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Dynamic Predication

I. The problem in outline

(1) Goals

 a. Crossover has been around for some 50 years (Postal 1971). And it is still

 a mystery.

 b. The debate on non C-command anaphora has been going on for nearly 40

 years (Kamp 1982, Heim 1982). And it is kind of stalled, without clear winners.

 As a result we still don’t know whether the propositional connectives of

 natural language are dynamic or not.

 c. I believe that DS actually leads to a breakthrough inour understanding of WCO;

 and that situation based (or, for that matter, continuation based) approaches,

 as currently construed do not.

(2) Canonical crossover cases:

 a. Scope

 i. Some manager (or other) interviewed every employee.

 ii. Every employeei [some manager interviewed ti]

 iii. Waiting for the pope’s visit, a parson was standing in front of every

 church

 b. Binding

 i. His manager interviewed every employee.

 ii. \* Every employeei [hisi manager interviewed ti]

 iii. \* Its parson was standing in front of every church

 c. Questions

 i. \* which student1 did [his1 advisor present t1 ]

 ii. which student1 [ t1 was presented by his advisor]

 iii. \* I wonder which church1 its1 parsons was standing in front of t1 waiting

 for the bishop.

 iv. I wonder which church1 was restored by its1 parson without the bishop’s

 help

 d. Relative clauses

 i. \* I am aware of no church that1 [its1 parson restored t1 recently]

 ii. I am aware of no church that2 [ was restored by its2 parson recently]

(3) Crossover extensions I: Functional and list readings.

 a. Q: Which person does no one ever have dinner with?

 A: His undertaker.

 b. Q: Which person has dinner with no one?

 A: \* His undertaker.

 c. Q: Which extra guest did everyone bring along?

 A: John brought Sue, Mary brought Bill, …

 d. Q: Which of those people brought every guest?

 A: \* John brought Sue, Mary brought Bill,…

 e. Specify the function f such that

 i. for every guest y: y brought along f(y) WCO compliant

 ii. for every guest y: f(y) brought along y Not WCO compliant

(4) Crossover extensions II: Donkey crossover.

 a. Every farmer who bought a donkey was surprised by its strength.

 b. \* Itsj strength surpriesed every farmer who bought a donkeyj.

 c. \* [every farmer who bought a donkeyj] i [ itsj strength surprised ti]

 d. Which farmer that bought a donkey i turned out to be surprised by its i

 strength?

 e. \* Which farmer that bought a donkey i did its i strength surprise t?

 - Canonical treatments of WCO do not extend to (3a-e)

 - Canonical treatment of Donkey Anaphora predict that the pairs in (3a-e) should

 be fully parallel.

 (5) Classical approaches to WCO

 Reinhart (1983): A pronoun *pro* can be bound by (covary with) an antecedent

 XP iff that XP (or its trace, if the XP is quantificational) is in an A position that

 C-commands pro. (= XP must C-command pro before A’- movement, if any)

 Cf. also Koopman and Sportiche (1983) or Safir (1984).

(6) Empirical issues with canonical WCO constraints:

 a. Non C-command anaphora

 i. If a farmer1 buys a donkey2, he1 trains it2.

 ii. Every farmer that buys a donkey1 trains it1.

 Cf. also Inverse linking, Possessor’s binding,…

 b. Binding into adjuncts

 Someone interviewed every employee in front of his union representative.

(7) υP

 υP

 DP

 υ VP

 someone DP VP

 every employee V PP

 interviewed in front of his union representative

(8) Cases of WCO obviation

 a. This booki [I would expect itsi author to disavow ti] but that bookj [ I wouldn’t] (Lasnik and Stowell 1991)

 b. Uno bravo studente, il suo dipartimento lo deve sostenere finanziariamente

 ‘A good student, his department him must provide financial support for.’

(9) The idea in a nutshell.

