be an attitude holder, as in (18) and (19). Both examples have readings where the specific indefinite systematically co-varies with its anchor (or binder), giving rise to the apparent intermediate reading discussed above. The examples also show that the anchoring relation is more abstract than the communicative "referential intention".

- (18) Every husband had forgotten a certain date – his wife's birthday.
- (19) Every professor rewarded every student who read a book on the semantics-pragmatics interface.

3.6 Familiarity

The anchor must in principle be familiar to both speaker and hearer, i.e. it must be contextually given or accessible. The content of the anchoring relation must be hearer-new in order to distinguish between specific indefinites and definites. (20) and (21) demonstrate that the exact definition of the function may be unknown even to the speaker. It is a controversial issue whether or not the speaker must in principle be able to recover the content of the function (see Schwarzschild's 2002, 307 Privacy Principle)

- (20) The teacher gave every child a certain task to work on during the afternoon.
- (21) Each reporter was assigned to a certain politician by the editor of the paper.

3.7 Summary

- (22) Informal definition of specificity in terms of referential anchoring
A specific indefinite $a N$ is represented by an anchoring f from an anchor to an individual and this individual is N . Both the anchor as well as the anchoring function must be given in the context
 - a) anchor is speaker and hearer given
 - b) content of anchoring function is hearer-new

4. Implementation of referential anchoring

4.1 Anchored representations in DRT

Kamp & Bende-Farkas (2006, submitted) use anchored representations in DRT. They distinguish between external anchors, i.e. functions that relate a discourse referent to an object in the world (like proper names to their bearers) and internal anchors, i.e. functions that relate the representation to other discourse referents. These two kinds of anchors allow them to model their distinction between the specific *use* of an indefinite by the speaker and the specific *interpretation* by the hearer. The speaker's specific use of an indefinite is represented by an external anchor to the object that is the intended referent of the indefinite. The hearer can have a specific interpretation of that indefinite. In that case he builds a representation of the speaker, the intended referent and the indefinite. The relation between these representations are internal anchors, but by the assumption that the speaker has an external anchor the hearer can establish a permanent representation of the indefinite by "inheriting" the direct anchor (they call this "vicarious anchor").

(23) A student was looking for you this morning

(24) Speaker's representation: [ANCH, x]{x | student(x) ...}

(25) Hearer's representation: [ANCH, a] {a | speaker(a)}
 [ANCH, x] {x | [ANCH, x_a]{x_a | ...} <x_a, x>} {student (x) ...}

This view takes the attitude holder as the central element for specificity. One has to see whether one can extend this view to a more flexible representation to cover the cases discussed above.

4.2 Referential anchoring and choice functions

Von Heusinger (2002 based on earlier work) cashes out the idea of referential anchoring in terms of parameterized or Skolemized choice functions, better known from Kratzer (1998) or Chierchia (2001, 2005). The idea is that the indefinite article can translate into the complex pronominal element f_x with x being a parameter that might be bound by some context agent or some quantifier phrase that has wider scope than the indefinite. The function f applied to the anchor yields a choice function that is applied to the set denoted by the descriptive content of the indefinite yielding the referent, as in (26) adapted from Roberts (2007).

(26) Referential anchoring with parameterized choice functions

i) complex pronominal element f_x

ii) x parameter (= anchor), the argument of f , binding is pragmatically given

a) might be bound by some context agent (speaker etc.)

b) might be bound by a wider scope QP to yield intermediate scope

iii) $f(x)$: a choice function that takes a set denoted by DC as its argument and yields an element of that set

(27) a Every professor rewarded every student who read a book on the semantics-pragmatics interface.

b $\forall x$ [professor(x) \rightarrow [x rewarded every student who read $f(x)$ (book on the s-p-i)]]
 with f assigning choice functions to professors such that the choice function selects a book on the s-p-i that the professor has recommended

Observation:

