Repairing bad questions makes for good assertions: the case of *but* and *at least**

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1 Introduction: pragmatic oddness, and two overt repair strategies

Disjunctions featuring contextually entailing disjuncts ($\boldsymbol{p}^+ \vDash p$) tend to be odd (Hurford 1974; see (1)). The related conditionals in (2) exhibit an unexpected asymmetry: (2a), featuring $\neg\boldsymbol{p}^+$ in its antecedent is odd, while (2b), featuring $\neg\boldsymbol{p}^+$ in its consequent is fine (Mandelkern & Romoli, 2018). This is surprising, since these conditionals are formally related by a variable change of the form $q := \neg\boldsymbol{p}^+; \boldsymbol{q}^+ := \neg p$ (with $\boldsymbol{q}^+ \vDash q$), and moreover are formally related to (1) assuming implication is material. We refer to (1-2) as **Hurford Sentences**.

(1) **H**urford **D**isjunctions (**HD**)
   a. # Ed **studied in Paris** or **in France**. $\boldsymbol{p}^+ \vee p$
   b. # Ed **studied in France** or **in Paris**. $p \vee \boldsymbol{p}^+$

(2) **H**urford **C**onditionals (**HC**)
   a. # If Ed did**n't study in Paris**, he **studied in France**. $\neg\boldsymbol{p}^+ \rightarrow p$
   b. If Ed **studied in France**, he did**n't study in Paris**. $p \rightarrow \neg\boldsymbol{p}^+$

There are many explanatory accounts of the HDs in (1), among which Meyer (2015); Katzir & Singh (2014); Mayr & Romoli (2016); Anvari (2018b); Zhang (2022); Kalomoiros (2024); Zhang (2025) and Hénot-Mortier (2025b). In addition to HDs, Kalomoiros (2024) and Hénot-Mortier (2025b) also cover the HCs in (2). But a less discussed and well-understood aspect of Hurford Sentences is their repairability by operators like *at least* and *but*. Singh (2008a); Marty & Romoli (2022); Zhang (2022) and Krifka (2024) discussed how *at least*, when applied to p in the second disjunct of HDs, can alleviate oddness; see (3a). We also observe that *at least* alleviates oddness when applied to the consequent of (2a)–see (3a); and induces oddness when applied to the antecedent of (2b)–see (4b).

(3) *at least* and HDs
   a. Ed **studied in Paris** or <u>at least</u> **in France**. $\boldsymbol{p}^+ \vee AL(p)$
   b. # Ed <u>at least</u> **studied in France** or **in Paris**. $AL(p) \vee \boldsymbol{p}^+$

(4) *at least* and HCs

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a. If Ed did**n't study in Paris**, he <u>at least</u> **studied in France**.
$\neg \boldsymbol{p}^+ \rightarrow AL(p)$

b. # If Ed <u>at least</u> **studied in France**, he did**n't study in Paris**.
$AL(p) \rightarrow \neg \boldsymbol{p}^+$

at least thus has a uniform behavior in (3) and (4): it repairs (resp. degrades) the entire sentence if applied to its second (resp. first) propositional element, and that element is the "weaker" of the two.[1] This is however not trivial, given that (1) and (2) have different forms (disjunctive vs. conditional), and different felicity profiles without repairs. Additionally, not all repair strategies display unified effects in Hurford Sentences. *But* for instance, rescues the HDs in (1) relatively equally, forming "Quasi-HDs" (Marty & Romoli, 2022); see (5). But we observe that *but* fails to rescue the HCs in (2) in the same way; see (6).

(5) *but* and HDs

a. Ed **studied in Paris** or **in France** <u>but not Paris</u>. $\boldsymbol{p}^+ \vee (pB\neg \boldsymbol{p}^+)$

b. ? Ed **studied in France** <u>but not Paris</u> or **in Paris**. $(pB\neg \boldsymbol{p}^+) \vee \boldsymbol{p}^+$

(6) *but* and HCs

a. # If Ed did**n't study in Paris**, he **studied in France** <u>but not Paris</u>.
$\neg \boldsymbol{p}^+ \rightarrow (pB\neg \boldsymbol{p}^+)$

b. # If Ed **studied in France** <u>but not Paris</u>, he did**n't study in Paris**.
$(pB\neg \boldsymbol{p}^+) \rightarrow \neg \boldsymbol{p}^+$

