Specific Indefinites
Lecture 1

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1   Introduction

The term **specific indefinite** is used to mean different things in the literature. Farkas 1994 lists three:

- **Scopal specificity**: A specific indefinite takes scope over another scopal element.

- Epistemic specificity: A specific indefinite 'refers' to an individual that the speaker can identity (but the hearer might not be able to).

- Partitive specificity: A specific indefinite has a definite domain of quantification.

We mostly focus on scopal specificity but my proposal has consequences on other understandings of 'specificity', including contrasts like (1) and (2).

(1)　　a.　Ali bought a book.
　　　　b.　Ali bought a certain book.

(2)　　Ali bir kitab(-ı)　aldı.
　　　Ali one book-ACC bought
　　　(lit.) 'Ali bought a book.'　　　　　　　　　　　　(adapted from Enç 1991: p. 5)

1.1   Background

Many theories have been developed for specific indefinites.

- Choice functions (Reinhart 1997, Winter 1997, Kratzer 1998a, Matthewson 1998, Geurts 2000, Chierchia 2001, Schwarz 2001, Schlenker 2006, Schwarz 2011)

- Presupposition projection (Cresti 1995, van Geenhoven 1998, Yeom 1998, Jäger 2007, Geurts 2010a, Onea 2015)

- Indexing theories (Abusch 1993, Farkas 1994, 1997, 2002a,b, Brasoveanu & Farkas 2011)

- Referential indefinites (Fodor & Sag 1982)

- Domain restriction ([Schwarzschild 2002](#))

- Flexible scope restrictions ([von Stechow 2000](#), [Barker 2022](#))

- Scope extension via pied-piping ([Charlow 2014](#), [2020](#), [Demirok 2019](#))

No time to go over all of these; we'll discuss the choice functional approach and my new theory.

1.2 Proposal

I propose yet another theory of specific indefinites that makes use of **dynamic presuppositions** ([Beaver 1994](#), [Elliott & Sudo 2021](#)).

In my theory specific indefinites get wide scope via presupposition projection, so the idea is similar in nature to the presuppositional theories mentioned above, but it makes better empirical predictions.

1.3 Plan

Lecture 1 Core data and choice function theories

Lecture 2 (Previous presuppositional theories)

Lecture 3 Wide scope via dynamic presuppositions

1.4 Useful overviews

- Historical account: [Ruys 2001](#)

- Detailed overview articles: [Ruys & Spector 2017](#), [Ebert 2021](#)

2 Restrictions on quantifier scope

Classical scope ambiguity:

(3)   Every boy watched a French film.
   a.   For every boy x, there is a French film that x watched.
        $\forall x[B(x) \rightarrow \exists y[F(y) \wedge W(x, y)]]$ (Surface scope; every > a)
   b.   There is a French film y and every boy watched y.
        $\exists y[F(y) \wedge \forall x[B(x) \rightarrow W(x, y)]]$ (Inverse scope; a > every)

(4)   Some man is standing in front of every building.
   a.   There is some man x and x is standing in front of every building.
        $\exists x[M(x) \wedge \forall y[B(y) \rightarrow S(x, y)]]$ (Surface scope, some > every)
   b.   For every building y, there is some man standing in front of y.
        $\forall y[B(y) \rightarrow \exists x[M(x) \wedge S(x, y)]]$ (Inverse scope; every > some)

Quantifier scope in natural language is constrained.

2.1 Scope islands

Generally, finite clauses and coordinate structures are **scope islands**. E.g., the following sentences don't have inverse scope readings.

(5)   a.   Somebody met a man who has watched every French film.

<div align="right">(*every > some)</div>

       b.   Somebody read every novel and watched TV before going to bed.

<div align="right">(*every > some)</div>

       c.   The professor hopes that no student will pass.   (*no > hope)

       d.   If no student succeeds, I will be particularly happy.   (*no > if)

Exceptions:

(6)   a.   I demanded that you read not a single book.   (Fox 2003: p. 85)

       b.   Determine whether each number in the list is even or odd.

<div align="right">(Szabolcsi 2010: p. 107)</div>

       c.   Someone is always willing to believe that every politician is corrupt.

<div align="right">(Reinhart 1997: p. 349)</div>

       d.   Every child who was born to every famous woman became famous too.

<div align="right">(Winter 1997: p. 417)</div>

       e.   A delegate who was elected from each district was disqualified.

<div align="right">(Winter 1997: p. 417)</div>

       f.   Somebody said that he could jump over every frog that Jessie did.

<div align="right">(Syrett 2015: p. 585)</div>

Paraphrases:

(7)   a.   No book is such that I demanded that you read it.

       b.   For each number x in the list, determine whether x is even or odd.

       c.   For every politician x, someone is always willing to believe that x is corrupt.

       d.   Every famous woman x is such that every child who was born to x became famous.

       e.   For each district x, a delegate who was elected from x was disqualified.

       f.   For every fog x that Jessie jumped over, someone said that he could jump over x.

Another scope island involves 'inverse linking', which is only possible with certain prepositions (May & Bale 2006).

(8)   a.   Someone from every city despises it.   (May 1977: p. 149)

       b.   Someone with every known skeleton key opened this door.

<div align="right">(May & Bale 2006: p. 643)</div>

Exercise: Which prepositions allow inverse scope??

2.2 Scope freezing

Double object constructions in English (Larson 1990: p. 603f).

(9)   You showed a child every picture.   (*every > a)

Compare:

(10) a. You showed a picture to every child.
     b. You showed every picture to a child.

2.3 Semantic constraints

Inverse scope readings are harder with downward entailing quantifiers (cf. Mayr & Spector 2012).

(11) A PhD student presented every paper.

(12) a. No PhD student presented every paper. (*every > no)
     b. A PhD student presented no paper. (*no > a)

3 Indefinites with exceptional wide scope

The classical analysis of indefinites as existential quantifiers (Russell 1905; see Heim 2011 for an overview).

(13) a. ⟦**A cat entered**⟧ = 1 iff there is a cat that entered.
     b. ⟦**Some dogs barked**⟧ = 1 iff there are some dogs that barked.

NB: For now we focus on *a NP* and *some NP(s)* (and importantly, ignore markers like *certain*). We'll come back to the question of what counts as an indefinite below.

Fodor & Sag 1982 point out that indefinite noun phrases show peculiar scope properties: their quantificational scope is not restricted, unlike other quantificational expressions like universal quantifiers and *no NP*.

3.1 Scope islands

(14) If-*clause*
     a. If every relative of mine dies, I will inherit a house. (*every > if)
     b. If some relative of mine dies, I will inherit a house. (Reinhart 1997: p. 342)

(15) *Coordinate structure*
     a. Somebody read every novel and watched TV before going to bed.
                                                              (*every > some)
     b. Everybody read some novel and watched TV before going to bed.

(16) *Inverse linking*
     a. A show with every young performer I like was unpopular.
                                                              (*every > a)
     b. Every show with a young performer I like was unpopular.