 The canonical mapping in DS: Introduction of DRs via DPs.

 a. A man walked in.

 b. i. a man ⇒ λP***∃***x [man(x) ∧ P(x)] Italicized ***∃*** introduces a DR

 ii. walked in ⇒ λy. walked-in(y)

 c. λP***∃***x [man(x) ∧ P(x)]( λy. walked-in(y)) = ***∃***x [man(x) ∧ walked in (x)]

(10) Dynamic Predication: it’s (only) predicates that introduce DR.

 a. i. a man ⇒ λP∃x [man(x) ∧ P(x)]

 ii. walked in ⇒ λx***∃***y. x = y ∧ walked-in(x)

 b. ∃x [man(x) ∧ ***∃***y. x = y ∧ walked-in(y)] ⇔ ***∃***x [man(x) ∧ walked in (x)]

(11) Why bother?

 a. His brother saw a man

 b. i. *a man* introduces no DR

 ii. The object slot of *see* does; but presumably at a level where it is not

 accessible to the subject

 c. AG(e)(his father) ∧ Th(e)(a man) ∧ see(e)

 DR 1 DR 2

(12) What “DPs NEVER introduce DRs” must actually mean

 a. His son saw a man.

 b. a mani [his son saw ti]

 c. λP∃x [man(x) ∧ P(x)] (λxi. his father saw xi) Heim and Kratzer (1998)

 d. i. DPi [φ] ⇒ DP(λxi. φ)

 ii. NOT: DPi [φ] ⇒ DP(λxi. ***∃***y. xi = y ∧ φ)

(13) Dynamic Predication Principle

 a. Only predicates (things of type <e,t>) can introduce DRs

 b. Which predicates?

 i. The lexical ones

 ii. Predicates derived for the sole purpose of scope assignment NEVER can

 An incomplete answer that, however, derives the basic cases of WCO.

(14) An important antecedent: Büring (2004)

 Binding of pronouns is regulated by an operator at A-positions (inspired by the

 ‘Geach rule’).

 a. Every cat licks its whiskers.

 b. Every cati [ ti β3 licks its3 whiskers]

 c. Every cat λi [t i λ3 [t3 licks t3’s whiskers] ]

 d. Its whiskers bother every cat.

 e. Every cati [its3 whiskers bother ti ]

 f. \* Every cati [its3 whiskers β3 bother ti ]

 g. \* Every cati β3 [ its3 whiskers bother t3]

 “To put the gist of this treatment as a slogan: A’-dependencies and pronoun

binding dependencies are strictly distinct.3”

Fn. 3: “Maybe there is a more principled reason why binding from an A’-

position cannot bind pronouns, namely that the traces of A-movement are of

a semantic type other than e, so that no binding of an individual variable can

occur as a ‘side effect’ of A’-trace binding (as has been suggested recently in

Ruys (2000)). This would avoid the stipulated restriction on β-adjunction to

A-positions.” (Büring 2004, 28)

Büring marries this idea with a situation theoretic framework. But DS has a built in distinction between pronoun meanings/DRs and ordinary variables. The DPP is an arguably natural way of following up on B’s sugggestion.

II. Fleshing it out in an event-based setting.

(15) Which dynamic system?

 a. Formulae are relations between an input and output (CCPs)

 b. There is an operation on predicates of DR-introduction.

 b. Indefinites are subject to novelty; pronouns/anaphoric definites to

 familiarity.

 c. Simple propositional dynamics: Active DRs are passed on/blocked through

 the dynamics of propositional connectives.

 Heim (1982), Dekker (1996, 2012), Muyskens (1996), Champollion et al. (2018).

 “Pronouns are essentially indexical. … Pronouns are a device to refer to

 contextually given entities. … And when I say that a pronoun refers to a

 contextually given entity, I mean it relates to something that is ‘given’ at its

 point of occurrence … by an expression that literally occurs to the left of the

 pronoun’s occurrence in a formula.” (Dekker 2012: 17)

 The emphasis on ‘leftness’ is, I think misplaced; I would rather say:

 “A pronoun refers to something that is structurally accessible to it”

 But the idea that pronouns are ‘quasi-indexicals’ is right.

(16) Types.

 a. Basic: e, t, **n**; where: De = U (domain of individuals, including events),

 Dt = {0,1}, D**n** = N (the set of positive integers)

 b. D<a,b> = [Da ⇒ Db] (the set of all total or partial functions from Da into Db)

 c. i. **ω** = <**n**, e> Assignments

 ii. <**ω**,e> Pronouns

 iii. T = <**ω**, <**ω**,t>> Context change potentials

(17) Dynamic lifting and DR-introduction as an operation on predicates.