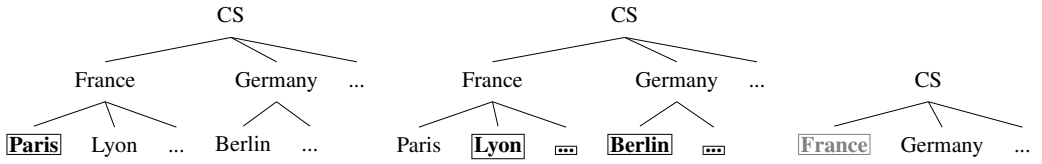
Why do some repair operators (e.g. *at least*) behave similarly across Hurford Sentences, while other operators (e.g. *but*) do not? Building on the Question under Discussion framework (henceforth **QuD**; Van Kuppevelt 1995; Büring 2003; Roberts 2012; Ginzburg 2012 i.a.) and specifically the model introduced in Hénot-Mortier (2025b,a), this paper suggests that *at least* and *but* modify the implicit QuD inferred from the sentences in (1) and (2) in different ways, creating new QuDs that are not equally "good". This will be shown to capture the pattern of repairs in (3-6), in addition to the baseline pattern in (1-2). The rest of this paper is structured as follows. Section 2 introduces a model of implicit QuDs covering (1-2). Section 3 discusses past approaches to *at least* and *but* in the context of HDs, showing that they do not straightforwardly extend to HCs. The Section then associates *at least* and *but* with different QuD-level repair strategies, and shows how they differentially affect (1-2), producing the pattern in (3-6). Section 4 concludes, pointing out a few other supporting and challenging datapoints.

2 Implicit QuDs as oddness drivers

The idea that oddness arises from the interaction between a sentence and the question(s) it addresses is not new (Katzir & Singh 2015; Zhang 2022; Hénot-Mortier 2025a i.a.). Zhang and Hénot-Mortier in particular, building on Roberts (2012) and Büring (2003) (i.a.), assume that sentences evoke QuDs in the form of trees, subject to pragmatic constraints. Under Hénot-Mortier's view (henceforth **HM25**),

[1] In the case of (2) this holds *modulo* negation.

QuD trees (**Qtrees**) correspond to *recursive* partitions of the Context Set (**CS**, Stalnaker 1978 i.a.). This means that their root corresponds to the CS, and each of their non-terminal nodes is partitioned by the set of its children. A declarative sentence S may evoke several possible implicit Qtrees, with the constraint that the partition formed by the Qtrees' leaves match S's degree of specificity. Additionally, S "flags" specific nodes in the tree as "good answers"–typically leaves entailing S. A sentence like *Ed studied in Paris* may then evoke a by-city partition nested in a by country-partition of the CS,[2] and flag the *Paris*-leaf as a good answer (Fig. 1a). Likewise, *Ed studied in France* (weaker, less specific) may evoke a by-country partition,[3] and flag the *France*-leaf as a good answer (Fig. 1c). HM25 also introduces compositional rules deriving flagged Qtrees for structurally more complex sentences. Negation for instance, does not affect Qtree structure but "flips" flagged nodes at any relevant level. This is performed for *Ed did not study in Paris* in Fig. 1b–compare with the "unnegated" Qtree in Fig. 1a.



(a) A QuD for *Ed studied in **Paris***.

(b) A QuD for *Ed did not study in **Paris***.

(c) A QuD for *Ed studied in **France***.

Figure 1: Possible Qtrees for simple sentences with different degrees of specificity (and logical strengths). Nodes flagged as good answers are boxed

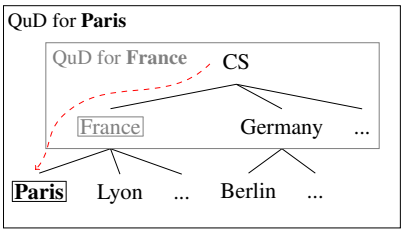
As for binary operations, HM25 proposes that disjunction symmetrically "fuses" the Qtrees evoked by the disjuncts (including their flagged nodes), retaining only the well-formed outputs. This cashes out the idea that disjuncts tend to address the same overall QuD (Simons, 2001; Zhang, 2022). This is performed in Fig. 2a to represent (1a) and (1b)'s implicit QuDs. By contrast, conditionals "refine" the nodes that were flagged in the antecedent's Qtree, based on the consequent's Qtree.[4] This "refinement" amounts to *replacing* the flagged nodes of the antecedent's Qtree by their intersection with the consequent's Qtree.[5] This effectively *restricts* the consequent's Qtree to the domain(s) of the CS flagged by the antecedent. This is performed in Fig. 2b for the felicitous conditional (2b): the *France*-leaf flagged by the antecedent is further refined according to a by-city partition, where every French city but *Paris* gets flagged. Note that the replacement of a node by its refinement *a priori* erases flagging on the refined node: this is why in Fig. 2b, the *France*-node that was flagged by the antecedent is no longer so.

