SNEAKY DERIVATIONS SNEAK RULE-I IN:
A REPLY TO HEIM'S "FORKS IN THE ROAD TO RULE-I"[*]

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1   Introduction: Sneaking Past Condition B

When *he* and *him* corefer, *He pointed at him* is usually unacceptable, presumably because of a violation of Condition B of BT (Binding Theory; e.g., Chomsky 1981), which says that a non-reflexive pronoun cannot have a c-commanding antecedent in its binding domain. To express the intended meaning, *He pointed at himself* must usually be used. What happens when *He pointed at him* is embedded, and *he* and *him* are "bound" from higher up by the same quantifier? Apparently, the same thing: (1), which we call a PBH sentence (after Partee and Bach 1981 and Higginbotham 1983, who noticed its theoretical significance), does not have the reading in (2).

(1)   Every man said that he thought that he had pointed at him.

(2)   For every man x, x said: "I think I pointed at myself".

To express that reading, its *himself*-counterpart – *Every man said that he thought that he had pointed at himself* – must be used. However, as illustrated by the "sneaky" LF in (3), it turns out that the unattested reading of (1) is generated without violating Condition B, as long as the grammar is compatible with (4). BD marks the binding domain (or local domain) of *him₃*.

(3)   [$_{CP3}$ *every man* $\lambda 1$ [t_1 *say* [$_{CP2}$ *he*$_1$ $\lambda 3$ [t_3 *think* [$_{CP1}$ *he*$_1$ $\lambda 5$ [$_{BD}$ t_5 *point at him*$_3$]]]]]]

(4)   The trace of a DP that undergoes QR (Quantifier Raising) need not be co-indexed with it.

On the fairly standard assumption that the semantic rules that interpret syntactic trees are local, the contra-indexed t_5 and him_3 in (3) do not "know", at the level of BD, that each of them is a place-holder for some occurrence of he_1. Stipulating that the binding domain of him_3 is CP1 – instead of BD – would not help because him_3 and the contra-indexed he_1-within-CP1 do not "know", at the level of CP1, that him_3 is a place-holder for a higher occurrence of he_1. (A further expansion of the binding domain would result in the ruling out of LFs of acceptable sentences such as *Every man thinks that Mary pointed at him*). This seems to imply that the grammar is incompatible with (4), in which case (3) is ungrammatical independently of Condition B. Indeed, such an idea is entertained in Heim (2009) – "Forks in the Road to Rule-I" – henceforth, Forks.

We observe that sometimes (1) does have a "bound" reading (though it is not the same as the reading described in (2)). For example, in a situation where every man looks at two different pictures of himself, while failing to recognize himself in those pictures (and to recognize that the two pictures are of the same individual), (1) may report that every man said: "The guy on my right thinks that the guy on my left pointed at him". This suggests that the grammar is compatible with (4) after all. To account for the context-dependent acceptability of (1), we propose a theory that incorporates insights from Reinhart's Rule-I (Reinhart 1983a,b). Rule-I famously rules *He pointed at him* out when *he* and *him* corefer "accidentally" due to the existence of a competitor with the same meaning, namely, *He pointed at himself*, where *himself* is a bound variable. We suggest that Rule-I rules (1) out when the men "accidentally" think that pointer and pointee are the same, due to the existence of a competitor with the same meaning, namely, *Every man said that he thought that he had pointed at himself.*

In section 2 we present Rule-I and the challenge PBH sentences pose for it. Based on data that show that PBH sentences have a limited range of bound readings, in Section 3 we propose a different syntax for them and a new rendition of Rule-I that accounts for their "bound" readings.

2   Accidental Sameness and BT

Let us begin with (5) – a simple clause with no embedding and no quantification, and with (6) – where the individual-denoting subject of (5) is replaced by a quantifier.

(5)   He/John pointed at him.

(6)   Every man pointed at him.

It is uncontroversial that (6) is unacceptable on a bound-variable reading (that implies that every man x pointed at x). To express that reading, *him* must be replaced with *himself*, as in *Every man pointed at himself.* (5) (uttered with plain intonation and no special emphasis on the subject or the object) is different. For example, when "sameness" of subject and object is presupposed, (5) is unacceptable, and again, to express that reading *him* should be replaced with *himself*, as in *He/John pointed at himself.* But when the interlocutors are not in agreement regarding subject-object "sameness", a sentence such as (5) is acceptable (see Postal 1970, Evans 1980 and others). The *himself*-counterpart of (5) often expresses a different meaning, in such a state of affairs, as illustrated by (7) (where, for pragmatic reasons, a different verb is used).

(7)   Bill: Is the speaker John?
          Mary and Sally respond together.

> Mary: I think so. **He just spoke very highly of him**. Everyone else hates John and
> would never do that. ('do that' = 'speak highly of John')
> Sally: I'm not sure. **He just spoke very highly of himself**. Isn't John too humble to do
> that? ('do that' = 'speak highly of oneself')

Classical BT provides only a partial account of these facts. To see this, let us assume that QR results in a λ-enriched LF – [...[$DP\ \lambda n[t_n \dots]$]...] – in the style of Heim and Kratzer (1998). Let us also assume (for simplicity, nothing crucial hinges on this) that subjects obligatorily QR. In this system, *him* is a bound variable only if it is co-indexed with a λ-bound trace at LF.[1] Accordingly, (6) and its *himself*-counterpart have the LFs in (9) and (10) respectively; (8) rules out a bound-variable reading of (6) and rules in a bound-variable reading of its equivalent *himself*-counterpart.

(8)   BT   <u>Condition A</u>: A reflexive pronoun must be bound in its binding domain.
              <u>Condition B</u>: A non-reflexive pronoun cannot be bound in its binding domain.[2]
       (Node X <u>binds</u> node Y iff X ≠ Y, X is co-indexed with Y and X c-commands Y.)

(9) $DP\ \lambda 2\ [_{\text{BD}}\ t_2\ [point\ at\ him_{1/*2}]]$

(10) $DP\ \lambda 2\ [_{\text{BD}}\ t_2\ [point\ at\ himself_{*1/2}]]$

But on its own, (8) does not account for (5), because (11a,b) are well-formed whenever the subject trace and the object DP are not co-indexed. By (8), *him* may always corefer with the QR'ed DP: via co-indexation with the QR'ed DP (as in (11a)), or accidentally (as in (11b)).

(11)   a. $he_1\ \lambda 3\ [_{\text{BD}}\ t_3\ [point\ at\ him_{1/*3}]]$
        b. $he_2/John\ \lambda 3\ [_{\text{BD}}\ t_3\ [point\ at\ him_{1/*3}]]$

The LFs in (11) illustrate the problem of licit accidental sameness (often referred to as 'accidental coreference'). *He pointed at him* should be ruled out whenever it is presupposed that *he* and *him* corefer (in which case it conveys exactly what its *himself*-counterpart conveys), and ruled in whenever this is not presupposed (in which case it conveys something slightly different from what its *himself*-counterpart conveys; see (7)), yet it *always* has an LF that is well-formed by (8): even if we expanded the binding domain, (11b) would offer a well-formed LF.

    A well known solution to the problem of licit accidental sameness is proposed in Reinhart (1983a,b) (and its descendants – Grodzinsky and Reinhart 1993, Heim 1998, Fox 2000, Büring 2005, Reinhart 2006 and Roelofsen 2010, among others). According to this solution, there is a preference for a bound-variable LF over a non-bound-variable LF with the same meaning. We claim that while this solution accounts for the case of accidental sameness illustrated by *He pointed*

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[1]An index is a pair consisting of a number and a semantic type (the type is often suppressed in the LFs for simplicity). By the definition of the interpretation function $[\![\ ]\!]^{w,g}$ (as in, for example, Heim and Kratzer 1998), (i) and (ii) hold for any node α, index n, world w and variable assignment g.

(i)   If α is a (reflexive or non-reflexive) pronoun or a trace, $[\![\alpha_n]\!]^{w,g}$ is defined only if n ∈ Dom(g); when defined, $[\![\alpha_n]\!]^{w,g} = g(n)$.

(ii) $[\![\lambda n[\alpha]]\!]^{w,g}$ is that function f such that $\text{Dom}(f) = \{x: [\![\alpha]\!]^{w,g[n\to x]}$ is defined$\}$, and for all y ∈ Dom(f): $f(y) = [\![\alpha]\!]^{w,g[n\to y]}$ (g[k→z] is that function h such that: (i) Dom(h) = {k} ∪ Dom(g), (ii) h(k) = z, (iii) for all m ≠ k such that m ∈ Dom(h), h(m) = g(m)).

[2]We do not discuss Condition C effects here.

at him, it does not straightforwardly account for all cases of accidental sameness (specifically, those illustrated by PBH sentences).

