What Co-varies in Backward Variable Binding

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1.   3rd person bound variable pronouns

The case for a c-command requirement on 3rd person bound variable pronouns has become too implausible to sustain. Barker (2008) has reviewed the spurious source of the c-command requirement and has documented many cases of bound variable pronouns that are not c-commanded by their quantificational binders, as in (1).

(1)   After unthreading each$_i$ screw, but before removing it$_i$, make sure to hold the screw in place while separating the screw from the driver. (Barker 2008: 10(25))

Williams (1994), Pica and Snyder (1995), Ruys (2000), and Barker (2008) argue that the constraint is really about scope:[1] a bound variable interpretation is available to the extent that the quantifier can out-scope the pronoun.[2] But the pronoun isn't the only thing that co-varies in (1): two definites do as well. And this is why it's very hard to distinguish truly bound 3rd person pronouns from D-type pronouns (Heim 1990, Elbourne 2005). D-type pronouns are put to use to capture donkey anaphora (and their kin), classic instances of binding—or, rather, co-variation—without c-command (2a). The D-type approach has been extended to various other problematic cases of binding without c-command in (2b)/(2c) by (Büring 2004):

(2)   a.   Every knight who courted a$_i$ lady kissed her$_i$ mother's hand.
       b.   Every boy$_i$'s mother loves him$_i$.   binding from possessor
       c.   Everyone in some city$_i$ hates its$_i$ climate.   binding out of DP

On the D-type account, it is a situation that co-varies. The donkey pronoun is interpreted as definite description which co-varies relative to those quantified situations, its uniqueness requirements satisfied by the part-structure defined in situation semantics (Kratzer 1989).

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[1]Save the problem of weak crossover, something we'll get to soon enough.
[2]Since *each* is notoriously wide-scoping, its ability to bind in (1) then follows.

(3) **Every x,s s.t. s is a minimal situation** in which x is a knight and x courted a lady can be extended into a situation s′ in which x visited the mother of **the lady in s**.

An obvious question is where else a D-type solution might be possible. The naive answer is wherever situations can co-vary.[3] Now, events are a type of situation. And complex verb phrases can be littered with events. We might expect these events to supply the resources for a D-type strategy (Ferreira 2005), giving rise to pronominal co-variation in a wider range of configurations than individual binding can. This paper shows that this expectation is borne out by backward binding in causative constructions.

2. Backward Variable Binding (BVB)

Backward bound variable pronouns (BBVs) co-vary with a non-c-commanding quantifier (Reinhart 1983, Williams 1994) as in (4) and (5). Note that the attention is on bound variables; backward bound reflexives/reciprocals have a different distribution.[4]

(4) a. His$_i$ costume made every dancer$_i$ look stupid.
    b. Her$_i$ first movie made every actress$_i$ famous.

(5) a. That people hate him$_i$ disturbs every$_i$ president.
       (Reinhart 1983: 180(13b), attr. to Ross)
    b. That he$_i$ might someday meet the Queen inspired every$_i$ British soldier.
       (Williams 1994: 238(92))

This is the key generalization: backward binding is only available if the BBV is in a causer argument (psych-predicates are just a sub-type of causative (Pesetsky 1995)).[5,6] In contrast, pronouns in non-causers do not allow BBVs so readily, giving rise to weak crossover violations (WCO).The contrasts are subtle (hence '?'), since WCO is weak, a fact addressed in §5.

(6) a. ?Her$_i$ father loved each girl$_i$.   non-causer
    b. Her$_i$ toys made each girl$_i$ happy.   causer

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[3]That said, Elbourne (2001) argues that there are instances of individual pronominal binding and these can be empirically distinguished from D-type anaphora.

[4]Backward bound reflexives/reciprocals (BBRs) are governed by non-syntactic constraints (Pollard and Sag 1992, Landau 2009); Psych-predicates and *picture*-NPs (Arad 1998) are not necessary for BBVs, unlike BBRs. (But see Larson and Cheung 2008: (3–4)) for a potential interaction of BBVs with psych-predicates.