More examples from the literature:

(17) a. John overheard the rumor that a student of mine had been called before the dean.
     b. John overheard the rumor that each of my students had been called before the dean. (Fodor & Sag 1982: p. 369)

(18)   a.   If a friend of mine from Texas had died in the fire, I would have inherited a fortune.

          b.   If each friend of mine from Texas had died in the fire, I would have inherited a fortune.

          c.   If no friend of mine from Texas had died in the fire, I would have inherited a fortune.   (Fodor & Sag 1982: 369f)

(19)   a.   Each teacher overheard the rumor that a student of mine had been called before the dean.

          b.   Each teacher thinks that for a student I know to be called before the dean would be preposterous.   (Fodor & Sag 1982: p. 374)

According to Fodor & Sag 1982, (20a) is narrow scope only, (20b) is ambiguous, (20c) favours the wide scope reading.

(20)   a.   This producer believes that every actor in our company is too fat to appear in public.

          b.   This producer believes that an actor in our company is too fat to perform in public.

          c.   This producer believes that an actor in our company that he used to know in Arkansas before the war despises him.   (Fodor & Sag 1982: 368f)

Additional observations:

- *There* constructions are believed to fix scope (Fodor & Sag 1982).

  (21)   a.   If some relatives are dead, John will be happy.

            b.   If there are some dead relatives, John will be happy.

- See Reinhart 1997 for tests using sluicing and *wh*-in-situ.

- Fodor & Sag 1982 discuss a test involving VP ellipsis but it has been criticised (see Abusch 1993: fn. 3 and Ruys & Spector 2017: §3.2.2; see also Elliott & Sudo 2016 for relevant facts).

3.2 Scope freezing

(22)   a.   I showed a child every painting by Van Gogh.   (*every > a)

          b.   I showed every child a painting by Van Gogh.

(23)   a.   The professor assigned some PhD student every article in this volume. (*every > some)

          b.   The professor assigned every PhD student some article in this volume.

3.3 Semantic constraints

(24)   a.   No PhD student presented every paper about quantifiers. (*every > no)

          b.   No PhD student presented a paper about quantifiers. (It was my paper!)

4 What are indefinites?

4.1 Bare numerals

In addition to *a NP* and *some NP*, NPs modified by bare numerals, *several, many*, etc., also give rise to exceptional wide scope, so they should be seen as 'indefinites' (for our purposes).

(25) a. If two relatives of mine die, I will inherit a house.
     b. If several relatives of mine die, I will inherit a house.
     c. If many relatives of mine die, I will inherit a house.

Ruys' observation Ruys 1992 made an important observation that under the wide scope readings of (25), the distributivity still take scope inside the *if* clause. So (25a) means (26a), rather than (26b) (see also Szabolcsi 2010).

(26) a. Two relatives of mine are such that if both of them die, I will inherit a house.
     b. There are two relatives of mine, each x of whom is such that if x dies, I will inherit a house.

However, some have raised counterexamples:

(27) If some relatives of mine invite me for dinner, I will panic.

<div align="right">(Geurts 2010b: p. 134)</div>

(28) A: How many relatives will bequeath Paul a fortune if they die?
     B: If THREE relatives of Paul die, Paul will inherit a fortune.

<div align="right">(Endriss 2009: p. 111)</div>

At the same time, Winter 1997 points out that there's some truth to Ruys' generalisation nonetheless.

(29) a. If three women gave birth to John then he has a nice mother.
     b. Every artist who was born in three cities became famous.

<div align="right">(Winter 1997: p. 417)</div>

Van Geenhoven 1998: pp. 82-83 discusses this in more detail. She points out that we need to be careful with the interpretation of the conditional: it's either universal/generic, or existential (a *when*-like interpretation). And under a wide scope reading, there's no way to have the universal/generic reading, because you can only die once. In fact, with repeatable events, it's easy to get the wide scope distributive reading:

(30) If two relatives of mine show up at my place, I pretend that I am not at home.
<div align="right">(Van Geenhoven 1998: p. 83)</div>

But this is at odds with some people's intuitions who disagree with Ruys and with the observation by Endriss 2009. We'll leave this empirical question open.

4.2 Modified numerals

It seems to be a consensus that modified numerals don't give rise to exceptional wide scope, unlike bare numerals (e.g., Cresti 1995: p. 13, Reinhart 1997: §6.4, Ebert 2021: p. 5, Ruys & Spector 2017: §8).

(31)   a.   If at least two relatives of mine die, I'll inherit a fortune.
            b.   If more than two relatives of mine die, I'll inherit a fortune.
            c.   If between two and five relatives of mine die, I'll inherit a fortune.
            d.   If at most five relatives of mine die, I'll inherit a fortune.
            e.   If less than five relatives of mine die, I'll inherit a fortune.

4.3 Bare plurals

Bare plurals in English always take narrow scope (Carlson 1977, van Geenhoven 1998, Dayal 2011).

(32)   a.   If relatives of mine die, I'll inherit a fortune.
            b.   If some relatives of mine die, I'll inherit a fortune.

(33)   a.   Everyone watched French movies.
            b.   Everyone watched some French movies.

Van Geenhoven 1998 observes that incorporated nouns in West Greenlandic and German split topics show similar interpretive properties.

4.4 *Certain*

There is quite a lot of work on specificity markers like *certain* (Hintikka 1986, Enç 1991, Schwarz 2001, Farkas 2002b, Schlenker 2006, Endriss 2009, Ionin 2010, Schwarz 2011, Solomon 2011, Ionin 2015).

Enç 1991 asks an important question: What's the difference between (34a) and (34b)? It can't be scopal, or even truth-conditional!

(34)   a.   Ali bought a book.
            b.   Ali bought a certain book.

I will argue that there is a presuppositional difference between them.

Schwarz 2001 made an important observation: *certain* sometimes gives rise to more interpretations than unmarked indefinites.

(35)   a.   No boy tried every dish that a certain female relative of his had made.
            b.   No boy tried every dish that a female relative of his had made.

(Schwarz 2011: p. 893)

(35a) has a 'functional reading', (35b) doesn't, e.g. no boy tried every dish that his mother had made, but some tried every dished that his sister made.

Related observations:

- *There*-sentences with *certain* (Richard Breheny, p.c.).

(36) a. If there is a dead relative of John's, he'll be happy.
b. If there is a certain dead relative of John's, he'll be happy.

- Schlenker sentences (Schlenker 2006, Solomon 2011)

(37) *Context: Every student in my syntax class has one weak point—John doesn't understand Case Theory, Mary has problems with Binding Theory, etc. Before the final I say:*
a. If each student makes progress in some area, nobody will flunk the exam.
b. If each student makes progress in a certain area, nobody will flunk the exam.
c. If each student makes progress in an area, nobody will flunk the exam. (adapted from Schlenker 2006: p. 299)

- Intermediate scope readings are easier with *certain* (but do not require it). E.g., Fodor & Sag 1982 claim that the examples in (38) have no intermediate scope readings, but the example in (39) does (without explaining why).