[2]There may be more or less nesting; but the leaf-level partition will always need to be city-level.

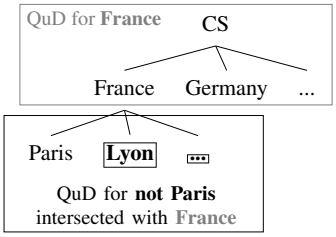
[3]There may be more or less nesting; but the leaf-level partition will always be country-level.

[4]A similar operation was proposed by Enguehard (2021) to account for patterns of presupposition projection in conjoined questions.

[5]We understand the intersection between a tree T and a node N, as a tree whose nodes are the non-empty intersections between N and each node in T, and whose branches are faithful to T's.



(a) A QuD for (1a)=#*Ed studied in* ***Paris*** *or* ***France*** or (1b)=#*Ed studied in* ***France*** *or* ***Paris***. Based on Fig. 1a and 1c.



(b) A QuD for (2b)=*If Ed studied in* ***France*** *he did not study in* ***Paris***. Based on Fig. 1a and 1c.

Figure 2: Compositional derivation of disjunctive and conditional Qtrees.

In that framework, the oddness of HDs is a matter of *Redundancy* (a concept used by Katzir & Singh 2014 among many others), as defined in (7).

(7) The pair formed by an LF X evoking a Qtree T is ***Redundant*** iff there is a simplification X' of X obtained *via* constituent-to-subconstituent substitutions *à la* (Katzir, 2007), s.t. X' evokes T', and T and T' are equivalent.

a. T and T' are **equivalent** iff T and T' have same structure (nodes, branches, disregarding flagging) and minimal strategies of inquiry.

b. A **strategy of inquiry** is a path (=ordered list of nodes) from the root to a flagged node.

c. A path p' contains another path p ($p \subseteq p'$) iff p is a prefix of p'.

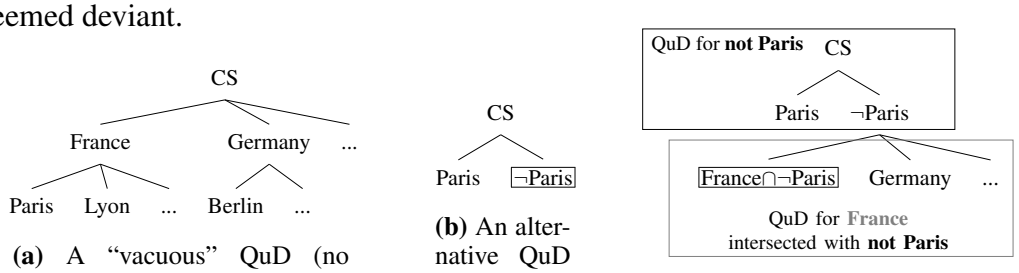
d. If P is a set of strategies of inquiry together covering all flagged nodes, the set of **minimal**[6] **strategies of inquiry** induced by P is the set of maximal elements of P w.r.t. path containment ($\subseteq$).

The Qtree in Fig. 2a, as evoked by the HDs in (1) is *Redundant* due to it being equivalent to a Qtree evoked by the sentence *Ed studied in Paris*–which constitutes a strict simplification of (1a)/(1b). Two Qtrees are equivalent iff they are structurally equal (disregarding flagging), and display the same *minimal strategies of inquiry*, i.e. the same minimal sets of paths starting at their respective roots and covering all their respective flagged nodes. The Qtrees in Fig. 1a and 2a are then equivalent because they have same nodes and branches, and for both of them, the path from the root to the *Paris*-leaf happens to be the minimal path covering all flagged nodes. This correctly predicts HDs to be odd. Note that the Qtree in Fig. 2b representing the felicitous HC (2b) is not *Redundant*, since it is structurally distinct from Qtrees evoked by the simplifications *Paris*, *not Paris*, and *France*–see Fig. 1.