(i) a. Pictures of herself$_i$ nude made Mary$_i$ *famous/^{ok}upset.   BBR
    b. Pictures of her$_i$ nude made every$_i$ woman ^{ok}famous/^{ok}upset.   BBV
    c. Pictures of himself$_i$/*Friends of himself$_i$ amused Paul$_i$ a lot.   BBR
    d. Pictures of him$_i$/Friends of his$_i$ amused each$_i$ child a lot.   BBV

[5]Pesetsky (p49): "A Causer argument of a predicate π may behave as if c-commanded by an argumental DP governed by π. This generalization . . . bears no relation to anything else we know about binding phenomena."

[6]See Appendix B for further evidence from PRO-gate for the central role of causers.

(7)   a. ?His$_i$ costume didn't fit any dancer$_i$.   non-causer
        b. His$_i$ costume didn't make any dancer$_i$ look good.   causer

(8)   a. ?His$_i$ headshot fell on every actor$_i$'s face.   non-causer
        b. His$_i$ headshot made every actor$_i$ look stupid.   causer

(9)   a. ?The teacher that wrote to her$_i$ father scolded every girl$_i$ in the class.
        b. The teacher's writing to his$_i$ father annoyed every child$_i$ in the class.
           ((b) from Higginbotham 1980: 688, ft 11)

(10)   a. *The woman that he$_i$ met in front of him in the checkout line eventually married every incoming student$_i$.
        b. That he$_i$ might someday meet the Queen inspired every$_i$ British soldier.
           (Williams 1994: 238(92b,c))

(Belletti and Rizzi 1988, Pesetsky 1995) posit an underlyingly low position for causers, below experiencers. Larson and Cheung (2008) argue for a low position of causers in periphrastic causatives with psych-adjective complements. This can't be the whole story; BBVs are available in a wider set of causatives ((4), (8b)).

A D-type approach provides a ready, natural alternative, one that suits the observed data to a tee. It's the causer argument that co-varies in BBV. The binding quantifier puts the causer in its scope via QR (an unsurprising fact, but one that is nonetheless systematically demonstrated in Appendix A). Since the causer can be construed as a minimal situation (an event) that co-varies with respect to the quantifier, it supports a co-varying D-type pronoun.[7]

(11)   a. Her$_i$ first movie made every actress$_i$ famous.
        b. ≈ For every actress x **there is a minimal situation s** containing the movie of **the actress in s** and s made x famous.

But a question remains: why no WCO violation? That question is relevant because D-type pronouns *do* show crossover effects (Haïk 1984, Reinhart 1987, Chierchia 1995). Reducing BBVs to D-type pronouns won't by itself exempt them from WCO effects. However, there's a final important fact: D-type pronouns in causers avoid WCO violations, too:[8]

(12)   a. *Her$_i$ mother visited every knight who courted a lady$_i$.
        b. Her$_i$ mother made every knight who courted a lady$_i$ nervous.

(13)   a. *His$_i$ friends love every boy$_i$'s mother.
        b. His$_i$ friends made every boy$_i$'s mother worried.

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[7]We'll make formal later this idea, which is really the intuition reported Williams (1994), here with the benefit of events/situations and their relation to D-type pronouns.

[8]Dependent definites seem to pattern the same way, but future work is needed:

(i)   (Every young author will have a new book at the fair.)
      a. *The book will make every author rich. (Chierchia 1995:226)
      b. The book he$_i$ presents at the fair will make each author$_i$ rich/*be sold by each author$_i$.

Once again, it's causers that make the difference. The analysis offered in the next section will formally distinguish between causers and non-causers and in the right way to support D-type anaphora in the former.

3.   Situation-based D-type pronouns

Assembled below are the central ingredients of D-type analyses (Heim 1990, Elbourne 2005). First, quantification is over individual-situation pairs (Berman 1987). Second, pronouns are definite descriptions with silent NP complements—interpreted uniquely in Kratzerian (1989) situations (Elbourne 2005): *it* ~~donkey~~$_s$ = the donkey in s.