1. systematic intermediate scope (i.e. wide scope functional) readings are forced by
 - (i) bound variables in the descriptive content (but then problem with identical sets)
 - (ii) by parameterizing the choice function
 - (iii) it is unclear whether we need both
2. Referential anchoring is expressed more indirectly – it assigns a particular choice function to the agent, not the object as such (see discussion below on the motivation of choice functions)
3. There are in principle two ways to reduce the restrictor set of the indefinite:
 - (i) enrich the descriptive content, including variables
 - (ii) make a determined choice
4. One has to make sure that free variables in the descriptive content and in the anchoring function can be simultaneously bound

4.3 Referential anchoring and domain restriction

Schwarzschild (2002) proposes to derive the effects of wide scope or intermediate readings of indefinites by implicit domain restriction. The mechanism of domain restriction is necessary for other quantifiers as well, as in (28), and for incomplete definite description, as in (29). Domain restriction can even contain a variable that is bound by some other operator in the sentence, as in (30) (see discussion in Szabolcsi 2010).

(28) All bottles are empty.

(29) Please, can you pass me the book on the semantics pragmatic interface.

(30) Every child ate every apple.

This mechanism allows deriving the non-narrowest scope readings by reducing the restrictor set to a singleton or to a function. Schwarzschild (2002) argues that the one principle of domain restriction is sufficient to explain specificity effects. At the same time one can keep to the classical interpretation of indefinite as existential quantifiers.

- (31) a Every professor rewarded every student who read a book on the semantics-pragmatics interface
- b $\forall x$ [professor(x) \rightarrow [x rewarded every student who read *a book on the s-p-i that was on top of the reading list of x.*]]

Observation:

1. The domain restriction approach is generally said to be equivalent to the *contextually determined choice function*-approach, as it adds pragmatically derived material (Schwarz 2001, Chierchia 2001). The content of the function is made explicit and added into the structure.
2. Still there seems to be a difference between other kinds of domain restrictions
 - (i) Domain restriction in cases like (28) to (30) should be hearer known, while
 - (ii) domain restriction as in (31) should be hearer unknown (see Schwarzschild's 2002, 307 privacy principle), additionally this type must result in a singleton or a function.
3. Different status of the descriptive content

- explicit given set	book
- implicit domain restriction, discourse given	recommended by professor
- implicit domain restriction, hearer unknown	his favorite book

4.4 Referential anchoring and Skolem Functions

Onea & Geist (submitted) argue that domain restriction and referential anchoring have different contextual triggers and semantic effects, as domain restriction reduces the descriptive content of the indefinite, and referential anchoring directly identifies one element of the set. They assume a classical representation of the indefinite article, represent domain restriction with the relation $R(x,y)$, and allow for referentially anchoring $m(c) = x$, which guarantees the singleton set condition. The anchoring function m and the anchor c are free variables and must be instantiated by the context.

- (32) referential anchoring as pragmatic enrichment (Onea & Geist submitted)
- i) lexical semantics: $\lambda Q. \exists x. [N(x) \ \& \ Q(x)]$
 - ii) domain restriction $\lambda Q. \exists x. [N(x) \ \& \ Q(x) \ \& \ R(x,y)]$
 - iii) referential anchoring $\lambda Q. \exists x. [N(x) \ \& \ Q(x) \ \& \ R(x,y) \ \& \ m(c) = x]$

Observation

1. It is unclear how different this approach is from domain restriction.
2. One has to formulate the different conditions under which domain.

4.5 Domain restriction and content of the function

There is an obvious relation between the definition of the function - either the simple function or the parameterized choice function and the material one can explicitly add to the indefinite. Let us assume that in the systematic co-variation case the professors buy the book that quotes them most often.