(38) a. Each teacher overheard the rumor that a student of mine had been called before the dean.
b. Each teacher thinks that for a student I know to be called before the dean would be preposterous. (Fodor & Sag 1982: p. 374)

(39) Tom said that Sandy believes that a certain boy has been cheating.
(Fodor & Sag 1982: p. 362)

Examples of intermediate scope readings without *certain*:

(40) a. Every teacher overheard the rumor that a student of his had been called before the dean. (Kratzer 1998b: p. 166)
b. Every professor rewarded every student who read a book he had recommended.
(Abusch 1993: p. 90)
c. Each choreographer believes that it would be damaging for a dancer of his to quit the company. (Abusch 1993: p. 92)
d. Every professor got a headache whenever a student he hated was in class. (Abusch 1993: p. 95)

(41) a. Each student has to come up with three arguments which show that some condition proposed by Chomsky is wrong.
b. Everybody told several stories that involved some member of the Royal family. (Farkas 1981: p. 64)

(42) a. Each professor had a dream that a famous football player ran for President.
b. Each author in this room despises every publisher who would not publish a book that was deemed pornographic. (King 1988: p. 434)

(43) a. At most four committee members resisted a proposal that a candidate be turned down.

       b.   At most four committee members resisted a proposal that every candidate be turned down.   (Abusch 1993: p. 92)

(44)   A: John is a total neurotic. He got so worked up when Chomsky gave a talk.
         B: Big deal. *Everybody* got nervous when *some speaker* talked.
         B':   *Somebody* got nervous when *almost every speaker* talked.[1]
                         (Abusch 1993: p. 94)

(45)   a.   Every gambler will be surprised if one horse wins.[2]
       b.   Every purported miracle attributed to Moses would have been less impressive if a now uncontroversial scientific theory had been known at the time.
       c.   Every one of them moved to Stuttgart because a woman lived there.
                         (Abusch 1993: p. 94)

(46)   a.   Most linguists have looked at every analysis that solves some problem.
       b.   Each student has to find all arguments in the literature which showed that some condition proposed by Chomsky is wrong.
                      (Reinhart 1997: p. 346)

(47)   a.   Every movie director is happy to direct every film that features some actor.
       b.   Every country's security will be threatened if some building is attacked by terrorists.   (Winter 1997: p. 431)

(48)   John wasn't examined by every professor competent on some problem.
                       (Schwarz 2011: p. 889)

(49)   a.   When everybody an agent works with trusts him, he is usually a traitor.
       b.   Rarely does every critic who reviews a book by Henry Miller like it.
                      (Abusch 1993: p. 93)

(50)   a.   Every critic who reviews each and every book that some author writes quickly grows sick of him.
       b.   Every country whose security is threatened if a building is attached by terrorists protects it well.
       c.   Whenever Beatrix overhears the rumor that some politician is corrupt, the poor slob loess his job.   (Ruys & Spector 2017: p. 23)

5 Choice functions

5.1 Definition

Choice functions take a non-empty set and return a member of the set.

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[1]Abusch 1993: fn. 10 remarks that this sentence sounds better with *every*, which would be another exception to the finite clause island constraint.

[2]Abusch 1993: fn. 11 observes that the intermediate scope reading of this sentence is not possible with *a*, but ok with *some*.

(51)   A function f from sets of individuals to individuals is a *choice function*, if for each non-empty set S, $f(S) \in S$.

Let $\mathsf{CF} \coloneqq \{\, f \mid f \text{ is a choice function} \,\}$.

According to (51), a choice function maps $\varnothing$ to an arbitrary individual, but this is arguably not good for natural language applications. We'll discuss modifications proposed by Winter 1997, 2001 later.

5.2 Choice function indefinites

Reinhart 1997 and Winter 1997 propose to use choice functions to account for indefinites with exceptional scope.

When no confusion arises, I'll write $f(P)$ for $f(\{\, x \mid P(x) \,\})$.

(52)   A woman entered.
   a. $\exists f \in \mathsf{CF}[E(f(W))]$
   b.   'There is some way f of choosing a woman such that the woman chosen by f entered.

(53)   If some relative of Mary's dies, she'll inherit a fortune.
   a. $\exists f \in \mathsf{CF}[(D(f(\{\, x \mid R(x,m) \,\}))) \rightarrow I(m)]$
   b.   'There is a way f of choosing a relative of Mary's such that if the relative of Mary's chosen by f dies, Mary will inherit a fortune.'

(54)   John has looked at every analysis that solves some problem mentioned in the textbook.   (Schwarz 2011: p. 881)
   a. $\exists f \in \mathsf{CF}[\forall x[(A(x) \land S(x, f(P))) \rightarrow L(j,x)]$
   b.   'There's a way f of choosing a problem such that John looked at every analysis that solves the problem chosen by f.'

Reinhart 1997 assumes that indefinites are ambiguous between a choice function reading and an ordinary quantificational reading, the latter of which obeys the scope constraints (also Kratzer 1998b, Matthewson 1998).

Winter 1997, 2001 argues against this assumption, favouring a uniform account where all indefinites are choice functional, but this difference doesn't concern us here. Let us assume Winter's version for the sake of simplicity.

5.3 Some compositional details

A Heim-and-Kratzer style implementation in an extensional system:

(55)   a. $[\![\mathbf{cat}]\!] = \lambda x_e.\ x$ is a cat
       b. $[\![\mathbf{purred}]\!] = \lambda x_e.\ x$ purred

(56)   a. $[\![\mathbf{a}_\xi]\!] = [\![\mathbf{some}_\xi]\!] = \lambda P_{\langle e,t \rangle}.\ g(\xi)(\{\, x \mid P(x) = 1 \,\})$
       b. $[\![\mathbf{a}_\xi\ \mathbf{cat}]\!] = [\![\mathbf{some}_\xi\ \mathbf{cat}]\!] = g(\xi)(\{\, x \mid [\![\mathbf{cat}]\!](x) = 1 \,\})$

(57)   EXISTENTIAL CLOSURE: For any constituent ϕ of type t,
$$\left[\!\!\left[\underset{\exists^\xi \quad \phi}{\overset{\frown}{}} \right]\!\!\right]^g = 1 \text{ iff for some } f \in \mathsf{CF},\ [\![\phi]\!]^{g[\xi \mapsto f]} = 1$$

$$\left[\!\!\left[\begin{array}{c} \exists^3 \\ \text{DP} \quad \text{VP} \\ \mathbf{a}_3 \quad \mathbf{cat} \quad \mathbf{purred} \end{array} \right]\!\!\right]^{g} = 1$$

iff for some $f \in \mathsf{CF}$, $\left[\!\!\left[\begin{array}{c} \text{DP} \quad \text{VP} \\ \mathbf{a}_3 \quad \mathbf{cat} \quad \mathbf{purred} \end{array} \right]\!\!\right]^{g[3 \mapsto f]}$

$= [\![\mathbf{purred}]\!]^{g[3 \mapsto f]}\left(\left[\!\!\left[\begin{array}{c} \text{DP} \\ \mathbf{a}_3 \quad \mathbf{cat} \end{array} \right]\!\!\right]^{g[3 \mapsto f]} \right)$

$= [\![\mathbf{purred}]\!]^{g[3 \mapsto f]}([\![\mathbf{a}_3]\!]^{g[3 \mapsto f]}([\![\mathbf{cat}]\!]^{g[3 \mapsto f]}))$

$= [\![\mathbf{purred}]\!]^{g[3 \mapsto f]}(f(\{\, x \mid [\![\mathbf{cat}]\!]^{g[3 \mapsto f]}(x) = 1 \,\}))$

$= [\![\mathbf{purred}]\!]^{g[3 \mapsto f]}(f(\{\, x \mid x \text{ is a cat} \,\}))$

$= 1$

iff for some $f \in \mathsf{CF}$, $f(\{\, x \mid x \text{ is a cat} \,\})$ purred

iff at least one cat purred

One could implement this in a dynamic semantics but it needs to be made sure that Existential Closure can apply at various scope sites, as in the statistic system.