On Reinhart's approach, the preference for bound variable LFs is fleshed out as a pragmatic principle that Reinhart called Rule-I, which applies post-syntactically. Essentially, Rule-I says that given a choice between a non-bound-variable LF and a bound-variable LF with the same meaning, the latter wins. For example, when *him* is not locally bound in the sense of (8), as in (11), and *he* and *him* corefer, *He pointed at him* and *He pointed at himself* (where *himself* is locally bound in the sense of (8), as in (10)) have the same truth conditions, so the latter wins. We do not use Reinhart's version of Rule-I here; instead, we use the version of Rule-I that is explored in Forks, which we call "Rule-I".

Within "Rule-I", the Binding conditions are restated based on the term *co-valuation*, defined in (12). We refer to the restated Binding conditions as "Condition A" and "Condition B"; see (13) (though "Condition A" is not specifically discussed in Forks). "Rule-I" is (12) and "Condition B" taken together. Simply put, (12) says that a DP is co-valued with another DP when replacing the one with the other in a clause results in saying the same thing.

(12)   <u>Co-valuation</u> (Forks-style). Let α and β be occurrences of DPs of type e in LF ϕ and let c be a common ground. Then β is *co-valued* with α in ϕ and c iff for all world-assignment pairs $\langle w, g \rangle \in c$ and all $g' \supseteq g$:
         $[\![\phi]\!]^{w,g'} = [\![\phi[\alpha/\beta]]\!]^{w,g'}$, where $\phi[\alpha/\beta]$ is the result of replacing β by a copy of α in ϕ.

(13)   <u>"Condition A"</u>: A reflexive pronoun must be co-valued with a c-commanding DP in its binding domain.
         <u>"Condition B"</u>: A non-reflexive pronoun cannot be co-valued with a c-commanding DP in its binding domain.

The term 'common ground' (= 'subjective context', in Forks) is borrowed from Stalnaker (1978); here it refers to the set of world-assignment pairs that are candidates for the world and assignment that the utterance might be located in according to the shared beliefs of the interlocutors. The interpretation function $[\![\ ]\!]^{w,g}$ is defined as in, for example, Heim and Kratzer (1998).

Strictly speaking, "Rule-I" seems to be very different from Reinhart's Rule-I, because it is not stated as a competition between LFs (that takes place post-syntactically). But as Heim points out, competition between LFs is incorporated into the definition of co-valuation; to know whether two DPs are co-valued in ϕ we have to construct an alternative to ϕ. That alternative – $\phi[\alpha/\beta]$ – corresponds to a competitor of ϕ in the old-fashioned Rule-I sense. This makes "Rule-I" sufficiently faithful to Reinhart's Rule-I, at least for our modest purposes, and so we use "Rule-I" here and call $\phi[\alpha/\beta]$ a "competitor" for ϕ (but see Appendix I for an attempt to state Rule-I in a manner that is more faithful to Reinhart 1983a,b).

Regarding reflexive pronouns, "Condition A" in (13) predicts what Condition A in (8) predicts. For example, *DP* $\lambda 1[_{BD} t_1$ *point at himself*$_1]$, whose "competitor" is the equivalent *DP* $\lambda 1[_{BD} t_1$ *point at $t_1]$*, satisfies "Condition A", because t_1 and *himself*$_1$ are co-valued in any common ground. Regarding non-reflexive pronouns, "Condition B" and Condition B make different predictions. For example, *he*$_2$ $\lambda 3[_{BD} t_3$ *pointed at him*$_1]$, whose "competitor" is the non-equivalent *he*$_2$ $\lambda 3[_{BD} t_3$ *pointed at $t_3]$* (itself equivalent to *he*$_2$ $\lambda 3[_{BD} t_3$ *pointed at himself*$_3]$), violates "Condition B" when *him*$_1$ is co-valued with t_3 by (12). This happens when coreference of *he*$_2$ and *him*$_1$ is presupposed (i.e., when they have the same reference throughout c). When such coreference is not presupposed,

he$_2$ λ3[$_{BD}$ t$_3$ pointed at him$_1$] may be grammatical (for example, in the common ground of (7)). Accidental sameness is illicit by "Condition B".[3]

   This solution to the licit accidental sameness problem seems, at first sight, to also handle non-accidental sameness correctly. According to "Rule-I", the bound-variable LFs of *Every man pointed at him*, *Every man said that he pointed at him* and *Every man said that he thought that he pointed at him* all have equivalent "competitors" and therefore violate "Condition B", as shown in (14),[4] but only (14a) violates classical Condition B.

(14)   a.   *DP λ5[$_{BD}$ t$_5$ point at him$_5$]*   (Condition B is violated)
            "Competitor":   *DP λ5[$_{BD}$ t$_5$ point at t$_5$]*
                            (cf. *DP λ5[$_{BD}$ t$_5$ point at himself$_5$]*)
            t$_5$ and *him$_5$* are always co-valued, so "Condition B" is always violated.
       b.   *DP λ1[t$_1$ say he$_1$ λ5[$_{BD}$ t$_5$ point at him$_1$]]*   (Condition B is <u>not</u> violated)
            "Competitor":   *DP λ1[t$_1$ say he$_1$ λ5[$_{BD}$ t$_5$ point at t$_5$]]*
                            (cf. *DP λ1[t$_1$ say he$_1$ λ5[$_{BD}$ t$_5$ point at himself$_5$]]*)
            him$_1$ is always co-valued with *t$_5$*, so "Condition B" is <u>always</u> violated.
       c.   *DP λ1[t$_1$ say he$_1$ λ3[t$_3$ think he$_1$ λ5[$_{BD}$ t$_5$ point at him$_3$]]]*
                                                                          (Condition B is <u>not</u> violated)
            "Competitor":   *DP λ1[t$_1$ say he$_1$ λ3[t$_3$ think he$_1$ λ5[$_{BD}$ t$_5$ point at t$_5$]]]*
                            (cf. *DP λ1[t$_1$ say he$_1$ λ3[t$_3$ think he$_1$ λ5[$_{BD}$ t$_5$ point at himself$_5$]]]*)
            him$_3$ is always co-valued with *t$_5$*, so "Condition B" is <u>always</u> violated.

Thus, PBH sentences such as (1) (*Every man said that he thought that he pointed at him*) and RPBH (reduced PBH) sentences such as *Every man said he pointed at him* are predicted to be no different from *Every man pointed at him*: they are all predicted not to have bound variable readings at all. The motivation for "Rule-I" is not preference for bound-variable LFs (as both PBH and RPBH sentences have bound-variable LFs); the motivation seems to be preference for "local" variable binding (cf. Fox 2000 and Büring 2005; see Appendix I).

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[3]"Condition B" under-generates if we assume that it cares about the extension of φ (rather than its intension). For example, when c ⊆ { ⟨w, g⟩ | g(2) spoke highly of g(1) in w iff g(2) spoke highly of g(2) in w}, *he$_2$ λ3[t$_3$ spoke highly of him$_1$]* and *he$_2$ λ3[t$_3$ spoke highly of t$_3$]* have the same truth value throughout c regardless of whether *he$_2$* and *him$_1$* have the same reference throughout c. Yet *He spoke highly of him* seems to be acceptable not just in (7), where *he$_2$* and *him$_1$* are not presupposed to have the same reference, but also in scenarios where, in addition, it is presupposed that 'g(2) spoke highly of g(1) iff g(2) spoke highly of g(2)'. Also, *He pointed at him or [it is raining or it isn't raining]* is acceptable if *He pointed at him* is, yet it violates "Condition B" even if *He pointed at him*, on its own, does not (and even if "Condition B" cares about the intension of φ). One possible solution adopts (a weak version of) Gajewski (2009), and is based on the idea that "Condition B" looks at LFs scrubbed of information on identity of verbs (rather than traditional LFs). Thus, on the one hand, *He spoke highly of him or [it is raining or it isn't raining]* is unacceptable only when *He spoke highly of him* is, because [*it is P-ing or it isn't Q-ing*] does not have a fixed extension. On the other hand, *He spoke highly of him* is unacceptable only when *he$_2$ λ3[t$_3$ P him$_1$]* and *he$_2$ λ3[t$_3$ P t$_3$]* have the same extension (in practice, only when *he$_2$* and *him$_1$* are presupposed to have the same reference).

[4]Because:

(i) $[\![λ1[t_1 \ say \ he_1 \ λ5[t_5 \ point \ at \ him_1]] \ ]\!]^{w,g} = λx. \ [\![say]\!]^{w,g}(λw'. \ [\![point \ at]\!]^{w',g}(x)(x))(x)$

(ii) $[\![λ1[t_1 \ say \ he_1 \ λ3[t_3 \ think \ he_1 \ λ5[t_5 \ point \ at \ him_3]]] \ ]\!]^{w,g} =$
       $λx. \ [\![say]\!]^{w,g}(λw'. \ [\![think]\!]^{w',g}(λw''. \ [\![point \ at]\!]^{w'',g}(x)(x))(x))(x)$

The conclusion regarding non-accidental sameness brings us back to the puzzle introduced in Section 1, as it raises a conceptual question and an empirical problem. Starting with the former, it is not obvious why banning non-accidental sameness should involve competition between LFs. It seems reasonable to entertain the alternative hypothesis that non-accidental sameness is blocked without any appeal to competition. And indeed, the following idea is entertained in Forks as an alternative to "Rule-I": all bound variable LFs of *Every man$_1$ ... (he$_1$) ... pointed at him$_1$* are ruled out in the syntax, without competition, either by classical Condition B (as is the case in (14a)), or as violations of a constraint that requires a QR'ed DP to be co-indexed with its trace. (14b) and (14c) respect classical Condition B but violate the requirement to co-index a moved DP with its trace. Importantly, while the *himself*-counterparts of *Every man$_1$ ... (he$_1$) ... pointed at him$_1$* have Condition-A-compliant bound-variable LFs – namely, *every man $\lambda 1[t_1 ... (he_1) ... \lambda 1[_{BD} t_1$ point at himself$_1$]]* – that respect the movement constraint, *all* bound-variable LFs of *Every man$_1$ (... he$_1$) ... pointed at him$_1$* violate it.