For reasons that will become clear, we follow Büring (2004)'s implementation.[9] A quantifier phrase introduces a situation binder Σ which binds the D-type pronoun's s variable—identifying it with the 'base' situation. This rule of Situation Binding is given in (14). Büring also spells-out a constraint ruling out WCO in (14c).

(14)   Situation Binding (Büring 2004)

    a.   [DP XP] $\rightsquigarrow$ [DP [$_{XP}$ Σ_n XP]]

    b. $[\![\Sigma_n$ XP $]\!]^g = \lambda x \lambda s.[\![$ XP $]\!]^{g[n \to s]}(x)(s)$

    c.   DP must occupy an A-position (rules out WCO)

(15)   a. $[\![$ *every knight who courted a lady* $]\!] = \lambda P \lambda s$. for all x, s_b s.t. s_b is a minimal situation of x being a knight and x courting a lady, $P(x)(s_b)$

    b. $[\![\leq]\!] = \lambda P \lambda x \lambda s_b$. there is an extended situation s_e, $s_b \leq s_e$ and $P(x)(s_e)$

    c. $[\![$ she$_s$ ~~lady~~ $]\!] = \lambda s$.the unique x such that x is a lady in s

I adopt the following convention for possessive pronouns: *her*$_s$ $\approx$ [*she*$_s$ ~~NP~~]+gen $\approx$ [*the NP in s*]'s.

(16)   Every knight who courted a lady$_i$ visited her$_i$ mother.

    a.   [Every knight who courted a lady [Σ_{s_1}[$\leq$ [visited **the lady in s$_1$**'s mother]]]]

    b. λs for every x, s_b s.t. $s_b \leq s$ & s_b is a minimal situation containing a knight x courting a lady, there is an extended situation s_e, $s_b \leq s_e$ such that x visited in s_e **the lady in s$_b$**'s mother.

(17)   Donkey Crossover: *Her$_i$ mother visited every knight who courted a lady$_i$.

[Every knight who courted a lady [Σ_{s_1}[$\leq$ [λ_2 [[**her**$_{s_1}$ mother] [visited t$_2$]]]]]]

Here a quantifier in A-bar position generates a Σ, in violation of (14c).

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[9]Some simplifications are made here that need commentary (for the donkey specialists). For one, I don't give the D-type pronoun a denotation. Büring's is a higher type, which I've managed to obscure here; Second, Büring's Σ is sorted to bind situation variables.

4.   How Causers suspend WCO

Causers introduce a minimal situation (and binder), distinct (but co-varying with) the situation bound by the quantifier. The ingredients here are all fairly standard. Causatives relate two event(ualities) (Lewis 1973, Dowty 1979), which are a kind of (small) situation (Kratzer 2007).

(18) $[\![make]\!] = \lambda q_{\langle s,t\rangle}\lambda p_{\langle s,t\rangle}\lambda s.\exists s_c \exists s'\ [p(s_c)\ \&\ q(s')\ \text{and}\ s_c \leq s\ \text{and}\ s_c\ \text{makes}\ s'\ \text{in}\ s\ ]$

Here causers are sub-situations of the 'extended' causing situation.[10] Causer arguments, then, denote *properties* of situations, $\langle s,t\rangle$. This is best appreciated with gerundive causers:

(19) $[\![someone\ seeing\ his\ father\ in\ s]\!] = \lambda s_1.$ s_1 is a situation containing someone seeing his_{s_2} father and nothing else

We are going to have to let ordinary individuals be causers, too: we'll treat them as properties of situations. (A semantics for shifting ordinary individuals into properties of situations is given in the next section.)

(20) $[\![her\ first\ movie]\!] = \lambda s_1.s_1$ is a sit. containing her_{s_2} first movie & nothing else

The only 'new' ingredient in the analysis is putting Büring's Σ to use at the edge of the causer argument.[11] There, it co-binds the D-type pronoun's s-variable and the causer s-variable.