(58) No one read a paper about quantification.
    a. $\exists^8$ [no one read a_8 paper about quantification]   (Wide scope)
    b.   No one $\exists^8$ [read a_8 paper about quantification]   (Narrow scope)

Some don't assume such flexible Existential Closure (Kratzer 1998b, Matthewson 1998), but that will cause empirical issues, as we will discuss later.

The narrow scope reading could be derived in one of two ways (depends on your syntactic assumptions too).
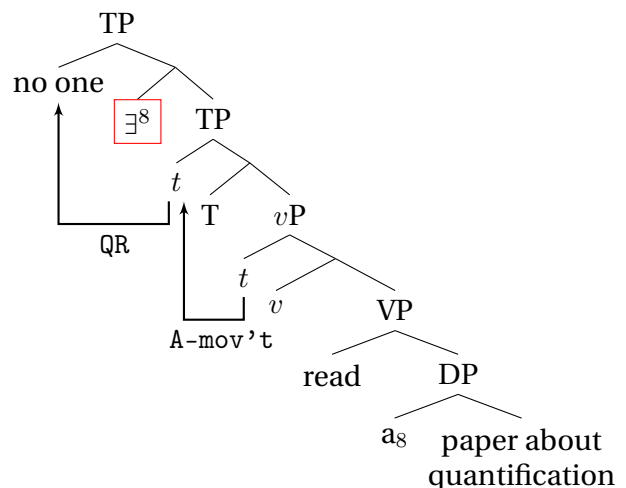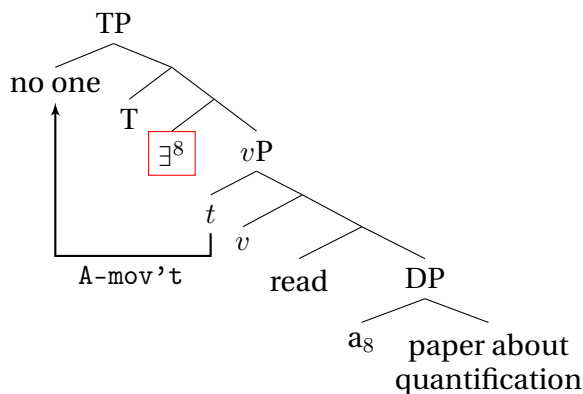
6 Intermediate scope readings

Both Reinhart 1997 and Winter 1997 derive intermediate scope readings with Existential Closure at intermediate scope positions.

(59)   Each student has to come up with three arguments which show that some condition proposed by Chomsky is wrong.   (Farkas 1981: p. 64)
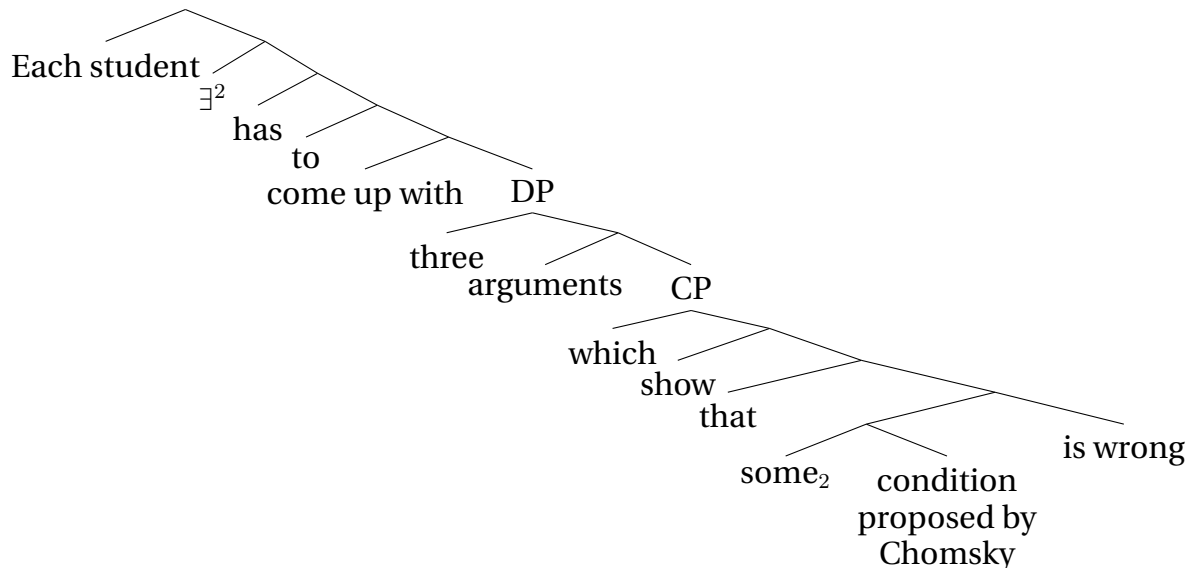

(60)   (59) is true iff for each student x, there is $f \in \mathsf{CF}$ such that

x has to come up with three arguments which show that

$f(\{\, y \mid y \text{ is a condition Chomsky proposed} \,\})$ is wrong

The choice function denoted by the indefinite determiner picks out one particular individual out of the NP denotation, and that individual behaves scopeless with respect to the operators above it... until the semantic derivation hits $\exists$.

Choice functions can also deal with the examples that are problematic for referential theories like Schwarzschild 2002: Existential Closure can apply below negative operators.

(61)   No boy ate all the cookies that a girl in his class brought.

(62)   John wasn't examined by every professor who is competent on some problem.   (Ruys & Spector 2017: p. 32)

John wasn't ∃⁵ VP PP
t examined by DP
every professor who is competent on some₅ problem

John wasn't $\exists^5$

VP   PP

t examined   by   DP

every professor

who is competent on some_5 problem
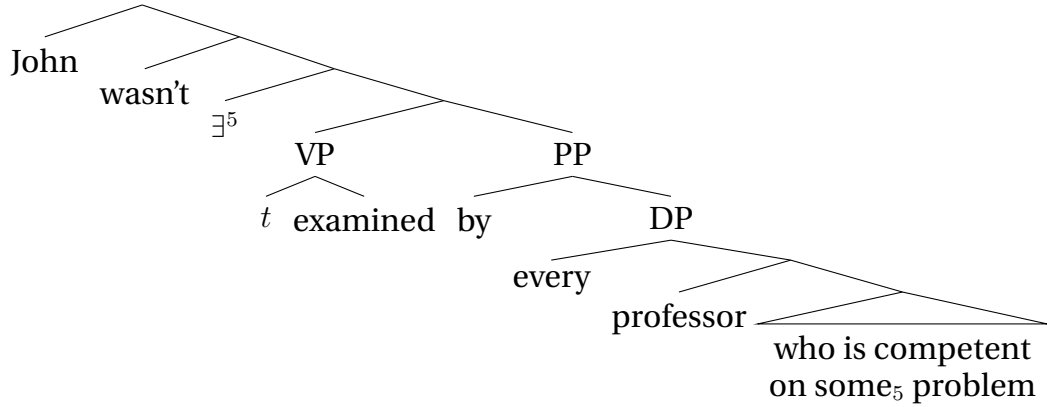
(63) (62) is true iff there is no $f \in \mathsf{CF}$ such that John was examined by every professor who is competent on $f(\{\, x \mid x \text{ is a problem} \,\})$

7 Plurality

7.1 Ruys' observation

The choice functional analysis straightforwardly explain Ruys' observation (Reinhart 1997, Winter 1997, 2001).