We take issue with this suggestion, because of the following empirical problem. As we saw, (1) indeed does not have the bound-variable reading described in (2) (for every man x, x said: "I think I pointed at myself"). Its *himself*-counterpart must be used to express that meaning. However, as we claim in Section 3, (1) is sometimes acceptable, and its *himself*-counterpart unacceptable, when it is presupposed that each man – unaware that he is both alleged pointer and alleged pointee – takes pointer and pointee to be distinct. (Admittedly, the contrast is subtle and not all speakers agree on the judgments.) Therefore, we do not assume that a QR'ed DP must be co-indexed with its trace. Instead, we propose that (1) has an assignment-dependent LF (an assignment-dependent alternative to (14c) which, like (14c), violates the requirement to co-index a QR'd DP with its trace). As we show, (1) behaves like *He pointed at him*: there are common grounds where what is presupposed about the men's beliefs regarding the identity of pointer and pointee results in violation of "Condition B", and there are common grounds where what is presupposed about those beliefs does not result in such violation. The bound-variable LFs of *Every man pointed at him* and of the RPBH *Every man said that he pointed at him* are still (correctly) always ruled out by "Condition B", regardless of what the common ground looks like.

3   PBH Sentences and "Rule-I"

3.1   The Syntax and Semantics of PBH Sentences

Imagine that John is looking at a picture that depicts him looking at two pictures of himself (so all in all, we have the "real" John and three pictures of John – two of those three pictures are pictures within a picture). John forms a belief about himself as illustrated in (15).

(15)   According to us:

J	J	J	(☞)	J

According to J:

	B	P	(☞)	B

According to B
   (as percieved by J:)

|		P	☞	F
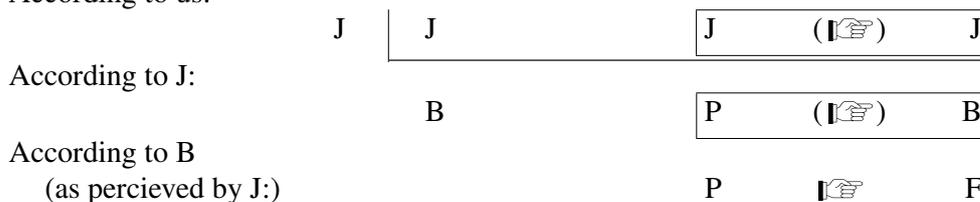
According to (15), John fails to recognize himself: in his mind the person in the first picture is Bill, and the two pictures-within-a-picture are of Paul and of Bill. John says to himself: "According to Bill, Paul pointed at him (though Bill does not recognize himself in the second picture)."

Now suppose there are two other men in the room – Bill and Fred – and each one of them is also looking at a picture of himself that depicts him looking at two pictures of himself. They form similar beliefs about themselves (making similar identification mistakes). For many speakers, *Every man said that he thought that he had pointed at him* is good in (16).

(16)   John, Bill and Fred were each looking at three pictures of themselves (two of them were pictures within a picture). Each man failed to recognize himself.
John thought: "According to Bill, Paul pointed at him".
Bill and Fred thought: "According to John, Mary pointed at him".
Then, every man said out loud that he thought that he had pointed at him.

It does not matter what the men attribute to "their" thinkers, regarding identity of pointer and pointee. (1) is acceptable as long as all the men/sayers believe (alleged) pointer and (alleged) pointee are distinct.

(17)   According to us:

J	J		J	(☞)	J

According to J:

	B		P	(☞)	B

According to B
(as percieved by J:)

			P	☞	**P**
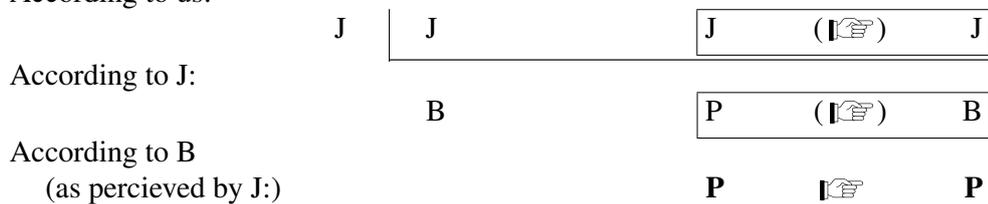
However, when at least one of the men/sayers thinks that pointer and pointee are the same, (1) is unacceptable (for all speakers).

(18)   a.   John, Bill and Fred were each looking at three pictures of themselves (two of them were pictures within a picture). Each man failed to recognize himself.
John thought: "According to Bill, Paul pointed at himself (though he, Bill, does not recognize Paul in the second picture)".
Bill and Fred thought: "According to John, Mary pointed at him".
#Then, every man said out loud that he thought that he had pointed at him
    b.   According to us:

J	J		J	(☞)	J

According to J:

	B		**P**	(☞)	**P**

According to B
(as percieved by J:)

			P	☞	F
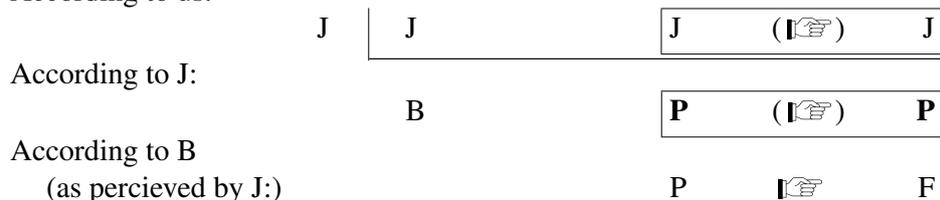
The *himself*-counterpart of (1) – *Every man said that he thought that he pointed at himself* – is unacceptable in the scenarios described in (16), (17) and (18a). In fact, it is acceptable only when *all* the men take pointer and pointee to be the same, regardless of whether they attribute the same belief to "their" thinkers.

(19)   Failing to recognize himself in any of the three pictures, John thinks: "According to Fred,
         Bill pointed at himself (except that he, Fred, thinks that the pointer and the person pointed
         at are different people)"; failing to recognize himself in any of the three pictures, Bill
         thinks: "According to John, Paul pointed at himself"; and failing to recognize himself in
         any of the three pictures, Paul thinks exactly what John thinks. **Every man later said
         that he thought that he had pointed at himself.**

The facts regarding *Every man said that he thought that he had pointed at him* and *Every man said
that he thought that he had pointed at himself* are summarized in (20).

(20)   ...him   ...himself
         (a) for some man x:
              pointer = pointee   --   + modulo (b)
         (b) for some man x:
              pointer ≠ pointee   + modulo (a)   --

This state of affairs is not expected given the proposed LF of (1) – *Every man said that he thought
that he pointed at him* – in (14c), which predicts it to be equivalent to its *himself*-counterpart. But
(14c) is a simplified LF that does not fully reflect the fact that (1) is a 'de re' attitude report, which
is often thought of as a report of an event where an attitude holder ascribes some property to the
'res' – the individual whom the attitude is about – under some acquaintance relation (Kaplan 1968,
Lewis 1979, Cresswell and von Stechow 1982, von Stechow 1984 among others; based on Quine
1956). Assigning (1) an LF along these lines might explain (20).

  Let us start with a simpler 'de re' report: (21) can mean that John simultaneously ascribes to
Mary the being-French property and the being-German property, when from his perspective he
is thinking of two distinct women (though from our perspective, it is the same woman, namely,
Mary).

(21)   John believes that Mary is French and that she is German.

The truth conditions of (21) are given in (22), where Dox(John)(w) is the set of John's doxastic
alternatives (the set of worlds compatible with what John believes in w), and F1 and F2 are
contextually-supplied acquaintance-based functions from world-individual pairs to individuals.
That a function F is acquaintance-based means that F implies cognitive contact between the attitude
holder and the 'res' (for example, F1 may map each world-individual pair $\langle w, x \rangle$ in its domain to
the unique y such that x sees y in the morning in w).[5]

(22)   Mary = F1(w, John) = F2(w, John), and for all w' ∈ Dox(John)(w):
         F1(w', John) is French in w' and F2(w', John) is German in w'.

         (Can mean: Mary is the woman John actually saw in the morning and Mary is also the

woman John actually saw in the evening, and John actually thinks: "the woman I saw in the morning is French and the woman I saw in the evening is German".)