(21)   a. $[\![\ \Sigma_s\ her_s\ first\ movie\ in\ s]\!] = \lambda s.$ s is a situation containing her_s first movie and nothing else
         b. $[\![\ \Sigma_s\ someone\ seeing\ his_s\ father\ in\ s\ ]\!] = \lambda s.$ s is a situation containing someone seeing his_s father and nothing else

A type variant of Σ that combines with expressions of type $\langle s,t\rangle$ is needed:

(22) $[\![\ \Sigma_n\ XP\ ]\!]^g = \lambda s.[\![\ XP\ ]\!]^{g[n\to s]}(s)$

BBV is derived in (23): since it's the Σ in the causer argument that binds the D-type pronoun, crossover doesn't obtain. The Σ associated with the moved quantifier binds vacuously (or it would just not be inserted, so no violation of (14c)). (s_c = causer situation; s_e = extended situation; s_b = base situation.)

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[10]Difficult questions about causation (direct vs indirect) arise (Kratzer 2005).

[11]Recall that we are following Büring (2004)'s D-type analysis, where D-type pronouns are always bound non-locally by situation binders. This is different from Elbourne (2005). We return to this in §5.

(23) Her$_i$ first movie made every actress$_i$ famous.
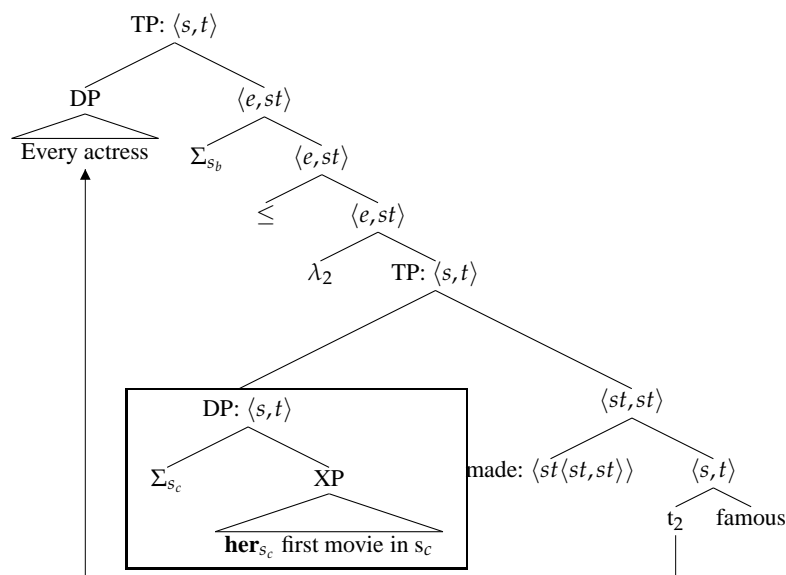
(24) λs. for every y, any minimal situation $s_b \leq$ s in which y is an actress is a situation which can be extended to a situation s_e such that **there is a situation $s_c \leq s_e$ and &** s_c is a minimal situation containing the first movie of **the actress in s_c** & s_c makes x famous in s_e.

The D-type pronoun co-varies because the causer situation co-varies, and this is due in part to the lexical semantics of *make*. And so since $s_c \leq s_e$ and s_e is a minimal extension of s_b, then the actress y in each s_b remains the same unique actress in each respective extended situation.

4.1 Where can Σ go?

The question of WCO is now re-framed: why isn't a D-type strategy available outside of causers? A standard WCO violation is incurred, as in (25a), because the subject does not describe (co-varying) situations. But why can't there be a Σ in agent/non-causer subjects (25b)?

(25)   a.   ?His$_i$ mother loves every$_i$ boy.
       b.   every boy x [[Σ_s His$_s$ mother] loves x]

Here we venture a proposal. In addition to its role in (14), Σ can be introduced by a D^0, and bind into its complement.[12] The presence of a null determiner in gerunds is routine, and on it we hang Σ:

(26)   [$_{DP}$ **D** Σ_s [Someone seeing his$_s$ father]] pleased every boy.