 For any P, of type <e,t>:

 a. [P<e,t>] = λu [ λωλω’. ω = ω’ ∧ P(u)] Dynamic Lifting

 b. [P<e,t>]n = λu [ λωλω’. ω=n/u ω’ ∧ P(u)] DR Introduction

 where ω = n/u ω’ is an abbreviation of ω’ = ω ∪ <n,u>, defined only if the

 input assignment is *un*defined for the *n*th coordinate.

(18) Pronouns.

 Pronouns, of type <**ω**,e>, combine with predicates of type <e,T> via function

 composition:

 a. hen = λω.ω(n); henceforth we write ω n for ω(n).

 b. If β is of type <e,T>, and αn is of type <**ω**,e>, then

 β(αn) = λω λω’. β (αn(ω))(ω)(ω’)

 c. he3 runs ⇒ [run](he3) = λωλω’. ω = ω’ ∧ run<e,t>(ω3)

(19) The logic.

 For any ψ, φ of type T, any variable ω, ω’ of type **ω,** and any variable αa of type a:

 a. ↓ω φ = ∃ω’ [φ(ω)(ω’)] ‘φ is true relative to ω’; ↓ is of type <**ω**,<T,t>>

 b. ¬ φ = λωλω’. ¬↓ω φ ∧ ω = ω’

 c. (φ ∧ ψ) = λωλω’. ∃ω’’ [φ(ω)(ω’’) ∧ ψ(ω’’)( ω’)]

 d. φ →∀ ψ = ¬ (φ ∧¬ ψ)

 e. φ ∨ ψ = ¬ (¬ φ ∧¬ ψ)

 f. ∃αa φ = λω λω’. ∃αa [φ(ω)(ω’)]

 g. ∀αa φ = ¬∃αa ¬ φ

(20) Example

 a. Someone [walked in]2. He2 was [very tall]3

 b. ∃x [walked in]2 (x)] ∧ [tall]3(he2)

 c. λωλω’ ∃x[ ω=2/x ω’ ∧ WI(x) ]

 d. λωλω’. ω = ω’ ∧ tall<e,t>(ω2)

 e. λωλω’ ∃x[ ω= 2/x ω’ ∧ WI(x) ∧ tall<e,t>( (x)]

 f. ↓νλωλω’ ∃x[ ω= 2/x ω’ ∧ WI(x) ∧ tall<e,t>(x)]

 = ∃ω’ ∃x[ ν= 2/x ω’ ∧ WI(x) ∧ tall<e,t>(x)]] Def. ↓

 c. ∃x [walked in(x) ∧ tall(x) ]

(21) Conjunction in DS.

 In going dynamic, Boolean ‘∧’ (a commutative, associative operation) is

 replaced by function composition (a non commutative, associative operation).

 We need to figure out how the *componens* and the *componendum* of dynamic

 *and* are mapped onto syntactic constitutents.

 a. BoolP

 XP1 Bool XP2

 and

 b. i. John met a linguisti and talked to heri.

 ii. \*John met heri and talked to a linguisti.

 The anaphora facts suggest that the *componens* of dynamic *and* is mapped

 onto the hierarchically higher conjunct in (a). I think this is fully parallel to

 what happens with reflexives.

c. υP

 DP1 υ VP

 V DP2

 d. i. John likes himself.

 ii. \* Himself likes John.

(22) What happens when event semantics enters the scene.

 a. John loves his cat ⇒ ∃e [ EX(e)(j) ∧ TH(e)(j’s cat) ∧ love(e)]

 b. There is an eventuality e (a state, in the case at hand) such that John is the

 EX(periencer) of e and John’s cat is the TH(eme) of e and e is a state of loving.

 c. love<ev, <e, et>> ⇒ λeλxλy[EX(e)(y) ∧ TH(e)(x) ∧ love(e)] *Polyadic approach*

 d. love<ev,t> ⇒ λe.love(e) *Monadic approach*

 where *ev* is the type of eventualities

(23) Verbs as monadic predicates

 a. John loves his cat.

b. υP

 DP υ5 VP

 John V DP

 TH1 V2 his cat

 loves

 c. i. love = λe.[love]2(e)

 ii. TH1 (love2) = λuλe[TH(e)] 1(u) ∧ love2 (e)]

 ii. TH1 (love2)(his cat) = λe[[TH(e)]1(j’s cat) ∧ love2(e)]

 iii. υ5 (TH1(love2)(his cat)) = λuλe[[EX(e)]5(u) ∧ [TH(e)]1(j’s cat) ∧ love2(e)]

 iv. υ5(TH1(love2)(his cat))(j) = λe[[EX(e)] 5(j) ∧ [TH(e)] 1(j’s cat) ∧ love2(e)]

 d. λe [ [EX(e)]5(j) ∧ [TH(e)]1(his5 cat) ∧ love2(e) ]

 e. λe . [TH(e)]1(his5 cat) ∧ love2(e) ∧ [EX(e)]5(j)

 O V S

 There are OVS languages, e.g. Guarajito (Uto-Atzecan) or Uranina (Peru).