To derive the truth conditions in (22) in a compositional fashion, we adopt the LF in (23).

(23)   *John $\lambda 1[t_1$ believe-w_0 $\lambda 2[[[G_3$-pro$_1$-w_0 Mary]-w_2 $\lambda 6[t_6$ be-w_2 French]] and [[G_8$-pro$_1$-$w_0$ she$_5$]-w_2 $\lambda 6[t_6$ be-w_2 German]]]]]*

The free w_0 is a BT-exempt pronominal syntactic argument of *believe* which, by convention, denotes the actual world, and w_2 is a pronominal world-denoting syntactic argument of *be* which is bound by – i.e., c-commanded by and co-indexed with – $\lambda 2$ (itself introduced by *believe*). The free pronouns G_3 and G_8 are distinguished silent free pronouns of type $\langle e, \langle s, \langle e, \langle s, e \rangle \rangle \rangle \rangle$, denoting functions from individual-world pairs to <u>concept generators</u>. Concept generators are functions from individuals to individual concepts. <u>When *pro*$_1$ denotes John, G_3-*pro*$_1$-w_0 and G_8-*pro*$_1$-w_0</u> denote concept generators suitable for John in the actual world. Each one of these concept generators takes the 'res' – Mary – as its argument, and supplies a suitable acquaintance-based function (i.e., a suitable "guise", or description, that John uses to describe Mary to himself in the actual world).[6] A (simplified) definition of 'concept generator' is given in (24), and the semantics assumed for *believe* is given in (25) (since world-arguments are now represented as pronouns in the syntax, $[\![\ ]\!]$ is relativized only to variable assignments).

(24)   a.   A function h of type $\langle e, \langle s, e \rangle \rangle$ is a *suitable concept-generator* for x in w iff:
           (a) $Dom(h) = \{z \mid x$ is acquainted with z in w$\}$; and
           (b)   there is a function F from individuals to suitable acquaintance-based functions such that for every $z \in Dom(h)$: (i) $F_z(x)(w) = z$, and (ii) $Dox(x)(w) \subseteq \{w' \mid F_z(x)(w') = h(z)(w')\}$.
        b. $[\![G_j]\!]^g(x)(w)$ is defined only if $g(j)(x)(w)$ is a concept-generator suitable for x in w. (We refer to x as the *restrictor* of G_j; the first argument of $[\![G_j]\!]^g(x)(w)$ is the *res*.)

(25)   For any world w, individual x, and p such that p is a function from worlds to truth values, $[\![believe]\!]^g(w)(p)(x)$ is defined only if $Dox(x)(w) \subseteq \{w' \mid p(w')$ is defined$\}$.
        When defined, $[\![believe]\!]^g(w)(p)(x) :=$ True iff $Dox(x)(w) \subseteq \{w' \mid p(w') =$ True$\}$.

The resulting interpretation of (23) is (26) (essentially the meaning in (22)): $[\![G_3]\!]^g$ is associated with F1$_{Mary}$, F1$_{Mary}$(John)(w) = Mary, and for all $w' \in Dox(John)(w)$: $[\![G_3]\!]^g$(John)(w)(Mary)(w') = F1$_{Mary}$(John)(w'). Similarly for $[\![G_8]\!]^g$, which is associated with F2$_{Mary}$.

(26)   For all $w' \in Dox(John)(w)$: $[\![G_3]\!]^g$(John)(w)(Mary)(w') is French in w' and $[\![G_8]\!]^g$(John)(w)(Mary)(w') is German in w'.

Interestingly, some 'de re' reports have a more complex structure than (21), with variable binding in the scope of the attitude verb, as illustrated by (27).

(27)   John believes that every female student likes herself.

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[6]The idea that acquaintance-based functions are introduced in the syntax, via concept-generator pronouns, is due to Percus and Sauerland (2003a) and Anand (2006). While for Percus & Sauerland concept-generators are λ-bound in the syntax and existentially bound in the semantics, Anand also considers the possibility that they are supplied by the context (see Fn. 5).

It is observed in Sharvit (2011) and Charlow and Sharvit (2014) that (27), where *every female student* "binds" *herself* in the scope of *believe*, has a complex 'de re' reading (in addition to the simpler 'de re' reading, according to which John's belief is simply: "Every one of these individuals likes herself"). The more complex "bound" 'de re' reading is illustrated by a scenario such as the following. John is looking at pairs of pictures: two pictures of Mary, two pictures of Sally and two pictures of Betty. He is not aware that Mary, Sally and Betty are the female students, and he thinks that each pair depicts two distinct individuals. He thinks: "This professor [pointing at one picture of Mary] likes that professor [pointing at the other picture of Mary]; this professor [pointing at one picture of Sally] likes that professor [pointing at the other picture of Sally]; this professor [pointing at one picture of Betty] likes that professor [pointing at the other picture of Betty]." While a simple bound variable reading can be read off (28a), the complex reading cannot. Charlow & Sharvit propose (a variant of) (29a), where the trace of *every female student* and the co-indexed *herself* are each "wrapped" by a different concept-generator (recall that subjects QR obligatorily).[7]

(28)   a.   *John $\lambda 1[t_1$ believe-w_0 $\lambda 6[$every female-student-w_0 $\lambda 2[_{BD}$ t_2 like-w_6 herself$_2]]]$*
        b.   For all w' $\in$ Dox(John)(w), for all female students x in w: x likes x in w'.

(29)   a.   *John $\lambda 1[t_1$ believe-w_0 $\lambda 6[$every female-student-w_0 $\lambda 5[_{BD}$ $[G_7$-pro$_1$-w_0 $t_5]$-w_6 like-w_6 $[G_8$-pro$_1$-w_0 herself$_5]$-$w_6]]]$*
        b.   For all w' $\in$ Dox(John)(w), for all female students x in w:
              $[\![G_7]\!]^g$(John)(w)(x)(w') likes $[\![G_8]\!]^g$(John)(w)(x)(w') in w'.

The LF in (29a) implies that while *herself* is bound in the scope of *believe*, in John's "mind" it can, but need not, pick out the same individuals picked out by the trace of *every female student*. To guarantee that (29a) complies with BT, we assume that if X is c-commanded by a concept-generator complex, the 'res' position of that complex also c-commands X. Accordingly, *herself$_5$* is c-commanded by t_5. Crucially, c-command is not possible from the restrictor position of G (see (24b)), which is hierarchically lower than the 'res' position (if c-command from the restrictor position were possible, the ungrammatical *John believes that every female student likes himself* would be grammatical whenever John is a male individual).

Since *Every man said that he thought that he pointed at him* and its *himself*-counterpart have, like (27), variable binding in the scope of an attitude verb, we propose the assignment-dependent (30) and (31) as possible LFs for them, where traces in the scope of an attitude verb and pronouns co-indexed with them are "wrapped" by concept-generators.

(30)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 9[$he$_1$ $\lambda 3[[G_4$-pro$_1$-w_0 $t_3]$-w_9 think-w_9*
        $\lambda 2[[G_7$-pro$_1$-w_0 he$_1]$-w_9 $\lambda 5[_{BD}$ $[G_6$-$[[G_4$-pro$_1$-w_0 pro$_3]$-$w_9]$-w_9 $t_5]$-w_2 point-at-w_2
        $[G_8$-$[[G_4$-pro$_1$-w_0 pro$_3]$-$w_9]$-w_9 $[G_{10}$-pro$_1$-w_0 him$_3]$-$w_9]$-$w_2]]]]]$

(31)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 9[$he$_1$ $\lambda 3[[G_4$-pro$_1$-w_0 $t_3]$-w_9 think-w_9*
        $\lambda 2[[G_7$-pro$_1$-w_0 he$_1]$-w_9 $\lambda 5[_{BD}$ $[G_6$-$[[G_4$-pro$_1$-w_0 pro$_3]$-$w_9]$-w_9 $t_5]$-w_2 point-at-w_2
        $[G_8$-$[[G_4$-pro$_1$-w_0 pro$_3]$-$w_9]$-w_9 himself$_5]$-$w_2]]]]]$

Consistently with (20), (30) and (31) are indeed not equivalent (for simplicity, we assume that *say*, *think* and *believe* have the same semantics; see (25)).

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[7]Charlow and Sharvit (2014)'s analysis adheres to Percus and Sauerland (2003a) and has the concept-generator pronouns λ-bound at LF (see Fn. 5, 6).

(32) Interpretation of (30): For all men x in w, all w' $\in$ Dox(x)(w) and all w" $\in$ $\overline{\text{Dox}([\![G_4]\!]^g(x)(w)(x)(w'))(w')}$:
$[\![G_6]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w")$ pointed in w" at $[\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_{10}]\!]^g(x)(w)(x)(w'))(w")$.

(33) Interpretation of (31): For all men x in w, all w' $\in$ Dox(x)(w) and all w" $\in$ $\overline{\text{Dox}([\![G_4]\!]^g(x)(w)(x)(w'))(w')}$:
$[\![G_6]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w")$ pointed in w" at $[\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w")$.