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[12]We probably need to bind situation variables in the restrictor of a QP (the syntactic complement of a Q) anyway: *No one drinking at the local pub ever orders sherry*. The adjective *local* sits in the restrictor and it co-varies with respect to situation-individual pairs quantified by *no one*.

It now follows that there must be some determiner to house a Σ, higher than the possessor, in cases of BBV in a non-gerundive causer, as in *Her$_i$ first movie made every actress$_i$ famous*. For such causers that denote 'ordinary' individuals, we postulate a type shifter δ that outputs properties of situations (thus making good on the promise in §4, ex (20)). $\delta_{\langle s,e\rangle \rightarrow \langle s,t\rangle}$ takes an individual (concept) and returns a property of situations that contain just that individual. $\delta_{\langle s,e\rangle \rightarrow \langle s,t\rangle}$ hosts Σ.

(27)   a. $[\![\ \delta_{\langle s,e\rangle \rightarrow \langle s,t\rangle}\ ]\!] = \lambda G_{\langle s,e\rangle}.\lambda s'.\ s'$ is a situation containing $G(s')$ & nothing else.
       b. $[\![\ [_{DP}\ \delta_{\langle s,e\rangle \rightarrow \langle s,t\rangle}\ \Sigma_s\ [\ her_s\ \text{first movie}\ ]]\ ]\!] = \lambda s'.\ s'$ is a situation containing her$_{s'}$ first movie and nothing else.

(Σ here must be a type variant that combines with $\langle s,e\rangle$.) Returning to WCO, the type-shifter is not applicable to non-causers (i.e. agents, experiencers), which must denote ordinary individuals in order to serve as external argument of verbs like *love* and *visit*:

(28)   a.   *His$_i$ mother loves every boy$_i$
       b.   *$[_{DP}\ \delta_{\langle s,e\rangle \rightarrow \langle s,t\rangle}\ \Sigma_s\ [\ his_s\ \text{mother}\ ]]$ loves every boy.

It's natural to suppose that any D^0 can host Σ. It's predicted then that a pronoun embedded below D^0 is able to escape WCO. The prediction is borne out: the more deeply embedded a pronoun is, the weaker the WCO violation. We imagine, then, that possessors are above the D^0 that bears Σ in (29a), whereas the pronouns in (29b)–(29c) are below D^0.[13]

(29)   a.   (i)   *[His book] struck every author on the head.
             (ii) $[_{DP}\ \text{His}_?\ [_D\ [\ \Sigma_s\ [\ \text{book in s}\ ]]]$
       b.   (i)   ?[A book about him] struck every author on the head.
             (ii) $[_{DP}\ A\ [\ \Sigma_s\ [\ \text{book about him}_s\ ]]]$
       c.   (i)   [A book that he wrote] struck every artist on the head.
             (ii) $[_{DP}\ A\ [\ \Sigma_s\ [\ \text{book that he}_s\ \text{wrote}\ ]]]$

Also relevant is that the indefinite DPs in (29b) and (29c) co-vary more easily than the subject DP in (29a) (Williams 1994).

4.2   Interim Conclusion

D-type pronouns are ideally suited to capturing the distribution of BBVs—i.e. their restriction to causer arguments, which are simply a type of situation. The proposed mechanics explain the lack of WCO as well. We have here a way of getting BBVs without having to put the causer low, a result that may benefit some accounts of experiencers.

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[13]This hinges on whether the genitive pronoun starts low or not; if it does, we'd have to rule out reconstruction of the pronoun.

5. Base situation, extended situation, and WCO

We end with a twist. It turns out it's crucial that we follow Büring's implementation of D-type pronouns, not the one given by Elbourne (2005). Büring requires a D-type pronoun be bound by a Σ associated with a QP, and thus be interpreted in its 'base situation.' Elbourne allows a D-type pronoun to be interpreted in the 'extended situation.'

(30)   Every knight who courted **a lady** visited her mother.