- (33)
- a Every professor buys a certain book on the semantics pragmatics interface.
 - b $\forall x$ [professor(x) \rightarrow x buys (f(x)(book on the s-p-i)]
with f a function from professors to choice function such that the choice function selects the book on the s-p-i that quotes the professor most often
 - c $\forall x$ [professor(x) \rightarrow x buys (f(x))]
with f a Skolem function from professors to books such that the book on the s-p-i quotes the professor most often.
 - d $\forall x$ [professor(x) \rightarrow $\exists y$ [book on the s-p-i(x) & quote-most-often(y,x) & buys(x,y)]]
 - e $\forall x$ [professor(x) \rightarrow x buys f(x)(λy [book on the s-p-i(y) & quote-most-often(y,x)])]
 - f Every professor buys the book on the semantics pragmatics interface that quotes him most often.

Observation:

1. Once the material is explicitly uttered in the descriptive content, the expression becomes definite.
2. In (33e) we can take any choice function, including the contextually given salient choice functions for definite noun phrases.
3. The definition of the function must be hearer-new.

Question: What kind of contexts do we need to make a difference between the explicit material in the restrictor and the definition of the function?

4.6. Summary

1. There are different ways to express the function between the anchor and the referent.
2. There are certain differences in the type of indefinite as (i) a singleton or as an individual
3. Still, all approaches link the additional operation to the “referential intentions” of the speaker (or some other agent) or to some other binder
4. Theories must make a difference between discourse given information and speaker given information
 - anchor: discourse given
 - function: hearer-new
5. There are observations that certain markers indicate that the speaker is not willing to disclose the definition of the function.

- (34) Professor Hegel hat ein gewisses Buch gekauft, #nämlich *Game Theory*.
 Professor Hegel bought a particular book, namely *Game Theory*.

5. Further questions

5.1 Semantics or pragmatics

There are languages that encode the contrast in different functional forms, such as article, case markers, indefinite pronouns or other elements. We have to assume for those languages a semantic representation.

For languages like English with only one indefinite article *a* the situation is controversial.

5.2 Semantics of non-specific indefinites

If we assume (at least for languages with specific vs. non-specific indefinite articles) two semantic representations, what is the representation for non-specific indefinites?

- (i) existential quantifiers (Fodor & Sag 1982, Reinhart 1997, Kratzer 1998, Chierchia 1998)
- (ii) existentially bound choice functions (Egli & von Stechow 1995)

5.3 Choice functions or simple functions?

Why choice functions?

- different location for scope and descriptive content
- different location for existential scope and distributive scope
- distinguishing between the given descriptive content and the intended choice (only speaker known)

Similarity between specific indefinites and definites

- generalized term creating operator – for type shifting
- similarity to functional definites (Chierchia)
- similarity to incomplete definite noun phrases
- skolemized choice functions –
- syntactic effects (weak cross over, Chierchia 2005)

Why not?

- very partial choice functions for indefinites
- no existence entailment
 - good for fictional objects
 - maybe there is no existence, but presupposition
- problems in downward entailing contexts
 - but only for quantified choice functions
- if skolemized choice functions, why not Skolem function from the beginning

Motivation for choice functions

1. for definites (Egli (1991), Egli & von Heusinger (1995))

- a contextually given (speaker-given and hearer-given) global choice function assigns particular objects to properties (sets) – that are the salient properties in the situation and the discourse.

2. for specific indefinites

a speaker given, hearer-unknown choice function could assign to properties / sets objects that correspond to the speaker's intention. These objects are situationally not salient and discourse new, still they need a permanent discourse representation

6. Summary

1. Speakers have referential intentions, i.e. they use a linguistic expression and intend to refer to a particular object. There are different means to signal such intentions.
2. If a hearer realizes that the speaker has referential intentions, he can represent this by a permanent discourse representation (without knowing the exact identity of the referent)
3. Specificity is motivated by this communicative principle, but is more deeply built into the language. It covers the relation between referents even if there is no referential intention involved.
4. The referent of a specific indefinite is functionally dependent on some discourse participant or on another expression in the sentence.
5. The anchor must be familiar to speaker and hearer, while
6. the content of the anchoring function must be unfamiliar to the hearer (to distinguish specific indefinites from definites).
7. Still the hearer has to accommodate the fact that there is a function and must establish a permanent representation for the specific indefinite.

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