As for BT, we assume "Condition B" as in (13), but to account for non-reflexive pronouns, we re-adopt classical Condition A (which checks co-indexation, as in (8)) instead of "Condition A". In (30)-(31), BT applies to *him(self)* or any expression of type e that contains it (which is also a DP, by assumption). The binding domain (marked as BD in (30) and (31)) is the same as that of *him(self)* in the corresponding concept-generator-free LFs. Recall that we allow c-command from the 'res' position of a (c-commanding) concept-generator; hence, (30) does not automatically violate "Condition B", and (31) automatically satisfies Condition A.

(34) (30): by (12) and the non-equivalence of (30) and any relevant "competitor" of (30), "Condition B" can, in principle, be respected.

(35) (31): in BD, t_5 c-commands the co-indexed *himself$_5$*, from the 'res' position of G_6; therefore, Condition A is respected.

Examples of ill-formed LFs are given in (36) and (37).

(36) **every man-w_0* $\lambda 1[t_1$ *say-w_0* $\lambda 9[\textbf{he}_1$ $\lambda 3[[G_4$-*pro$_1$-w_0* $t_3]$-w_9 *think-w_9* $\lambda 2[[G_7$-*pro$_1$-w_0* $\textbf{he}_1]$-w_9 $\lambda 5[_{\text{BD}}$ G_6-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $t_5]$-w_2 *point-at-w_2* $[G_6$-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $\textbf{him}_5]$-$w_2]]]]]$

In BD, $[G_6$-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $t_5]$-w_2 c-commands the co-indexed $[G_6$-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ *him$_5]$-w_2. By (12), they are co-valued, in violation of "Condition B".

(37) **every man-w_0* $\lambda 1[t_1$ say-w_0 $\lambda 9[\textbf{he}_1$ $\lambda 3[[G_4$-*pro$_1$-w_0* $t_3]$-w_9 think-w_9 $\lambda 2[[G_7$-*pro$_1$-w_0* $\textbf{he}_1]$-w_9 $\lambda 5[_{\text{BD}}$ G_6-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $t_5]$-w_2 *point-at-w_2* $[G_8$-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $[G_{10}$-*pro$_1$-w_0* $\textbf{\textit{himself}}_3]$-$w_9]$-$w_2]]]]]$

There is no expression in BD that c-commands and is co-indexed with *himself$_3$*, $[G_{10}$-*pro$_1$-w_0* *himself$_3]$-w_9 or $[G_8$-$[[G_4$-*pro$_1$-w_0* *pro$_3$]$-$w_9]$-$w_9$ $[G_{10}$-*pro$_1$-w_0* *himself$_3]$-$w_9]$-w_2. As a result, Condition A is violated. By assumption, *pro$_3$*, which is in the restrictor of G_6 and G_8, is too deeply embedded to be able to c-command the co-indexed *himself$_3$*.

That (31) satisfies Condition A and (37) violates it accounts for the *himself*-column of (20). That (36) violates "Condition B" is consistent with the *him*-cell in (20a). Moreover, that (30) does not automatically violate "Condition B" is consistent with the *him*-cell in (20b).[8] But as it stands, "Condition B" does not guarantee the unacceptability of *Every man said that he thought he had*

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[8]It is worth pointing out that classical Condition B is respected in (30) and violated in (36). In Appendix I we explore a version of Rule-I that presupposes classical BT (Conditions A and B).

pointed at him in all cases corresponding to the *him*-cell in (20a): due to the non-equivalence of (30) and (31) (which is equivalent to the "competitor" of (30)), (30) may be grammatical when some man takes pointer and pointee to be the same.

3.2   A New "Rule-I"

Since it suffices that only one man take pointer and pointee to be the same for *Every man said that he thought that he had pointed at him* to be unacceptable, we revise the definition of *co-valuation* as in (38): it seeks a "competitor" for a sub-LF of (30) rather than (30) itself.[9]

(38)   <u>Co-valuation</u> (revised). Let α and β be occurrences of DPs of type e in a root LF ϕ, and let c be a common ground suitable for ϕ. Then β is *co-valued* with α in ϕ and c iff there is a sub-LF ϕ' of ϕ such that:

    (i) ϕ' contains α, β and a λ that c-commands them, and

    (ii)   for all $\langle w, g \rangle \in$ c, there is a g' $\supseteq$ g such that $[\![\phi']\!]^{g'}$ and $[\![\phi'[\alpha/\beta]]\!]^{g'}$ are defined and $[\![\phi']\!]^{g'} = [\![\phi'[\alpha/\beta]]\!]^{g'}$.

Co-valuation is restricted to *suitable* common grounds. That c is suitable for LF ϕ means, among other things, that c is nonempty, that the presuppositions of ϕ are satisfied in c, that all and only pronouns that are free in ϕ are assigned a value by the assignments of c, and that c $\subseteq$ {$\langle w, g \rangle$| for every world-index k free in ϕ, g(k) = w}. If c is not suitable, ϕ cannot be used anyway, independently of "Condition B". By quantifying over super-assignments of the assignments of c, co-valuation can compare ϕ' with its "competitor" even if they both contain free traces.

   The revised "Rule-I" makes exactly the same prediction as (12)-(13) regarding *Every man pointed at him* on its bound variable reading. *every man-w_0 $\lambda 2$[$_{BD}$ t_2 point at-w_0 him$_2$]* violates "Condition B" because t_2 and *him$_2$* are co-valued by the equivalence of *every man-w_0 $\lambda 2$[$_{BD}$ t_2 point at-w_0 him$_2$]* and *every man-w_0 $\lambda 2$[$_{BD}$ t_2 point at-w_0 t_2]*. But now, "Rule-I" also regulates accidental sameness in both *He pointed at him* and *Every man said that he thought that he pointed at him*. Starting with the former, suppose that c is suitable for *he$_2$ $\lambda 3$[$_{BD}$ t_3 point-at-w_0 him$_1$]* (so for all g in c, Dom(g) = {0, 1, 2}) and that the assignments of c all assign the same value to indices 1 and 2. Then for all g in c, $[\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 him$_1$]*$]\!]^g$ and $[\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 t_3]*$]\!]^g$ are defined and $[\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 him$_1$]*$]\!]^g$ = $[\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 t_3]*$]\!]^g$. By (38), *him$_1$* is co-valued with t_3, and "Condition B" is violated. When not all assignments g in c assign the same value to indices 1 and 2, *he$_2$ $\lambda 3$[$_{BD}$ t_3 point-at-w_0 him$_1$]* may be grammatical, because it is possible that there is a g in c such that $[\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 him$_1$]*$]\!]^g \neq [\![$*he$_2$ $\lambda 3$[t_3 point-at-w_0 t_3]*$]\!]^g$; similarly for $[\![$*$\lambda 3$[t_3 point-at-w_0 him$_1$]*$]\!]^g$ and $[\![$*$\lambda 3$[t_3 point-at-w_0 t_3]*$]\!]^g$ (there are no other sub-LFs of *he$_2$ $\lambda 3$[t_3 point-at-w_0 him$_1$]* that contain t_3, *him$_1$* and a λ that c-commands them).

   Turning to *Every man said that he thought that he pointed at him*, notice that there are always many ways to fix the "reference" of the concept-generator pronouns of its LF in (30). Importantly, when it is presupposed that some man takes pointer and pointee to be the same, every choice for the values of G_7 and G_{10} in (30) that reflects this presupposition results in a "Condition B" violation. To see this, let us define γ and δ as in (39): γ is a proper sub-LF of (30) (corresponding to ϕ' in (38)); δ is $\gamma[t_5/[G_{10}$-pro$_1$-w_0 him$_3$]-w_9] (corresponding to ϕ'[α/β] in (38)).

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[9] γ is a *sub-LF* of β iff β dominates γ or $\gamma = \beta$; γ is a *proper* sub-LF of β iff γ is a sub-LF of β and $\gamma \neq \beta$.