 Maybe (c) is right for these languages. Or maybe, these are underlyingly SOV,

 the VP is preposed or the subject is postposed.

 But for English, we know that the structure is as in (b), and the mapping in

 (c) is, plausibly, the correct one.

 (25) Basic WCO cases.

 a. i. Everyone loves his cat.

 ii. [every onei [ ti υ5 TH1 loves his5 cat] ]

 iii. every one (λxi . ∃e [ [EX(e)]5(xi) ∧ [TH(e)]1(his5 cat) ∧ [love]2(e) ])

 b. i. His cat loves everyone.

 ii. [every onei [his cat υ5 TH1 loves ti] ]

 iii. every one (λxi ∃e [ **[EX(e)]5(his cat)** ∧ [TH(e)]1(xi) ∧ [love]2(e) ])

 iv.

 everyone λxi TP

 DP VP

 λω.ωn POSS cat [loves xi]

(26) Binding into adjuncts

 a. John loves his cat against its will.

 b. ∃e [ EX(e)(j) ∧ TH(e)(j’s cat) ∧ love(e) ∧ against(e)(j’s cat’s will)]

 c. There is an eventuality e of which John is the Experiencer and John’s cat is

 the Theme which is a state of love and this state holds against the will of

 John’s cat.

(27) a. υP

 DP υ5  VP

 VP PP

 John

 V DP against its1 will

 TH1  V2 his cat

 loves

 b. i. Lower VP: λe[TH(e)(j’s cat) ∧ love(e)] (from 26)

 ii. Upper VP: λe[TH(e)(j’s cat) ∧ love(e) ∧ against(e)(its will)]

 iii. υP = λe[EX(e)(j) ∧ TH(e)(j’s cat) ∧ love(e) ∧ against(e)(its will)]

 c. If α and β are both of type <e,t> (or <ev,t>), then the interpretation of [XP α β]

 is: λx[α(x) ∧ β(x)]

 d. Associativity: [[A ∧ B] ∧ C] ⇔ [A ∧ [B ∧ C]]

(28) The Polyadic Approach.

 a. If R is of type <e1,< …, en, t>…>, then:

 [R]j = λx1,…, λxn λω λω’[ ω= j/x1ω’ ∧ R(x1)…(xn)]

 This is fine, with two provisos:

* The event argument is crucial; the account of binding into adjuncts requires conjunction. A conjunctive account of verb-modification is impossible without the event argument.
* There is an issue of where the event argument is introduced. Is it the first?

 Or the last? Or somewhere in between?

 b. i. love<ev, <e, et>> ⇒ λe λxλy [EX(e)(y) ∧ TH(e)(x) ∧ love(e)] = (22c)

 ii. love<e, <e, <ev,t>>> ⇒ λxλyλe [EX(e)(y) ∧ TH(e)(x) ∧ love(e)]

 Where the event-argument is introduced does matter in determining the

 accessibility hierarchy matters. We do not want the event argument to be

 accessible to any other argument. Otherwise we could let crossover cases in

 through indirect anaphora:

 c. i. His father loves a boy.

 ii. There is an eventuality e and a boy u such that e is is a love-eventuality

 and **the father of the experiencer of e** loves u.

 On the monadic approach to verbs, the event argument is introduced with its

 DR before any other argument and thus it won’t be accessible to other

 arguments.

(29) Summary and perspectives

 a. DRs are introduced by predicates. They are never introduced at scope sites.

 b. There are reasons independent of WCO to think that (a) [= DPP] is necessary

 in the behavior of bare plurals.

III. Independent evidence for DPP

(30) Bare Plurals are kind denoting

 a. i. Dinosaurs are extinct. ii. \* A dinosaur is extinct.

 b. ii. Anteaters are so called because they eat ants.

 iii. ??An anteater is so called because it eats ants.