Additionally, HM25 proposes that the oddness of the HC (2a) is captured by the conspiration of two different constraints. First, assuming that the antecedent's Qtree for *not Paris* has the form of Fig. 1b, refining its non-Paris leaves according to a Qtree for *France* like the one in Fig. 1c, yields a Qtree structurally similar to Fig. 1b, but without any flagged node left (given that the refinement operation "erases" the flagged status of the nodes being refined)–see Fig. 3a. And it is reasonable to

[6]"Minimal", because picking maximal paths w.r.t. containment, minimizes the overall number of strategies of inquiry covering all flagged nodes.

assume that a Qtree flagging no node, i.e. identifying no "good answer", should be deemed deviant.



(a) A "vacuous" QuD (no flagged nodes) for (2a)=#*If Ed did not study in* ***Paris*** *he studied in* ***France***.

(b) An alternative QuD for *Ed did not study in* ***Paris***.

(c) A locally irrelevant QuD (2a)=#*If Ed did not study in* ***Paris*** *he studied in* ***France***.

Figure 3: The infelicitous HC (2b) produces odd Qtrees.

Considering a simpler Qtree for the antecedent, like the one in Fig. 3b, does not help. In that case, the ¬*Paris*-leaf is being refined by the consequent's Qtree, producing a subtree whose leaves are *France but not Paris*, and all the other possible country nodes; see Fig. 3c. Building on Lewis (1988) and Roberts (2012), HM25 deems this refinement deviant due to a failure of *Relevance*. A slightly updated definition of *Relevance* is given in (8). This definition appeals to at-issue layers within Qtrees, whereas HM25 was only focusing on the leaves of the restricted Qtree (which often form at-issue layers).

(8) Let N be a node (set of worlds) and T a Qtree. Restricting T with N (i.e. intersecting T with N) must be done in a ***Relevant*** way, in that any at-issue layer of T must be relevantly filtered.
   a. An **at-issue layer** of T is a maximal set of same-depth nodes in T containing at least one flagged node.
   b. A layer is **relevantly filtered** by an operation (e.g. intersection) if the output of the operation comprises at least one, and excludes at least one, of the layer's original nodes. A node is excluded if it intersects with no node in the output.

Fig. 3c is not *Relevant* as per (8); it is built from the consequent's Qtree is Fig. 1c, which displays an at-issue country-level layer (the *France*-node being flagged). This layer is not relevantly filtered in Fig. 3c, because this tree fails to fully exclude any country-leaf: only the *France*-node is shrunk slightly. This Qtree is therefore not *Relevant* in the sense of HM25 and (8). The Qtree corresponding to the felicitous HC (2b) in Fig. 2b does not run into a similar *Relevance* issue: in this tree, some (in fact all) non-French cities that were part of the at-issue layer of the consequent's Qtree are fully excluded after restricting that tree to the *France*-domain, and some French cities remain fully included.

In brief, the oddness of the HDs in (1) results from their evoked Qtrees being *Redundant*. As for HCs, (2b)'s felicity and (2a)'s oddness mainly result from a *Relevance* contrast: (2b) addresses a "more specific" (city-level) question in the context of a "less specific" (country-level) question, while (2a) oddly does the opposite. Bearing in mind this brief account of the repairless data in (1-2), we proceed to analyze their repaired counterparts in (3-6).

3 *At least* and *but* as QuD "fixers"

3.1 Past approaches to *at least* and *but*

There is much work on the various uses of *at least* (Geurts & Nouwen, 2007; Grosz, 2011; Kennedy, 2015; Nouwen, 2015; Schwarz, 2016; Ander Mendia, 2022) and *but* (Umbach, 2005; Jasinskaja & Zeevat, 2008; Winterstein, 2012; Toosarvandani, 2014; Wu, 2024); some of these works outlining the relation between these operators and the QuD. But very few (Tomioka, 2021; Zhang, 2022; Krifka, 2024) actually focus on how such operators influence oddness. Zhang (2022) proposes that *at least* affects the QuD in such a way that the disjuncts of (3a) end up addressing distinct QuDs. According to Krifka (2024), *at least* in (3a) strengthens the commitment to the embedded Speech Act associated with the weaker disjunct. Under both views, the action of *at least*, whether on the QuD or on Speech Acts, eventually prevents a violation of a disjunction-specific felicity principle.[7]

As for *but*, Tomioka (2021) observes that *but*-statements involving entailing alternatives pattern similarly to HDs (see (9)), an effect attributed to general contrastiveness: both *but* and *or* impose specific alternativeness conditions on their arguments, cashed out by Tomioka as the *Contrast Antecedent Condition*.[8]

(9) a. # Ed studied in **PARIS** but Al studied in **FRANCE**.
b. Ed studied in **FRANCE** but Al studied in **PARIS**.