(39) $\gamma := [t_1 \text{ } \textit{say-}w_0 \text{ } \lambda 9[\textbf{\textit{he}}_1 \text{ } \lambda 3[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } t_3]\textit{-}w_9 \text{ } \textit{think-}w_9$
   $\lambda 2[[G_7\textit{-pro}_1\textit{-}w_0 \text{ } \textbf{\textit{he}}_1]\textit{-}w_9 \text{ } \lambda 5[\text{BD } [G_6\textit{-}[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } \textit{pro}_3]\textit{-}w_9]\textit{-}w_9 \text{ } \underline{t_5}]\textit{-}w_2 \text{ } \textit{point-at-}w_2$
   $[G_8\textit{-}[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } \textit{pro}_3]\textit{-}w_9 \text{ } \underline{[G_{10}\textit{-pro}_1\textit{-}w_0 \text{ } \textit{him}_3]\textit{-}w_9}]\textit{-}w_2]]]]]$

   $\delta := [t_1 \text{ } \textit{say-}w_0 \text{ } \lambda 9[\textbf{\textit{he}}_1 \text{ } \lambda 3[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } t_3]\textit{-}w_9 \text{ } \textit{think-}w_9$
   $\lambda 2[[G_7\textit{-pro}_1\textit{-}w_0 \text{ } \textbf{\textit{he}}_1]\textit{-}w_9 \text{ } \lambda 5[\text{BD } [G_6\textit{-}[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } \textit{pro}_3]\textit{-}w_9]\textit{-}w_9 \text{ } \underline{t_5}]\textit{-}w_2 \text{ } \textit{point-at-}w_2$
   $[G_8\textit{-}[[G_4\textit{-pro}_1\textit{-}w_0 \text{ } \textit{pro}_3]\textit{-}w_9 \text{ } \underline{t_5}]\textit{-}w_2]]]]]$

In a common ground c suitable for (30), where some man takes pointer and pointee to be the same (e.g., some man thinks: '[the guy in Picture 2] = [the guy in Picture 3]'; see (18)), it must be the case that for all $\langle w, g \rangle \in c$, there is an x such that x is a man in w (= g(0)), $[\![\gamma]\!]^{g[1\rightarrow x]}$ is defined, and for all w' $\in$ Dox(x)(w), $[\![G_7]\!]^g(x)(w)(x)(w') = [\![G_{10}]\!]^g(x)(w)(x)(w')$. It follows that for all g in c, there is a g' $\supseteq$ g (namely, g[1→x], where x is some man in g(0)) such that $[\![\gamma]\!]^{g'}$ and $[\![\delta]\!]^{g'}$ are defined and $[\![\gamma]\!]^{g'} = [\![\delta]\!]^{g'}$. $[G_{10}\textit{-pro}_1\textit{-}w_0 \text{ } \textit{him}_3]\textit{-}w_9$ is then co-valued with t_5.[10] On the other hand, when it is presupposed that all the men take pointer and pointee to be distinct, there are choices for the "reference" of the concept-generator pronouns in (30) that reflect this presupposition yet do not result in the violation of "Condition B". Suppose that c is such that for each man x, as far as x is concerned, pointer-by-x $\neq$ pointee-by-x. There is no guarantee that for all g in c, there is a g' $\supseteq$ g such that $[\![\gamma]\!]^{g'}$ and $[\![\delta]\!]^{g'}$ are defined and $[\![\gamma]\!]^{g'} = [\![\delta]\!]^{g'}$, *even if* some man thinks: 'the guy in Picture 1 mistakenly thinks that [the guy in Picture 2] = [the guy in Picture 3]' (see (17); i.e., even if for all $\langle w, g \rangle \in c$, there is a man x in w such that for all w' $\in$ Dox(x)(w) and all w'' $\in$ Dox($[\![G_4]\!]^g(x)(w)(x)(w'))(w')$, $[\![G_6]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w'') = [\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_{10}]\!]^g(x)(w)(x)(w'))(w'')$).[11] Moreover, when all the men are convinced that "their" pointer is distinct from "their" pointee, it is possible to fix the "reference" of the concept-generator pronouns in (30) in a manner that reflects this and, at the same time, implies that for some g in c and all g' $\supseteq$ g, either (i) or (ii) holds: (i) g'(1) is a man in g'(0), in which case γ and δ have a value relative to g' but not the same value; (ii) g'(1) is not a man in g'(0), in which case either γ and δ do not have the same value relative to g' or at least one member of $\{\gamma, \delta\}$ does not have a value relative to g' (for example, $[G_4\textit{-pro}_1\textit{-}w_0]$ need not have a value if g'(1) is not a man in g'(0), in which case γ and δ have no value relative to g'). This is true of all other sub-LFs of (30) (that contain $[G_{10}\textit{-pro}_1\textit{-}w_0 \text{ } \textit{him}_3]\textit{-}w_9$, t_5 and a λ that c-commands them) and their "competitors".[12]

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[10]This is based on the assumption that when c is suitable for (30), in every world of c there is at least one man who satisfies the presuppositions of γ. This assumption presents a potential problem for sentences of the form *DP said that he thought that he pointed at him* whose subject is a non-presuppositional DP.

[11]Because it does not follow that for all $\langle w, g \rangle \in c$, there is a man x in w such that for all w' $\in$ Dox(x)(w) and all w'' $\in$ Dox($[\![G_4]\!]^g(x)(w)(x)(w'))(w')$, $[\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_{10}]\!]^g(x)(w)(x)(w'))(w'') = [\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w'')$. It is worth pointing out that when for all $\langle w, g \rangle \in c$, there is a man x in w such that for all w' $\in$ Dox(x)(w) and all w'' $\in$ Dox($[\![G_4]\!]^g(x)(w)(x)(w'))(w')$, $[\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_{10}]\!]^g(x)(w)(x)(w'))(w'') = [\![G_8]\!]^g([\![G_4]\!]^g(x)(w)(x)(w'))(w')([\![G_7]\!]^g(x)(w)(x)(w'))(w'')$, it follows that for all $\langle w, g \rangle \in c$, there is a g' $\supseteq$ g such that $[\![\gamma]\!]^{g'} = [\![\delta]\!]^{g'}$, but it need not be the case that some man takes pointer and pointee to be the same or that some "thinker" does.

[12]Modulo Fn. 3. Notice, also, that judgments are not clear regarding *Every man said that he thought that he had pointed at him* when some man is unsure about whether 'pointer = pointee' (but the prediction is clear).

To repeat: in practice, it is (30) that has to reflect what is presupposed, not its "competitor" (or any of the "competitors" of the other sub-LFs of (30)), so the "reference" of the concept-generator pronouns does not always result in violation of "Condition B". Specifically, when it is presupposed that some man takes pointer and pointee to be the same, violation of "Condition B" is unavoidable. But when this is not presupposed, violation of "Condition B" may easily be avoided (while what *is* presupposed – at least regarding the beliefs of the men about sameness/non-sameness of pointer and pointee – is still faithfully captured).[13]

Now consider the RBPH sentence discussed in Section 2 and repeated in (40a), and its *himself*-counterpart in (40b).

(40)   a.   Every man said that he pointed at him.
         b.   Every man said that he pointed at himself.

Like *every man* $\lambda 3[_{BD} \ t_3 \ point\text{-}at\text{-}w_0 \ him_3]$, which violates "Condition B" in any common ground, but unlike the PBH (30), the RPBH LF (41) violates "Condition B" in any common ground. This is expected given the equivalence of (41) and its "competitor" (42).

(41)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 6[he_1 \ \lambda 3[_{BD} \ [G_7 \ pro_1\text{-}w_0 \ t_3]\text{-}w_6 \ point\text{-}at\text{-}w_6 \ [G_8\text{-}pro_1\text{-}w_0 \ him_1]\text{-}w_6]]]*

(42)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 6[he_1 \ \lambda 3[_{BD} \ [G_7\text{-}pro_1\text{-}w_0 \ t_3]\text{-}w_6 \ point\text{-}at\text{-}w_6 \ [G_8\text{-}pro_1\text{-}w_0 \ t_3]\text{-}w_6]]]*

(43)   Interpretation of (41) and (42):   For all men x in w, for all w' $\in$ Dox(x)(w): $[\![G_7]\!]^g$(x)(w)(x)(w') pointed in w' at $[\![G_8]\!]^g$(x)(w)(x)(w').

Moreover, *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 6[he_1 \ \lambda 3[_{BD} \ [G_7\text{-}pro_1\text{-}w_0 \ t_3]\text{-}w_6 \ point\text{-}at\text{-}w_6 \ [G_8\text{-}pro_1\text{-}w_0 \ himself_3]\text{-}w_6]]]*, which is equivalent to (41)/(42), respects Condition A. The predictions are borne out, as suggested by the infelicity of the a.-continuation in (44), which contrasts with the felicity of the b.-continuation in (44) (the situation is one where every man is looking at two pictures of himself).

(44)   Failing to recognize himself in either of the two pictures, John thinks: "Bill pointed at Fred"; failing to recognize himself in either of the two pictures, Bill thinks: "Paul pointed at John"; and failing to recognize himself in either of the two pictures, Paul thinks: "Fred pointed at Bill".
         a.   #Every man said that he had pointed at him.
         b.   Every man said that he had pointed at himself.

To sum up, the new "Rule-I" correctly blocks accidental sameness of *he* and *him* in *He pointed at him*, and some instances of accidental sameness in *Every man said he thought he had pointed at him*. They do not have equivalent "competitors", and are unacceptable when one of their sub-parts happens to have the same meaning as that of its "competitor". It also correctly blocks non-accidental sameness in *Every man pointed at him* and *Every man said that he had pointed at him*: they have equivalent "competitors" and are always unacceptable.

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[13]Some readers are probably wondering if the (un-)acceptability of *Every man said that he thought that he had pointed at him* depends on the (un-)availability of E-type anaphora. This is only partly true (in addition, E-type pronouns are also subject to "Condition B"; see Appendix II for discussion).