(31) In context, BPs are understood quantificationally

 a. i. Raccoons are systematically chased away. ∀

 ii. Raccoons were chased away yesterday. ∃

(32) The scope behavior of BPs

 a. i. A raccoon was not chased away yesterday. ∃ ¬

 ii. Some raccoons were not chased away yesterday. ∃ ¬

 iii. A raccoon was chased away repeatedly yesterday. ∃ ADV

 b. i. Raccoons were not chased away yesterday. ¬ ∃

 ii. Raccoons were chased away repeatedly yesterday. ADV ∃

 c. i. I didn’t chase away a raccoon/some raccoon yesterday. ∃ ¬

 ii. I chased away a raccoon/some raccoons repeatedly yesterday. ∃ ADV

 d. i. I didn’t chase away raccoons yesterday. ¬ ∃

 ii. I chased away raccoons repeatedly yesterday. ADV ∃

(33) Derived Kind Predication

 a. VP

 [V]∃n DP

 raccoons

 TH V

 chased

 b. i. λe. **TH(e)(raccoons)** ∧ chase(e)

 ii. λe. **∃xn [xn ≤ raccoons ∧ TH(e)(xn)** ∧ chase(e)]

 iii. λe. [TH(e)]∃n(raccoons) ∧ chase(e)]

 iv. [TH(e)]∃n = λy . ∃xn [xn ≤ y ∧ TH(e)(xn)]

1. i. I walked out and saw raccoons that were chasing their own tails.

 ≠ I saw raccoons that were chasing raccoons’s tails

 ii. I walked out and saw raccoons in my garden. I got a gun and shot at

 them.

 ≠ I saw raccoons and shot at raccons

(34) DKP must be blocked at scope sites

 a. I chased away raccoons repeatedly yesterday.

 b. raccoonsi [ I chased away ti repeatedly yesterday]

 c. raccoonsi [ I chased away ti repeatedly yesterday]∃n

 In Chierchia (98) this was derived by assuming that DKP was a ‘last resort’

 type-shifting mechanism. Now its effects can be wholly subsumed under DPP.

 The behavior of BP shows the necessity of an ‘instance introduction’ operation

 with the very properties of DPP

IV. Broader issues in DS

 (36) No dynamic GQ,

 Dynamic GQs coupled with ordinary scope assignment mechanisms would

 yield Donkey Crossover effects:

1. i. \* Itsj strength surprised every farmer who bought a donkeyj.

ii. \* [every farmer who bought a donkeyj] i [ itsj strength surprised ti]

iii. \* Which farmer who bought a donkey j]i did [ itsj strength surprise ti]

 b. GQ quantifiers are static (adjusted for type)

 c. Dependencies involving GQs must be based on E-type anaphora.

 i. every person who had a cat fed it

 ii. ∀x [person-etc.(x) → ∃e[ [AG(e)]3(x) ∧ [TH(e)]( fcat(ω3)’s cat) ∧ fed(e)]

 d. A (trivial) theory of GQs

 i. No donkey smokes.

 ii. [donkey]2 = λu λωλω’. ω = 2/u ω’ ∧ donkey(u)

 iii. [smokes]5 = λuλωλω’. ω = 5/u ω’ ∧ donkey<e,t>(u)

 iv. no ([donkey]2)( [smokes]5) =df

λω λω’. ω = ω’ ∧ {u: ↓ω donkey<e,T>(u)} ∩ {u: ↓ω smoke<e,T>(u)} = ∅

 v. D’(P<e,T>)(Q<e,T>) = λω λω’. ω = ω’∧ D (λu. ↓ω P(u))( λu.↓ω Q(u))

(37) The broader range of readings of indefinites.

 Indefinites have a predicative meaning:

 a. i. John is a [linguist]2 ii. I consider him a [good colleague]1

 Perhaps, their argumental use stems from their predicative one, as an

 extension of DKP (or ‘Restrict’):

 For any thematic role θ, any eventuality e, and any (dynamic) property α,

 b. [θ(e)]n(α) = ∃u [α(u) ∧ [θ(e)]n(u)]

 Example:

 c. A dog + walked in ⇒ ∃e [ [TH(e)]2([dog]3) ∧ [walk in]1(e) ]

 d. = ∃e ∃u[ [dog]3(u) ∧ [TH(e)]2(u)] ∧ [walk in]1(e) ]