For indefinites with bare numerals, let us postulate an empty determiner denoting a choice function (not the only possible analysis). Bare numerals are modifiers.

(64) a. $[\![\varnothing_\xi]\!] = \lambda P_{\langle e,t \rangle}.\, g(\xi)(\{\, x \mid P(x) = 1 \,\})$
   b. $[\![\textbf{three}]\!] = \lambda P_{\langle e,t \rangle}.\lambda x_e.P(x) = 1$ and x has exactly three distinct atomic parts
   c. $[\![\textbf{cities}]\!] = \lambda x_e.$ each atomic part of x is a city

(65) $\exists^1$ Every artist who was born in $\varnothing_1$ three cities became famous.

(66) $[\![(65)]\!] = 1$ iff there is $f \in \mathsf{CF}$ such that
   every artist who was born in $f(\{\, x \mid [\![\textbf{three cities}]\!](x) = 1 \,\})$ became famous.

(NB: This is an *at-least* reading)

Reinhart 1997 claims that there's no reason why *three* cannot function as a determiner as well. For her, indefinites in general are ambiguous between choice functional indefinites and Generalised Quantifiers (GQs). Not so for Winter 1997.

The GQ denotation of *three* will look like (67). $\sup()$ is the supremum operator (with respect to the Linkian part-whole relation; Link 1983).

(67) $[\![\textbf{three}_{\textbf{GQ}}]\!] = \lambda P_{\langle e,t \rangle}.\lambda Q_{\langle e,t \rangle}.\, \sup(\{\, x \mid P(x) = Q(x) = 1 \,\})$ has (exactly) three distinct atomic parts

NB: P and Q can be predicates of plurals, so we can't simply count the individuals that make P and Q true; we have to count the atomic individuals that are part of such individuals (Landman 1989). Here, it makes a difference whether to encode maximality ('exactly') in the meaning (and we remain silent about it).

7.2   Modified numerals

Both Reinhart and Winter assume that modified numerals are always GQs. Then by assumption, they won't give rise to exceptional wide scope. Note that we do want maximality here (at least for upper bounded modified numerals; see Buccola & Spector 2016).

(68) $[\![\textbf{between 2 and 5}_{\textbf{GQ}}]\!] = \lambda P_{\langle e,t \rangle}.\lambda Q_{\langle e,t \rangle}.$ the (maximal) number of distinct atomic parts of $\sup(\{\, x \mid P(x) = Q(x) = 1 \,\})$ is between 2 and 5

However, given 'phantom readings' (Marty, Chemla & Spector 2015), we might want to have the same ambiguity for upper-bounded modified numerals: E.g.,

(69)   Between 2 and 5 relatives of Mary's died.

If *between 2 and 5* can be a modifier, as in (70), and if (69) can be interpreted via a choice function, we'll get the truth-conditions in (71).

(70) $[\![\textbf{between 2 and 5}]\!] = \lambda P_{\langle e,t \rangle}.\lambda x_e.P(x) = 1$ and x has bewteen 2 and 5 distinct atomic parts

(71) $[\![(69)]\!] = 1$ iff there is $f \in \mathsf{CF}$ such that
$f(\{\, x \mid [\![\textbf{between 2 and 5 relatives of Mary's}]\!](x) = 1 \,\})$ died.

This is also an *at least* reading (cf. Winter 1997: §3.5). For example, it will be true in a context where 10 relatives of Mary's died, because in such a context, we can use a choice function f that picks a group of, say, three relatives of Mary's that died, and make the sentence true.

Note that phantom readings don't require choice functions. A simple existential quantifier quantifying into an upper-bounded modified numeral also readings in an 'at-least' reading (van Benthem 1986: pp. 51–54).

No one has so far discussed exceptional wide scope phantom readings:

(72)   a.   Every artist who was born in between 2 and 5 cities became famous.
        b.   If between 2 and 5 relatives of Mary's die, she will inherit a fortune.

The truth-conditions predicted with wide-scope choice functions will be:

(73)   a. $[\![(72a)]\!] = 1$ iff there is $f \in \mathsf{CF}$ such that
             every artist who was born in $f(\{\, x \mid [\![\textbf{between 2 and 5 cities}]\!](x) = 1 \,\})$
             became famous.
        b. $[\![(72b)]\!] = 1$ iff there is $f \in \mathsf{CF}$ such that
             if $f(\{\, x \mid [\![\textbf{between 2 and 5 relatives of Mary's}]\!](x) = 1 \,\})$ died, then
             Mary will inherit a fortune.

- (73a) is still about artists that were born in multiple cities, so should be #.

- (73b) has a sensible lower-bounded reading.

Note that since the distributivity is still trapped in the finite clause, it's an orthogonal question why the following have wide scope distributive readings (for some speakers).

(74)   If three relatives of Mary's die, she will inherit a fortune.

(75)   If some relatives of mine invite me for dinner, I will panic.

8   The empty set problem and Winter's modification

Winter 1997: §4.1 discusses the 'empty set problem': Technically, a choice function applied to $\varnothing$ returns an arbitrary individual.

(51)   A function f from sets of individuals to individuals is a *choice function* if for each non-empty set S, $f(S) \in S$.

Consider:

(76)   A circular square lives in Sicily.

The predicted truth-conditions are:

(77)   (76) is true iff there is $f \in \mathsf{CF}$ such that $f(\varnothing)$ lives in Sicily.

Since some choice function maps $\varnothing$ to Daniele Panizza, who lives in Sicily, the sentence is predicted to be true.
We don't want to say that a choice function indefinite presupposes that the NP denotation is non-null, as in (78).

(78) $[\![\mathbf{a}_\xi]\!] = \lambda P_{\langle e,t\rangle}\colon \exists x[P(x) = 1].\, g(\xi)(\{\, x \mid P(x) = 1\,\})$

This will predict that (79) will be presupposition failure, rather than false (similarly for (76), but this example might be # for other reasons).

(79)   This summer Mary read a romantic novel that Chomsky wrote.

Judgments about presupposition failure are sometimes not so straightforward (von Fintel 2004, Abrusán & Szendrői 2013; see also Geurts 2000 and Winter 2001: §3.4.3 for related discussion), but it seems that in this case there's a contrast with (80).