3.3   Sneaky Derivations and Indexing Constraints

As an alternative to "Rule-I", a competition-free system is explored in Forks, designed to enforce a syntactically ill-formed status on all cases of sameness in *He pointed at him*, embedded or unembedded. On its own, classical Condition B in (8) cannot do this, as we saw, so it is supplemented with the global syntactic principles in (45)-(47).

(45)   Every DP carries an index.

(46)   Indices of quantificational DPs are deleted at LF (after movement/QR).

(47)   A moved/QR'ed DP is co-indexed with its trace.[14]

Principle (45) applies to pronouns, traces, names, definite descriptions and quantificational DPs alike. The index on *Mary$_j$* denotes Mary, the index on *man* in *the man$_j$* denotes some man, and the index on *man* in *every man$_j$* is deleted/not interpreted at LF. Together, (45)-(47) result in the following: any LF of (5) (*John/he pointed at him*) or the RPBH (40a) (*Every man said that he pointed at him*) that does not violate Condition B, either has no reading where all embedded occurrences of *he/him* are bound variables, as illustrated by (48)-(49), or it violates (47), as illustrated in (50) (for simplicity, world-denoting pronouns are omitted).

(48)   *John$_2$/he$_2$ $\lambda 2$[$_{BD}$ t_2 point at __him$_1$__]   (5)

(49)   *every man $\lambda 1$[t_1 say he$_1$ $\lambda 1$[$_{BD}$ t_1 point at __him$_3$__]]   (40a)

(50)   *[... (*John$_1$/*)he$_1$ $\lambda 2$[$_{BD}$ *t$_2$* point at him$_1$] ...]   (5)/(40a)

The LFs in (49)-(50) make correct predictions regarding the RPBH (40a), by ruling out completely any bound variable LF (see discussion in 4.1). (The BT-compliant *every man $\lambda 1$[t_1 say he$_1$ $\lambda 1$[$_{BD}$ t_1 pointed at himself$_1$]] does not violate (47).) To block accidental sameness in (48), (51) is invoked.

(51)   A common ground c can be paired with a root LF α only if for every two distinct indices i,j free in α, there is some $\langle w, g \rangle \in c$ such that g(i) $\neq$ g(j).

It is a consequence of (51) that when the common ground entails that the referents of *he/John* and *him* are the same, *he* and *him* carry the same index. This results in a violation of either Condition B (if *he* is not QR'ed) or (47) (if *he* is QR'ed while respecting Condition B). On the other hand, if the common ground does not entail that *he/John* and *him* corefer, *He/John pointed at him* is acceptable because *he/John* and *him* bear different indices.

Given the PBH facts, Condition-B+(47)+(51) clearly under-generates: (52) violates (47) (predicting *Every man said that he thought that he pointed at him* to be always unacceptable).

(52)   *every man $\lambda 1$[t_1 say he$_1$ $\lambda 3$[t_3 think [he$_1$ $\lambda 5$[$_{BD}$ t_5 point at him$_3$]]]]

To be able to admit the PBH LF in (52) in some common grounds, we should eliminate (47). To ensure that RPBH LFs are still always ruled out, we should expand BD (at least for non-reflexive pronouns) to include the closest QR'ed DP, rendering (53) ungrammatical.

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[14]For the proper rendition of (47), see Kratzer (2001) and Forks.

(53)   *every man $\lambda 1[t_1$ say $[_{BD}$ he_1 $\lambda 5[t_5$ point at $him_1]]]$

Expanding BD has no effect on (52): it respects Condition B. As for *He pointed at him*, all of its Condition-B-compliant LFs – e.g., $[_{BD}$ he_3 $\lambda 2[t_2$ point at $him_1]]$, but not *$[_{BD}$ he_1 $\lambda 3[t_3$ point at $him_1]]$ – are guaranteed by (51) to be paired only with common grounds with no presupposed coreference of *he* and *him*.

The biggest challenge for this approach is to regulate accidental sameness in (52). To do that we would have to assume: (i) that attitude verbs quantify, not only over worlds, but also over variable assignments (e.g., Cumming 2008, Santorio 2012), (ii) that variable assignments have the power to do the work that concept-generators do in Charlow and Sharvit (2014) (perhaps along the lines of Santorio 2014), and (iii) that both "global" contexts (common grounds) and "local" contexts (sets of world-assignment pairs introduced by attitude verbs) are constrained by a principle akin to (51). (iii) is problematic: the principle would apply in (52) to the men as attitude holders as well as the "thinkers" as attitude holders, yet it does not matter what the "thinkers" believe about 'pointer = pointee', only what the men/sayers believe about 'pointer = pointee' (see (20)).

4   Conclusion

PBH sentences such as *Every man said that he thought that he had pointed at him*, which sneak past Condition B, are sometimes acceptable, just like sentences of the *He pointed at him* variety. This fact supports the hypothesis that a competition-based principle such as Rule-I is part of linguistic competence.

Appendix I: Separating Rule-I from BT

Let us assume that for a sentence to be acceptable relative to some common ground, it must have an LF that is both grammatically well-formed – satisfying classical BT (see Section 2) among other grammatical rules, and pragmatically appropriate – satisfying Rule-II below (among other pragmatic principles). Rule-II states a preference for 'local binding' (cf. Fox 2000, Büring 2005).

(1)   <u>Rule-II</u>. Let β be a root LF and c a common ground suitable for β. Then β is inappropriate relative to c if there is a (pronominal) index j, an LF α and a sub-LF β' of β such that:

   (i)   j is λ-bound in α more locally than in β',
   (ii) α may contain free traces but is otherwise well-formed, and
   (iii) c $\subseteq \{\langle w, g \rangle \mid$ there is a f $\supseteq$ g such that $[\![\beta']\!]^f$ and $[\![\alpha]\!]^f$ are defined and $[\![\beta']\!]^f = [\![\alpha]\!]^f\}$.

Unlike "Rule-I", Rule-II does not specifically screen LFs with potentially "offending" pronouns. When β is (syntactically) ill-formed, Rule-II doesn't even "see" it. For example, *every man-w_0 $\lambda 1[t_1$ point at-w_0 $him_1]$* is ruled out by classical BT. But any well-formed β is, in principle, screened by Rule-II. So when β is well-formed but none of its sub-LFs has a competitor that satisfies clauses (i)-(ii) of Rule-II, β is safe from Rule-II (though it may be ruled out by other pragmatic principles). For example, *John $\lambda 1[t_1$ point at-w_0 $himself_1]$* is safe from Rule-II: although we do not provide here a formal definition for 'λ-bound more locally', it seems natural to assume that there is no well-formed LF where 1 has a closer binder. On the other hand, when β is well-formed and has a relevant competitor, it has one of the options in (2)-(4).

(2) β has an *equivalent* relevant competitor, so β **is always** rendered inappropriate **at least** by Rule-II. For example, (a) is equivalent to (b) where 1, presumably, is bound more locally. (Same prediction as "Rule-I" in Section 3.2 regarding (41).)

    (a)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 6[he_1$ $\lambda 3[_{BD}$ [G_7-pro$_1$-w_0 t_3]-w_6 point-at-w_6 [G_8-pro$_1$-w_0 him$_1$]-w_6]]]*

    (b)   *every man-w_0 $\lambda 3[t_3$ say-w_0 $\lambda 6[he_1$ $\lambda 1[_{BD}$ [G_7-pro$_1$-w_0 t_1]-w_6 point-at-w_6 [G_8-pro$_1$-w_0 himself$_1$]-w_6]]]*

(3)   <u>No</u> sub-LF of β has an *equivalent* relevant competitor, but <u>some</u> sub-LF of β and its competitor may have the same meaning in some common ground without violating any other pragmatic principle, **in which case β is** rendered inappropriate **specifically** by Rule-II. For example, (c) has a sub-LF with the same meaning as some sub-LF of (d) (where 3, presumably, is bound more locally), in suitable common grounds where the reference of G_7 and G_{10} is such that at least one man takes pointer and pointee to be the same. (Same prediction as "Rule-I" in Section 3.2 regarding (30).)