 This accounts for the contrast in (e):

e. i. a friend of mine who had a fancy snow blower got hurt by its blades

ii. \* Its blades hurt a friend of mine who had a fancy snow blower

(38) Long Distance construals of indefinites

 a. every studenti read every paper that a f(linguist)(i) wrote

 A possible approach is the choice function one, schematically illustrated in (b):

1. ∃f every student readi every paper that a f(linguist)(i) wrote

 Does ∃-closure of choice function introduce DRs? If it does, we would expect

 long distance/specific indefinites to obviate WCO. This seems to happen.

 c. \* Hisi father hates a boyi.

 d. Hisi father hates [a boy I know]i /[a friend of mine]i /[a certain boy]i.

 e. Hisi father hates Johni.

 Existential closure of choice functions is subject to some kind of discourse

 conditioning (in terms of topicality, specificity, etc.). The indefinite in (c)

 doesn’t meet the relevant conditions; those in (d)-(e) do.

 Is the CF approach sufficient, without also having to appeal to (37)?

(39) The distribution of readings of donkey pronouns

 a. *Every*: ∀ > ∃

 i. Every man that has a donkey beats it. ∀

 = Every man that has a donkey beats all the donkeys he owns.

 ii. Every man who had a dime put it in the meter. ∃

 = Every man who has a dime puts one dime he owns in the meter.

 b. *No*: ∃ > ∀

1. No one with a teenage son lends him the car on weekdays. ∃

 ii. No one who has an umbrella leaves it home on a rainy day. ∀

 c. Some/a: ∃ > ∀

 i. A friend who had a car lent it to me. ∃

 ii. A friend who had a car refused to lend it to me. ∀

(40) Syntax and semantics of pronouns.

 a. DP

 D NP

 hen ~~man~~

1. A man [walked in]3. He3 ~~man~~ was tall.
2. [he3 ~~man~~] ⇒ λω. fman(ω3), manwhere is a salient man-valued function.

(41) Case 1

 If the trigger of ellipsis is accessible, then f is simply the identity map.

 a. i. Everyone fed his cat.

 ii. everyonei [ ti υ3 fed [he3 ~~one~~ ’s cat] ] Rough LF

 b. i. fone(ωn) = ωn, if ωn ∈ person Abbreviated as IDone

 ii. ∀x [person(x) → ∃e[ [AG(e)]3(x) ∧ [TH(e)](IDone (ω3)’s cat) ∧ fed(e)]

 = ∀x [person(x) → fed (x’s cat)(x)

(42) Case 2.

 If the trigger of ellipsis is not accessible, f is whatever function the

 containing DP makes salient (as on the standard E-type approach)

 a. [Everyonei who has a cat] i ti υ3 fed it3 ~~cat~~

 b. i. ∀x [person-etc.(x) → ∃e[ [AG(e)]3(x) ∧ [TH(e)]( fcat(ω3)’s cat) ∧ fed(e)]

 ii. fcat(x) = a, where a is the/one of the cats x owns

(43) When more functions are available

 Apply a supervaluational approach. Dispreferred readings are obtained via D-

 restriction. Indefinites also allow for direct binding.

 a. (∀fcat) ∀x [person(x) → fed ( fcat(x))(x)

 b. (∀fson)[No one with a teenage son]i [ti υ3 lends fson(ω3) the car on weekdays]

 c. A friend with a car lent it to me

 i. (∀fcar) [A friend with a car]i ti υ3 lent fcar(ω3) to me ]

 ii. ∃u[friend with [a car]3]1(u) ∧ lent(it3 ~~car~~)(me)(u)]

(44) If/when clauses and quantificational adverbs.

 a. If a bishop meets a bishop, he always/often/never blesses him.

 b. Q-ADV (a bishop meets a bishop)(he blesses him)

 - An ‘Existential Disclosure’ approach (Dekker 1993)

 c. [a bishop meets a bishop] <2,1>

 d. D2,1 ([a bishop meets a bishop] <2,1> ) =

 = λuλu’ [ [a bishop meets a bishop] <2,1>∧ ω2 = u ∧ ω1 = u’]

 = λuλu’ [bishop(u) ∧ bishop(u’) ∧ u meets u’] <2/u,1/u’>

 e. For any [φ]n of type T, with active DR n: Dn([φ]n) = λu. [[φ]n ∧ λωλω’. ωn = u]