(80)   This summer Mary read the romantic novel that Chomsky wrote.

Winter 1997: §4.1 proposes a modification of the definition of choice functions so that when a choice function is applied to $\varnothing$, it will yield the trivial GQ $\bot$:

(81) $\bot \coloneqq \lambda P_{\langle e,t\rangle}.\, 0$

(82)   A function f from sets of individuals to individuals is a *choice function* if for each non-empty set S, $f(S) \in S$, <u>and $f(\varnothing) = \bot$</u>.

Winter 2001: §3.4.2 proposes a slightly different implementation of the same idea: He 'lifts' the choice function to a quantificational determiner that asserts that the NP is non-null.

(83) $[\![\mathbf{a}_\xi]\!] = \lambda P_{\langle e,t\rangle}.\lambda Q_{\langle e,t\rangle}.$ for some x, $P(x) = 1$ and $Q(g(\xi)(\{\, y \mid P(y) = 1\,\})) = 1$

9 Problems of the simple choice functional analysis

9.1 Problem 1: Overgeneration?

Recall that the original examples from Fodor & Sag 1982 don't seem to have intermediate scope readings.

(84)   a.   Each teacher overheard the rumor that a student of mine had been called before the dean.
       b.   Each teacher thinks that for a student I know to be called before the dean would be preposterous.   (Fodor & Sag 1982: p. 374)

Existential closure under the top-most quantifier will yield the intermediate scope reading.

9.2 Problem 2: Bound pronouns

Recall that some examples of intermediate scope readings involve bound pronouns.

(85)   Every professor rewarded every student who read a book he had recommended.
                                                  (Abusch 1993: p. 90)

The intermediate scope reading of (85) can be dealt with with Existential Closure under *every* as well.

(86)
$$\left[\!\!\left[\begin{array}{l} \textbf{every professor } \lambda 8 \\ \quad \exists^3 \, t_8 \textbf{ rewarded} \\ \qquad \textbf{every student who read } \mathbf{a}_3 \textbf{ book he}_8 \textbf{ had recommended} \end{array} \right]\!\!\right]^g = 1$$
     iff for each professor x, there is $f \in \mathsf{CF}$ such that x rewarded
         every student who read $f(\{\, y \mid y \text{ is a book that } x \text{ had recommended}\,\})$

Let us also consider what will happen if Existential Closure applies above *every professor*:

(87)
$$\left[\!\!\left[\begin{array}{l} \exists^3 \textbf{ every professor } \lambda 8 \\ \quad t_8 \textbf{ rewarded} \\ \qquad \textbf{every student who read } \mathbf{a}_3 \textbf{ book he}_8 \textbf{ had recommended} \end{array} \right]\!\!\right]^g = 1$$
     iff there is $f \in \mathsf{CF}$ such that for each professor x, x rewarded
         every student who read $f(\{\, y \mid y \text{ is a book that } x \text{ had recommended}\,\})$

- Suppose that different professors recommended different books. Then f will pick out a different book for different professors, so this is indistinguishable from the intermediate scope reading.

- But what if every professor happen to have recommended the exact same set of books? Then, f will return one and the same book for each professor. So it will look like a 'wide scope indefinite'. Winter 1997: p. 444, Winter 2001: p. 115f, and Geurts 2000: §3 seem to assume that this reading doesn't exist; but I'm not so sure.

- What if some of the professors recommended the same books? Then f has to return the same book for all of these professors. This might not be a good result, but since the intermediate scope reading is possible, it's hard to see if it's really problematic (Winter 2001: p. 115f makes a similar remark).

Schwarz 2001, 2011 points out that a clearer issue arises with non-upward monotonic quantifiers.

(88)   No professor rewarded every student who read a book he had recommended.

Existential Closure below *no professor* will account for the intermediate scope reading.
But crucially, nothing prevents us from applying it above the negative quantifier.

(89) $$\left[\!\!\left[\begin{array}{l} \exists^3 \textbf{ no professor } \lambda 8 \\ \quad t_8 \textbf{ rewarded} \\ \qquad \textbf{every student who read a}_3 \textbf{ book he}_8 \textbf{ had recommended} \end{array}\right]\!\!\right]^g = 1 \text{ iff}$$
there is $f \in \mathsf{CF}$ such that for no professor x, x rewarded
    every student who read $f(\{\, y \mid y \text{ is a book that } x \text{ had recommended}\,\})$

Suppose that different professors recommended different sets of books. Then (89) can be verified by finding some way of choosing f such that for each professor, there is a book that they recommended such that they didn't reward every student who read it. In other words, it means (90).

(90)   For no professor, every book that he recommended is such that he rewarded every students that read it.

This is not a possible reading of the sentence.
The same problem arises with a simpler example:

(91)   No boy likes a relative of his.

When Existential Closure is applied above *no boy*, it will mean (92a), which is what (92b) expresses. Clearly (91) cannot mean that.

(92)   a.   There is $f \in \mathsf{CF}$ such that no boy x likes $f(\{\, y \mid y \text{ is a relative of } x\text{'s}\,\})$.
        b.   No boy likes every relative of his.

Consider also:

(93)   Exactly one candidate submitted a (single-authored) paper they wrote.

With Existential Closure above *exactly one candidate*, we get the following truth-conditions:

(94)   There is $f \in \mathsf{CF}$ such that
            a candidate x submitted $f(\{\, y \mid y \text{ is a paper } x \text{ wrote}\,\})$ and
                no other candidates z submitted $f(\{\, y \mid y \text{ is a paper } z \text{ wrote}\,\})$

This can be made true when every candidate submitted a paper they wrote, e.g.:

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(95)   a.   Candidate A wrote papers p_{A1}, p_{A2}, p_{A3}, and submitted p_{A1} only.
        b.   Candidate B wrote papers p_{B1}, p_{B2}, and submitted p_{B1} only.
        c.   Candidate C wrote paper p_{C1}, and submitted p_{C1}.

Then there's a choice function that verifies (94), e.g.,

$$
\begin{bmatrix}
\{\, y \mid y \text{ is a paper that Candidate A wrote} \,\} \mapsto p_{A3} \\
\{\, y \mid y \text{ is a paper that Candidate B wrote} \,\} \mapsto p_{B2} \\
\{\, y \mid y \text{ is a paper that Candidate C wrote} \,\} \mapsto p_{C1} \\
\vdots
\end{bmatrix}
$$

So for sentences with non-upward monotonic quantifiers, we don't want Existential Closure to be able to apply above them.

To circumvent this overgeneration problem, Schwarz 2001 proposes a condition that prohibits relevant LFs ('Condition A' in Schwarz 2011):

(96)   Integrity Condition: A choice function variable and its Existential Closure cannot be separated by an operator binding a variable in the indefinite.

9.3   Functional readings

However, Schwarz 2001 points out that this constraint will undergenerate.

(97)   No boy talked with a certain female relative of his about girls.

(Schwarz 2001: p. 890)

This can be judged as true in a context where each boy didn't talked with his mother about girls but some of them did with their sisters, for example.