(31)   The Büring Version
         $\approx \lambda$s for every x, s_b s.t. $s_b \leq$ s & s_b is a minimal sit. of x courting a lady, there is an extended sit. s_e, $s_b \leq s_e$ such that x visited in s_e **the lady in s_b's mother.**

(32)   The Elbourne Version
         $\approx \lambda$s for every x, s_b s.t. $s_b \leq$ s & s_b is a minimal sit. of x courting a lady, there is an extended sit. s_e, $s_b \leq s_e$ such that x visited in s_e **the lady in s_e's mother.**

Büring argues that Elbourne's version predicts the sentence in (33) can be true in the following scenario.

(33)   Scenario: Every man in Athens worships two or more goddesses, but there is no goddess worshiped by every man.
         Every man in Athens worships the goddess.

The problem is simply that Elbourne's version can reduce dependent definites to mere existentials.[14]
     Elbourne (2005, p.63) p.63 shows with a context, these kinds of definites are fine:[15]

(34)   Each man was paired with a different woman for the training exercise. Fortunately, every man liked the woman, and things went smoothly.

If definite descriptions, and therefore D-type pronouns, can be interpreted in the extended situation, then Büring's account of WCO is insufficient. So we ask: is WCO ameliorated if the pronoun is evaluated in the extended situation, rather than the base situation?[16] Unfortunately, it's going to be very difficult to tell.

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[14]Elbourne's predicted truth conditions, (i), are satisfied in the scenario in (33).

(i) $\approx \lambda$s for for every x, s_b s.t. $s_b \leq$ s is a minimal situation in which x is a man, there is an extended situation s_e, $s_b \leq s_e$ such that x visited in s_e the unique goddess in s_e.

[15]F. Schwarz (2009) provides further evidence the definites can be evaluated in the extended situation. Schwarz shows that we need matching functions, in the sense of Rothstein (1995), to capture the context dependence illustrated in (33).

[16]We could also ask whether context helps WCO in the way context helps the dependent definite in (34). More testing is needed:

(i)   Each man was paired with a different partner for the training exercise. Fortunately, his_i partner liked each man_i, and things went smoothly.

The temporal interpretation of NPs (Enç 1987, Musan 1995) may help. Recast in a situation semantics, these effects allow us to ask whether a noun phrase is evaluated in the the 'same situation' as the verb phrase.

(35)   Every woman (first) met her husband at a bar.

    a.   #Every woman$_{s_b}$ (first) met$_{s_e}$ her husband$_{s_e}$ at a bar.
    b.   Every woman$_{s_b}$ (first) met$_{s_e}$ her husband$_{s_b}$ at a bar.

While these effects don't probe the pronoun directly, they do track a situation 'pronoun' in the relational noun: whether the husband relation holds in the first-meeting situation, s_e (which would be odd) or some (perhaps) larger, or temporally posterior, base situation, s_b (which may be the default in impoverished contexts). Now to crossover. Take the following two scenarios. The first biases us to interpret the relational noun *husband* in a situation that is distinct from the situation described by the verb, hence we might expect the base situation to be used. Accordingly, we get a WCO violation.

(36)   Context: At work a bunch of women were talking about where they first met the men that they later married. Since these woman are all very reserved, I was surprised to learn that...

    a.   #Her$_i$ husband met every woman$_i$ at a bar.
    b.   Every woman$_i$ met her$_i$ husband at a bar.
    c.   WCO: *Every woman Σ_{s_b} her husband$_{s_b}$ met in s_e ----

In contrast, if the relational noun *husband* can be evaluated true (and truly co-vary) in the extended situation, then there is no WCO violation. And, indeed, 'backward situation pronoun binding' is much better here:

(37)   Context: At work, a bunch of women were talking about what they did for lunch. Since I think couples should see each other during the day, I was happy to learn that:

    a.   Her$_i$ husband took every woman$_i$ out for lunch.
    b.   Every woman$_i$ was taken by her$_i$ husband out for lunch.
    c.   No WCO: Every woman Σ_{s_b} her husband$_{s_e}$ took out for lunch in s_e ----

Perhaps we're seeing why judgments about WCO (of the LF variety) are so iffy: we have to be sure to choose the right situation to evaluate the D-type pronoun. This might be hard, certainly from a processing perspective. When we encounter the quantifier we may need to re-analyze the pronoun as co-varying. And since the quantifier is processed most recently, we may be more likely to use the base situation for the D-type pronoun. And this is WCO. In any case, the kind of variability and context sensitivity we expect of a D-type approach matches the iffy-ness of WCO judgments. We leave this speculation to further research.