 - Q-adverbs are dynamic.

 f. Q(Dn,m(φ))(Dn,m(φ ∧ ψ))

 g. ∀ (λuλu’ [[bishop]2(u) ∧ [bishop]1(u’) ∧ u meets u’] <2/u,1/u’>) *1st arg*

 (λuλu’. [bshp(u) ∧ bshp(u’) ∧ u meets u’] <2/u,1/u’>∧ ω2 blesses ω1 ) *2nd arg*

 h. Every pair <u,u’> such that both u and u’ are bishops and u meets u’ are also

 pairs such that both u and u’ are bishops, u meets u’, and u blesses u’.

 - Asymmetric readings are expected.

 i. If a painter lives in a village, it is usually pretty.

 j. Most painters live in pretty villages.

 k. Most villages in which painters live are pretty.

(45) The GEN-operator

 a. i. A cat eats lizards, if it is really hungry.

 ii. I love a good cup of coffee, when it is hot

 iii. **a good cup of coffeej** GEN3/j [υP I love tj] **[if it3 is really hot]**

 b. GEN 3/j ([υP I love tj])( [if it3 is really hot])(a good cup of coffee)

 =df ∀GN[(λx.[good cup of coffee]3(x) ∧ hot(it3), λxi I love xi)

 c. For any φ, ψ of type T, and any P of type<e,T>,

 GEN3/i(φ)(ψ)(P) =df ∀GN( λx.[P]3(x) ∧ ψ, λi. φ) )

 The object *a good cup of coffee* has to be pulled out of the VP; its

 quantificational force needs to change through GEN. So GEN creates a complex

 derived predicate a good cup of coffee when it is hot, which acts as the

 restriction of a modalized universal. I.e. it (re)-intoduces a discourse referent,

 linked to a cup of coffee with universal force.

V. Which derived predicates introduce DRs and why.

(45) Which don’t

 a. QR/Scope assignment

 b. Wh-movement:

 λp ∃x[Person(x)∧ p = λw.showed upw(xi)]

 λp CP, [p = ∃x[Person(x)∧ p = λw.showed upw(xi)]

 DPi, λP∃x[Person(x)∧P(x)] C’, [p = λw.showed upw(xi)]

 who

 C, λq[p = q] TP, λw.showed upw(xi)

 DP VP

 ti showed up

 Neither QR nor WH-movement ‘semantically affects’ the DP. The individual

 variable inside the DP is not associated with new information as a consequence

 of the movement.

(46) The external subject position

 a. There are two subject positions

 i. [TP [vP all the boys [VP left]]

 ii. [TP the boys [vP all t [VP left]]

 This kind of movement creates a derived predicate. A particularly clear case

 is constituted by Raising.

 b. It seems to John that every athlete is ready to compete.

 c. Every athletei seems to hisi coach [ti to be ready to compete ]

 a. every athletei [TP ti [T]4 [seems to his4 coach [ti to be in good shape ]]]

 b. = λφλu [ λωλω’. ω = 4/u ω’∧ φ]

 We have already found a case of derived predicate that creates DRs:

 movement into the restriction of GEN. Now we find a second one.

 What teases apart movement to the external subject position (or to the

 restriction of GEN) from QR and WH-movement?

(47) Topic like character of the external subject position (Rizzi 2007, a.o.)

 a. Background question: What happened to John’s truck?

 b. John’s truck hit a car.

 c. i. ?? A car hit John’s truck.

 ii. A CAR hit John’s truck.

 d. i. \* Una macchina ha urtato il camion di Gianni.

 a car AUX hit the truck of Gianni

 ii. \* Una MACCHINA ha urtato il camion di Gianni.

 a car AUX hit the truck of Gianni

 iii. Una macchina lo ha urtato, (il camion di Gianni).

 a car it AUX hit the truck of Gianni

 So unlike QR and WH movement, GEN and the EXT-SUBJ semantically affect

 the moved constituent. The variable inside the DP changes its

 quantificational force or is marked as topic. The same holds of topicalization:

(48) Other forms of topics.

 a. This booki [I would expect itsi author to disavow ti]

 but that bookj [ I wouldn’t \_\_]

 b. Uno studente cosìj TOP3/j [mi aspetterei che il suoj advisor lo3 sosterrebbe \_\_

 ad oltranza]

 ‘A student like that [I would expect that his advisor him would support\_\_

 strongly]’

(49) *Affectedness as a condition on DR-introduction* (informal)

 a. Derived predicates [ DPi φ] that do not semantically *affect* the dislocated DP

 do not introduce DR (i.e., are static).

 b. Derived predicates that semantically condition the dislocated DP may

 introduce DRs (i.e., may be dynamic).