- To obey the Integrity Condition, Existential Closure has to happen below *no boy* but that amounts to the narrow scope reading, 'No body talked with any female relative of his about girls', which is false in the above scenario.

- Furthermore, Existential Closure above *no boy* will yield a reading that is too weak, i.e., 'No body talked with every female relative of his about girls'. This reading doesn't seem to exist.

Rather, the wide scope reading of (97) amounts to a reading about *natural functions*, e.g., the function from the boys to their mothers, the function from the boys to their sisters, the function from the boys to their closest female relative, etc. (Endriss 2009; see Groenendijk & Stokhof 1984: p. 174f for functional answers to multiple *wh*-questions).

Schwarz 2001 points out that the function reading is unavailable with plain indefinites:

(98)   No boy talked with a female relative of his about girls.

So perhaps we need to encode some meaning in *certain* such that it gives rise to a functional reading. But it seems that that will anyway violate the Integrity Condition, as long as we use choice functions.

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9.4 Problem 3: Undergeneration

Schlenker 2006 discusses a reading that cannot be accounted for with simple choice functions.

(99)   *Context: Every student in my syntax class has one weak point—John doesn't understand Case Theory, Mary has problems with Binding Theory, etc. Before the final I say:*
   a.   If each student makes progress in some area, nobody will flunk the exam.
   b.   If each student makes progress in a certain area, nobody will flunk the exam.
   c.   If each student makes progress in an area, nobody will flunk the exam.

   (adapted from Schlenker 2006: p. 299)

- ($\exists >$ if $>$ every): This reading is about one particular area, so that's just false in the above scenario.

- (if $> \exists >$ every): This is still the same area for all the students, meaning 'If there is an area that all the students make progress in, nobody will flunk the exam', so it's false.

- (if $>$ every $> \exists$): This is now too strong, roughly meaning 'If everyone makes any type of progress, nobody will flunk the exam', and again false.

The true reading seems to be some thing like: For the function f that maps each student to the area they need to work on, if each studnet x makes progress in $f(x)$, nobody will flunk the exam. But we don't seem to have the variable x in (99).

You might be tempted to postulate an implicit restriction with a bound pronoun, e.g., *some area* is read as *some area that they are unfamiliar with* where *they* is bound by *each student* (similarly to 'paycheck pronouns'). Then we wouldn't need to refer to a function. However, if such a covert description is available, it should be available in (100) as well, but (100) cannot mean the same thing.

(100)   If each student makes progress in at least one area, nobody will flunk the exam.

Chierchia 2001 and Schlenker 2006 conclude that we need *Skolemised choice functions* to derive the desired reading. Before talking about this idea, let's discuss intensionality.

10   Intensionality

10.1   Intensionality and the Integrity Condition

Because the indefinite never leaves the scope island, it should be able to get a *de dicto*/opaque reading. Reinhart 1997, Winter 1997, and Geurts 2000 seem to think that this is a problem and that wide scope indefinites only get *de re*/transparent readings.

(101)   Paul asked me whether a French student of mine has already graduated.

Suppose that I have an Italian student, who Paul wrongly thinks is French. He asked me whether she has already graduated (and he didn't ask me whether I have had a French student in the past). According to the above authors, (101) is false in such a scenario.

I'm not so sure about the judgment, but let's consider the predictions. We'll use a simpler example, so that we won't have to deal with question semantics.

(102)   Paul denied that a French student of mine has already graduated.

(103) $[\![\mathbf{denied}]\!]^{w,g} = \lambda p_{\langle s,t \rangle}.\lambda x_e.$
         for every possible world w' compatible with what x said in w, $p(w') = 0$

Let's assume that everything is read *de dicto*/opaquely. With Existential Closure at the top-most position, we'll get the following truth-conditions:

(104)   (102) is true with respect to w iff there is $f \in \mathsf{CF}$ such that
         for every possible world w' compatible with what Paul said in w,
             $f(\{\, x \mid x$ is a French student of mine in $w' \,\})$ has not graduated in w'

Crucially, in different worlds compatible with what Paul said, I could have different sets of French students (e.g, Paul didn't say anything about the identities of my French students), and in that case, f won't have to pick out the same student.

To be concrete, suppose:

(105)   I have no French student but Paul said:
         a.   that I have three French students;
         b.   that one of them has graduated for sure;
         c.   that either one of the other two has graduated, but he doesn't know which (so couldn't say which).

The narrow scope reading (i.e., EC under *denied*) is falsified, due to (105b). But the truth-conditions in (104) will be true, because we can pick a choice function f that assigns each world compatible with what Paul said a French student of mine in that world that hasn't graduated yet. But intuitively, the sentence does not sound true.

In fact, the reading in question violates the Integrity Condition, with the modal *denied* being the quantifier and the intensional variable being the bound pronoun variable.

With the Integrity Condition, the only admissible LF is the one where the NP of the indefinite is read *de re*/transparent (however you achieve that).

(106)   (102) is true with respect to w iff there is $f \in \mathsf{CF}$ such that
         for every possible world w' compatible with what Paul said,
             $f(\{\, x \mid x$ is a French student of mine in $w \,\})$ has not graduated in w'

10.2   Intensional choice functions

Reinhart 1997 proposes a different solution that uses intensional choice functions. The idea is to fix the world variable at the point of Existential Closure.

(107) An *intensional choice function* f maps (i) any possible world w and (ii) any function s from possible worlds to sets of individuals to:
   a. a member of $s(w)$ if $s(w)$ is not empty
   b. $\bot$ if $s(w)$ is empty.

Let ICF be the set of all intensional choice functions.

(108) INTENSIONAL EXISTENTIAL CLOSURE: For any constituent ϕ of type t,

$$\left[\kern-0.15em\left[\overset{\frown}{\underset{\exists\xi \quad \phi}{}} \right]\kern-0.15em\right]^{w,g} = 1 \text{ iff for some } f \in \mathsf{ICF},\; \llbracket\phi\rrbracket^{w,g[\xi\mapsto f(w)]} = 1$$

(109) a. $\llbracket \mathbf{a}_\xi \rrbracket^{w,g} = \lambda P_{\langle s,\langle e,t\rangle\rangle}.\, g(\xi)(\lambda w'_s.\,\{\, x \mid P(w')(x) = 1 \,\})$
       b. $\llbracket \mathbf{cat} \rrbracket^{w,g} = \lambda x_e.\, x \text{ is a cat in } w$

(110) *Intensional Functional Application (without presupposition projection)*
   If α is a branching node with β and γ as daughter constituents such that $\llbracket\beta\rrbracket^{w,g} \in D_{\langle\langle s,\sigma\rangle,\tau\rangle}$ and $\lambda w'.\llbracket\gamma\rrbracket^{w',g} \in D_{\langle s,\sigma\rangle}$, then $\llbracket\alpha\rrbracket^{w,g} = \llbracket\beta\rrbracket^{w,g}(\lambda w'.\llbracket\gamma\rrbracket^{w',g})$.
   (cf. Heim & Kratzer 1998)

10.3 *De dicto*/opaque wide scope indefinites?