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5.1   Appendix A: Locality constraints on BBVs

A BBV's containing phrase must fall in the scope of the binding quantifier (BQ) (Williams 1994, Pica and Snyder 1995, Ruys 2000). When QR of the BQ is blocked, so is BBV. In (38a), QR is possible out of the bare infinitive; QR is blocked from the finite clause in (38b). Concomitantly, BBVs are available in the former configuration, but not the latter (39).

(38) a.   A (different) picture made John fall in love with every girl. $\forall \succ \exists/\exists \succ \forall$
      b.   A (#different) picture made John think that he loved every girl. $*\forall \succ \exists/\exists \succ \forall$

(39) a.   A picture of her$_i$ made John fall in love with every girl$_i$. ^{ok}BBV
      b.   A picture of her$_{*i}$ made John think that he loved every girl$_i$.   *BBV

To the extent that BQs *can* scope exceptionally (*each* vs. *every*), BVB is available

(40) a.   *A picture of her$_i$ nude made John think that he loved every girl$_i$.   *BBV
      b.   ?A picture of her$_i$ nude made John think that he loved each girl$_i$.   ?BBV

The strongly distributive nature of object *each* (as compared to *every*, Beghelli and Stowell 1997) may help promote co-variation more generally. This is especially relevant given the situation semantic account offered for WCO in the last section, where each individual would need to be mapped different extended situations to support the D-type anaphor.

   Further evidence comes from a diagnostic used in Lebeaux (1991), Fox (2000), here applied to BBV. Infinitives block QR, so the only way to get low scope is to reconstruct the phrase containing the BBV—but introduces a disjoint reference effect.

(41) a.   *Pictures that John$_i$ took of her$_j$ seemed to him$_i$ to __ make every$_j$ actress rich.
      b.   Pictures that John$_i$ took of her$_j$ seemed to him$_i$ to __ make Mary$_j$ rich.
      c.   Pictures that he$_i$ took of her$_j$ seemed to him$_i$ to __ make every$_j$ actress rich.

5.2   Appendix B: PRO-Gate = Event Gate

Higginbotham (1980) claimed that a PRO subject improves WCO violations:[17]

(42) a.   ?Mary's/his$_i$ seeing his$_i$ father pleased every$_i$ boy.
      b.   Seeing his$_i$ father pleased every$_i$ boy.
           (Higginbotham 1980: 688 (50))

But PRO isn't the true source of improvement here: it's just that the phrase that contains the BBV must itself co-vary and PRO subjects are good for letting a gerund co-vary. But so are other subjects, like the indefinite and dependent definite in (43):

(43) a.   Someone seeing his$_i$ father through this ordeal pleased every$_i$ boy.
      b.   The teacher's writing to his$_i$ father annoyed every$_i$ child in the class.
           (Higginbotham 1980: 688, ft 11)

[17]Whether *wh*-crossover can be understood in the same way is left for future research.

Derived nominals show the same thing: the indefinite can co-vary with the binding quantifier better than the (dependent) definite, which is in turn better than the demonstrative DP. (Again, this is Williams (1994)'s point.)

(44)   a.   ?That Devotion to his$_i$ country (that the flag evokes) inspired every soldier$_i$.
       b.   ?The undying devotion to his$_i$ country (that the flag evokes) inspires every soldier$_i$.
       c.   A profound devotion to his$_i$ country inspires every soldier$_i$.
            (Safir 1984: 624(ft24))

And as Safir (1984, 632(59–60)) showed, PRO-Gate is sensitive to locality constraints on QR. PRO-gate is just 'event-gate', showing that BBV is sensitive to the presence of an event/situation, made use of by a D-type strategy.

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