(50) Further Binding Theory issues

 While ET obviates WCO, Principle C effects are never obviated:

 a. \* That mani [TOP]2 [ he2 would expect me to disavow ti ]

 = ‘That man is such that he would expect me to disavow him.’

 In the present set-up, Principle C takes on the following form:

 b. (Modified) Principle C

 i. A trace cannot be co-bound with a C-commanding pronoun.

 ii. A trace is co-bound with a pronoun in the following configuration:

 […DPi Hn/i…*pron*…ti…] , where HnC-commands *pron* and *pron* C-commands ti

VI. Comparisons and conclusions

(51) Situation theoretic takes: Büring (2004)

 a. Pronoun binding is regulated by an operation that only takes place at A-

 positions.

 b. Non C-command anaphora is situation driven

 c. i. Every man who has a donkey beats it.

 ii. ‘Every minimal situation s with a donkey-owning man is such that the

 man in s beats the donkey he owns in s.’

 d. i. Its mother kicks every man that beats a donkey.

 ii. [every man that beasts a donkeyi] j [itsi mother kicks tj]

 e. A formal system of situation-indices needs to be introduced in the syntax.

 Not every DP automatically activates ‘viable’ situation indices. Only DPs in A-

 position do. Active situation indices can only bind into their C-command

 domains

 f. Problems:

 i. Binding into adjuncts is a mystery.

 ii. It seems difficult/impossible to maintain that situation indices can only

 be active in A position, in view of the behavior of when-clauses.

 g. i. If a painter lives in a village it is usually pretty.

 ii. Most villages inhabited by painters are pretty.

1. Most minimal situations s that contain a village inhabited by a painter are

 such that the village in s is pretty.

(52) Continuation based approaches: Shan and Barker (2006)

 a. Continuations affords ways of assigning scope from an object position over a

 subject position. Scope assignment is a pre-requisite for binding. But it

 doesn’t automatically guarantee it.

 b. Leftness

 i. “Evaluate expressions from left to right” (S&B, p. 94).

 ii. *Distinguo*: Rather than ‘linear order’, what matters is ‘evaluation order’

 (ibid. pp. 97 ff), which in case of wh-words must look at the phonologically

 empty base positions.

 c. Evidence:

 \* He beats it, if a farmer owns a donkey . (B&S 2008: 36)

 However, there is a confound here. As is well known, right-adjoined *if*-clauses

 occur in a position where they are C-commanded by the subject. There is

 much evidence in favor of this analysis, including, e.g., VP-anaphora and

 (traditional) Principle C effects:

1. John sings in the shower, if he is happy, and Mary does ~~[~~~~VP~~ ~~sing in the shower if she is happy]~~ too.

 e. \* Hei sings in the shower, if Johni is happy.

 If we eliminate the confound of strong crossover, things do change and

 cataphora into right-adjoined *if*-clauses suddenly becomes possible:

 f. i. I am sure that you’ll like himi, if you get to meet Johni.

 ii. \* I am sure that you’ll like himi and you’ll get to meet Johni.

 g. [Context: Teachers are very sensitive to the prices of textbooks.]

 i. A teacher will never adopt iti, if a textbooki is too expensive.

 ii. \* A teacher will never adopt it and a textbook is too expensive.

 h. [Context: John is rich, and fanatic about cars]

 i. He always buys iti on the spur of the moment, whenever he falls in love

 with a new cari.

1. \* He always buys iti on the spur of the moment, and he does fall in love

 with a new cari.

 j. [Context: John was hit by something in the street.]

 i. I hope he got itsi plate, if it was a cari.

 ii. \* I hope he got its plate, and probably it was a car.

 These contrasts follow from a DS approach; the appear to be out of reach to

 any leftness/continuation based approach.

(54) Conclusions

 a. DS does appear to take us forward in understanding crossover effects

 b. In ways that are out of reach for current situation/continuation based

 approaches

 c. Many issues remain open; but we also have new ways of exploring them…