But both solutions will make wide scope indefinites always *de re*/transparent. Let's see if that's really a good prediction.

In (111), *certain* seems to give rise to a reading that violates the Integrity Condition (as before), and that seems to be compatible with the *de dico*/opaque reading of the NP. Is the *de dicto*/opaque reading also available without *certain*?

(111) Bill believes that there are unicorns in the forest near his house, and thinks that one of them has a golden mane and often comes to his garden, when people are not around.
   a. Bill thinks that a (certain) unicorn that lives in the forest often comes to his garden.
   b. Bill hopes that he will be friends with a (certain)/some unicorn that lives in the forest.
   c. Bill asked me if a (certain)/some unicorn that lives in the forest is afraid of people.

(112) If some alumni of UCL are still doing semantics 10 years from now, I can say that this seminar was not useless.

11 Skolemised choice functions

11.1 Schlenker's reading and Skolemised choice functions

Recall Schlenker's 2006 observation:

(99) *Context: Every student in my syntax class has one weak point—John doesn't understand Case Theory, Mary has problems with Binding Theory, etc. Before the final I say:*
   a. If each student makes progress in some area, nobody will flunk the exam.

b. If each student makes progress in a certain area, nobody will flunk the exam.
c. If each student makes progress in an area, nobody will flunk the exam.
(adapted from Schlenker 2006: p. 299)

Chierchia 2001 and Schlenker 2006 claim that we need *Skolemised choice functions* here.

(113) A *Skolemised choice function* maps a sequence of individuals $x_1, \ldots x_n$ to a choice function.

We call the number n of individuals a Skolemised choice function takes its *arity*. Normal choice functions are Skolemised choice functions of arity 0.
With Existential Closure at the top-most level:

(114) (99) is true iff for a Skolemised choice function f of arity 1,
if each student x makes progress in $f(x)(\{\, y \mid y \text{ is an area} \,\})$, nobody will flunk the exam.

11.2 Intermediate scope readings

The intermediate scope reading of (59) can be derived with a wide scope Existential Closure with a variable over Skolemised choice functions.

(59) Each student has to come up with three arguments which show that some condition proposed by Chomsky is wrong. (Farkas 1981: p. 64)

(115) (59) is true iff there is a Skolemised choice function f of arity 1 such that
each student x has to come up with three arguments which show that $f(x)(\{\, y \mid y \text{ is a condition proposed by Chomsky} \,\})$ is wrong

For different values of x, $f(x)$ can be a different choice function, so this is what's been called the intermediate scope reading.

- See Chierchia 2001 for discussion of word-order effects, which he analyses as Weak Crossover effects and takes to be (indirect) evidence for the Skolemised choice functional analysis.

- Kratzer 1998b goes one step further: We no longer need to existentially close the variable; just leave it free, and pragmatics will resolve it, similarly to free pronouns. She argues that this is why we feel that wide scope indefinites sound like the speaker has some particular individual in mind.

11.3 Need for flexible Existential Closure

But Kratzer's 1998 idea undergenerates. Chierchia 2001 points out that there are cases of intermediate scope readings that cannot be accounted for with wide scope Skolemised choice functions (see also Schwarz 2001).

(116) Not every linguist studied every conceivable solution that some problem might have. (Chierchia 2001: p. 60)

(62)   John wasn't examined by every professor who is competent on some prob-
         lem.

Because negation doesn't bind variables, the Skolemised choice function won't be dependent on it.

To derive the intermediate scope reading of the above examples, we need to be able to have Existential Closure under the negation.

(117)   (62) is true iff it is not the case that
              there is a Skolemised choice function of arity 0 such that
                  John was examined by
                      every professor who is competent on $f(\{\, y \mid y \text{ is a problem}\,\})$

Therefore, we will assume a version of the Skolemised choice function theory that allows flexible Existential Closure.

11.4   Problem: indefinites in non-upward monotonic contexts

There is a big issue with Skolemised choice functions, however. Chierchia 2001 and Schwarz 2001 point out that unattested readings are predicted when indefinites occur in non-upward monotonic contexts.

(118)   a.   No student cited a paper about quantification.
          b.   Exactly one student cited a paper about quantification.
          c.   Every student who cited a paper about quantification was smart.

If the indefinite is interpreted as referring to a Skolemised choice function of arity 1 whose individual variable is bound by the subject quantifier, the predicted readings will be:

(119)   (118a) is true iff for some Skolemised choice function f of arity 1,
              there is no student x that cited $f(x)(\{\, y \mid y \text{ is a paper about quantification}\,\})$
          $\approx$ No student cited every paper about quantification

(120)   (118b) is true iff for some Skolemised choice function f of arity 1,
              there is exactly one student x that cited $f(x)(\{\, y \mid y \text{ is a paper about quantification}\,\})$
          $\approx$ At least one student cited a paper about quantification, and for each of the other students, there is a paper about quantification that they didn't cite.

(121)   (118c) is true iff for some Skolemised choice function f of arity 1,
              every student x that cited $f(x)(\{\, y \mid y \text{ is a paper about quantification}\,\})$
              was smart.
          $\approx$ Every student that cited every paper about quantification was smart.[3]

---

[3]This might not be obvious. Here's a way to think about it: For each student x who did *not* cite every paper about quantification, we can always make sure that the Skolemised choice function f maps x to a choice function that picks a paper about quantification that x didn't cite. Then this student will be outside the domain of quantification for *every*, so they won't matter for the truth-conditions. For every student that cited every paper about quantification, we have to make sure that they were smart.

This problem is reminiscent of the problem of bound pronouns for choice functions, but in this case there isn't even a need for actual bound pronouns. In a way, Skolemised choice functions of arity > 0 come with bound pronouns built in them.

But we can't have an LF constraint like the Integrity Condition, because we need binding for Schlenker's example (99)!

Relatedly, Winter 2001: p. 199 puts forward the *Matching Condition*:

(122) The arity of a Skolemised choice function corresponds to the number of pronouns free in the NP argument.

But this won't work for Schlenker's example (99) (see Chierchia 2001: p. 57 for a related remark).

11.5   Combining Schlenker and non-upward monotonic quantifiers

(123) If any student makes progress in some area, I will be happy.

(124) a. If no student makes progress in some area, everybody will flunk the exam.
       b. If no student makes progress in a certain area, everybody will flunk the exam.

(125) If every student but John makes progress in some area, he will be sad.

(126) If every student that has made progress in some area takes the exam, then the majority of students will pass.

12   Summary of the choice functional approach

- Schlenker's observation requires Skolemised choice functions.

- Intermediate scope readings under negation require flexible Existential Closure (contra Kratzer 1998b, Matthewson 1998).

- Skolemised choice functions run into overgeneration issues with the configuration:
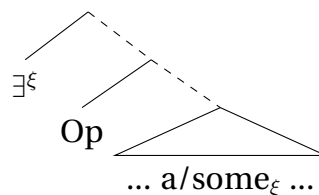
  where Op creates a non-upward monotonic environment for the indefintie (with respect to the sister constituent of $\exists^\xi$).

- Remaining mysteries

  - *Certain/specific/particular* and functional readings
  - Wide scope *de dicto*/opaque readings?

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