    (c)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 9[he_1$ $\lambda 3[[G_4$-pro$_1$-w_0 t_3]-w_9 think-w_9 $\lambda 2[[G_7$-pro$_1$-w_0 he$_1$]-w_9 $\lambda 5[_{BD}$ [G_6-[[G_4-pro$_1$-w_0 pro$_3$]-w_9]-w_9 t_5]-w_2 point-at-w_2 [G_8-[[G_4-pro$_1$-w_0 pro$_3$]-w_9]-w_9 [G_{10}-pro$_1$-w_0 **him$_3$**]-w_9]-w_2]]]]*

    (d)   *every man-w_0 $\lambda 1[t_1$ say-w_0 $\lambda 9[he_1$ $\lambda 5[[G_4$-pro$_1$-w_0 t_5]-w_9 think-w_9 $\lambda 2[[G_7$-pro$_1$-w_0 he$_1$]-w_9 $\lambda 3[_{BD}$ [G_6-[[G_4-pro$_1$-w_0 pro$_5$]-w_9]-w_9 t_3]-w_2 point-at-w_2 [G_8-[[G_4-pro$_1$-w_0 pro$_5$]-w_9]-w_9 **himself$_3$**]-w_2]]]]*

(4)   <u>No</u> sub-LF of β has an *equivalent* relevant competitor, and whenever <u>some</u> sub-LF of β has the same meaning as its competitor, some other pragmatic principle is violated; **in which case β is not** rendered inappropriate **specifically** by Rule-II. For example, (e) (an LF of *Every man$_1$ said that John pointed at his$_1$ mother*) may have the same meaning as the phonologically indistinguishable (f) (where 1, presumably, is bound more locally) when John is the only man in the common ground, in which case (e) is probably ruled out on independent pragmatic grounds anyway.[15]

    (e)   *every man-w_0 [$\lambda 1$ [t_1 say-w_0 $\lambda 5[John$ $\lambda 2[t_2$ point at-w_5 [$_{BD}$ his$_1$ mother-w_5]]]]]*

    (f)   *every man-w_0 [$\lambda 2$ [t_2 say-w_0 $\lambda 5[John$ $\lambda 1[t_1$ point at-w_5 [$_{BD}$ his$_1$ mother-w_5]]]]]*

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[15] The issue of phonologically indistinguishable competitors is much more complex (see Fox 2000, Büring 2005, and others) and not fully covered by Rule-II. Two other cases are worth mentioning here. First, *he$_1$ $\lambda 1[t_1$ say that he$_2$ $\lambda 2[t_2$ point at [$_{BD}$ his$_1$ mother]]* is predicted by Rule-II to be sometimes inappropriate because of the phonologically indistinguishable *he$_1$ $\lambda 3$ [t_3 say that he$_2$ $\lambda 1[t_1$ point at [$_{BD}$ his$_1$ mother]]*. But the acceptable *He said that he pointed at his mother* has at least one LF with no relevant competitors. Secondly (Philippe Schlenker, p.c.), (ii), an LF of (i), is predicted to be inappropriate because of (iii): given the gender presuppositions of *him$_2$*, (ii) and (iii) have the same meaning (and 2, presumably, is bound more locally in the latter). But if Rule-II is stated in terms of impoverished LFs (see Fn. 3 in Section 2), (i) is correctly predicted to have an acceptable non-bound-variable reading, because the impoverished counterparts of (ii) and (iii) do not have the same meaning (assuming there is more than one boy).

(i)   Every boy only plays with children who are the same gender as him.

(ii)   *every boy $\lambda 1[t_1$ only play with children who $\lambda 3[t_3$ be the same gender as him$_2$]]*

(iii)   *every boy $\lambda 2[t_2$ only play with children who $\lambda 3[t_3$ be the same gender as him$_2$]]*

Appendix II: Sneaky Derivations and E-type Pronouns

We claimed in Section 3 that while the PBH *Every man said that he thought that he pointed at him* has a bound reading, the RPBH *Every man said that he pointed at him* does not. As a matter of fact, this is only partly true. The more accurate generalization is that both have, what we now call, E-bound readings, but only the PBH sentence has non-E bound readings. The readings discussed in Section 3 are non-E bound readings.

To get a sense of the difference between the two types of bound readings, consider (1) and (2) below, which may be uttered when the men make identification mistakes, whether it is themselves that they fail to recognize or someone else (see Charlow 2010 for similar observations).

(1)   Every man believed, mistakenly, that the picture to his left was of his rival, and the picture to his right was of his best friend, and said that he pointed at him.

(2)   Every man believed, mistakenly, that the picture to his left was of his rival, the picture to his right was of his best friend, and the picture in between them was of his worst enemy, and said that he thought that he pointed at him.

That these bound readings are not the same as the readings discussed in Section 3 is suggested by the contrast between (44a) in 3.2 – repeated as (3) below – and (1).

(3)   Failing to recognize himself in either of the two pictures, John thinks: "Bill pointed at Fred"; failing to recognize himself in either of the two pictures, Bill thinks: "Paul pointed at John"; and failing to recognize himself in either of the two pictures, Paul thinks: "Fred pointed at Bill". **#Every man said that he pointed at him**.

It seems as though in *Every man said that he pointed at him*, we interpret *that he pointed at him* as if it were *that his rival pointed at his best friend* (or *that his best friend pointed at his rival*), where the pronouns function as E-type pronouns. An E-type pronoun often picks up its "reference" from a combination of more than one antecedent (see Geach 1962, Cooper 1979 and Evans 1980 among others). This is illustrated by (4) where *her* is an E-type pronoun.

(4)   Every man who has a wife should treat her with respect.

The "binder" of *her* is *every man who has a wife*, and *a wife* is its E-antecedent. Together, they make up a definite description that replaces *her* itself in the intuitive paraphrase *Every man who has a wife should treat **the wife that he has** with respect*, where **he** is directly bound by *every man who has a wife*. This explains the intuition that for every (relevant) man-wife pair, *her* "refers" to the wife in the pair. Borrowing this informal terminology, *Every man said that he pointed at him* can be thought of as a case of E-type anaphora, where *his rival*, *his best friend* etc. function as E-antecedents for *he* and *him*; same for (2). Why, then, is (3) not fully acceptable?

As is well known, not every kind of E-antecedent is adequate for E-type pronouns, as shown by the three-way contrast in (4)-(5) (cf. Heim 1990).

(5)   a.   #Every married man should treat her with respect.
        b.   Every married man should treat his wife with respect.

If all it took to interpret *her* in the manner it is interpreted in (4) was to construct, based on previous linguistic material, some definite description, it wouldn't be hard to interpret (5a) as *Every married man should treat **his wife** with respect*, yet this is not an easily available interpretation. For whatever reason, *her* in (5a) needs a more linguistically explicit E-antecedent, such as *a wife*. (The possibility that some of the married men are married to men is not the problem, as (5a) is odd even when same-sex marriage is not an option; furthermore, the acceptability of (5b) suggests that the domain of *every* can be contextually restricted to women-marrying men.) In addition, the fact that *his* in (5b) does not have an E-antecedent distinct from its binder (*every married man*) suggests that *his* has only a non-E bound interpretation in this case; hence the relative oddity of *Every married man should treat that man's wife with respect.*

The contrast between (1) and (3) shows that *Every man said that he pointed at him* cannot report a state of affairs where all the men use different descriptions for the pointer, and different descriptions for the pointee. We take this to mean that the "natural" function denoting expressions, *his rival* and *his best friend* mentioned in (1), count as adequate E-antecedents for *he* and *him*, but the mere mapping between men and pointers/pointees, provided by the scattered linguistic expressions in (3) (*John. . . Bill. . . Fred. . .*) does not suffice to construct adequate E-antecedents for *he* or *him*.

Given the contrast between (1) and (3), it comes as no surprise that there is also a contrast between (2), (6) and (7). In the absence of adequate E-antecedents (such as *his rival*), (6), unlike (2), cannot describe a situation where each man is looking at pictures of other individuals, but thanks to the non-E 'de re' strategy discussed in Section 3, (7), which also lacks adequate E-antecedents, can report a situation where each man is looking at his own pictures.

(6)   John, Bill and Fred were each looking at three pictures of one of their friends. Failing to recognize their friends in any of the pictures, John, Bill and Fred had the following thoughts.
John's thought: "Jim thinks that Fred pointed at him";
Bill and Fred's thought: "John thinks that Fred pointed at him".
#Then, every man said out loud that he thought that he pointed at him.

(7)   John, Bill and Fred were each looking at three pictures of themselves. Failing to recognize themselves in any of the pictures,
John thought: "Bill thinks that Sally pointed at him"; and
Bill and Fred thought: "John thinks that Mary pointed at him".
Then, every man said out loud that he thought that he pointed at him.

The non-E 'de re' strategy is not available for (3), which is a RPBH sentence (as we saw in 3.2).

Without going into details, we suggest that E-bound readings and non-E-bound readings are read off different LFs.[16] The contrasts discussed above – between (2), (6) and (7) on the one hand and between (1) and (3) on the other hand – confirm that PBH sentences (e.g., *Every man said that he thought that he pointed at him*) in principle have well-formed non-E bound and E-bound LFs, but when we take out one level of embedding (as in *Every man said that he pointed at him*) we also take away the non-E bound reading. The theory presented in Section 3 is compatible with this:

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[16]Various researchers have claimed that all pronouns have the same underlying structure (see Elbourne 2008 and others). Some independent support for the claim that E-type pronouns have a special underlying structure comes from resumption phenomena in Modern Hebrew (Sharvit 1999) and Jordanian Arabic (Guilliot and Malkawi 2011).

PBH sentences have non-E bound readings when "Condition B" permits it, but RPBH sentences are completely "robbed" of the non-E bound reading by "Condition B". The contrast between (8) and (9) suggests that E-type pronouns are also subject to "Condition B": the acceptability of *Every man said that he had pointed at him* depends on the availability of two distinct adequate E-antecedents.

(8)   Each man thought: "this is a picture of my best friend and that is a picture of my worst critic, and my best friend is my worst critic", and said that he pointed at him.

(9)   #Each man thought: "these are pictures/two pictures of my best friend", and said that he pointed at him.

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