Though this approach relates *but* to *or*, and the QuD (*via* alternatives), it does not directly focus on the repairing effect of *but*, *within a disjunctive environment*, HDs typically. To address this particular issue, Zhang, building on Riester (2019), proposes another constraint on the maximization of given material in HDs, forcing the accommodation of finer-grained questions, and ultimately achieving a repairing effect similar to *at least*. However, none of these various approaches (Tomioka, 2021; Zhang, 2022; Krifka, 2024) cover repairless HCs, and remain silent on how, and why, HDs and HCs are differentially affected by *at least* and *but*. In the following, we will reuse two core ideas entertained by these approaches: that *at least* "shifts" the QuD; and that *but* is essentially "disjunctive" when it comes to node-flagging, but "conditional" when it comes to Qtree building. We will show that, conjoined with our current model of disjunctive and conditional QuDs, and a few extra assumptions, these intuitions derive the repair pattern in (3-6).

3.2 *At least*

We focus on a "granular" reading of *at least* under which *Jo at least studied in France* conveys ignorance about stronger, and crucially finer-grained alternatives to *France*–see (10). This contrasts with the ordinary "scalar" reading of *at least*, conveying ignorance about stronger (sometimes exclusive) same-specificity alternatives (Hirschberg, 1991; Ander Mendia, 2022)–see (11).

[7] For Zhang: that disjunctions should not give redundant answers to the *same* QuD; for Krifka: that ambiguity between commitments should be minimal.

[8] Which roughly states that the alternatives activated by the contrasted element (first argument of *or*/*but*) be exclusive and contain the ordinary semantic value of both the contrasted and the contrasting element (second argument of *or*/*but*).

(10) In which **city** did Jo study? Jo studied $^{??}$(in **Paris** or) at least in **France**.
$\rightsquigarrow$ maybe Lyon, maybe Nice...

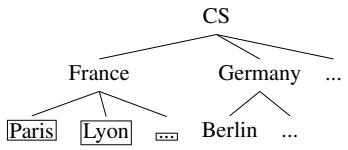
(11) a. Where did Jo study? Jo studied at least in **France**.
$\rightsquigarrow$ and maybe also the US, the UK...

b. What is Jo's occupation? Jo is at least an assistant professor.
$\rightsquigarrow$ maybe in fact an associate professor, a full professor...

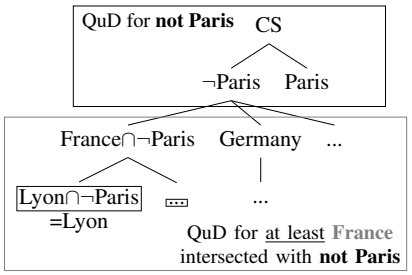
Under its granular reading, *at least* is anaphoric: for instance, deleting the *Paris*-disjunct in (10) leads to some degree of oddness. We thus propose that the target interpretation of *at least* is licensed if an antecedent alternative at least as specific as *at least*'s prejacent is retrievable. This directly captures the infelicity of (3b) and (4b): in these *at least*-first variants, *at least* is not provided with a suitable antecedent. Whenever licensed, we propose that granular *at least* "shifts" the QuD of its prejacent to match the specificity of the antecedent's evoked QuD, while inducing a "flagging" consistent with the prejacent. This is summarized in (12).

(12) The granular interpretation of *at least X* is available if an antecedent Qtree *containing* a tree evoked by X (in terms of nodes, and edges) is retrievable (typically, evoked by an expression preceding *at least X*). If such a Qtree T is retrievable, the corresponding Qtree evoked by *at least X*, is structurally equal to T, and its flagged nodes are the leaves entailing the proposition denoted by X.

A prediction of (12) is that if the antecedent proposition is more specific than *p*, then the Qtree evoked by *at least p* will flag leaves strictly entailing *p*. For instance, if the antecedent is *(not) Paris*, as in (3a) or (4a), then *at least France* will evoke a Qtree structurally similar to Fig. 1a/1b, i.e. a Qtree evoked by *(not) Paris* c(ontaining a Qtree for *France*). Additionally, *at least France* is expected to flag the leaves of the tree entailing *France*, i.e. all French cities. This is represented in Fig. 4a. Note that this Qtree is also evoked by a disjunction of the form *Ed studied in Paris or in Lyon or in Nice or...* involving all French cities.



(a) A QuD for *Ed at least studied in **France*** (if preceded by a city-level antecedent), based on the structure of Fig. 1a/1b. Also a QuD for (3a)=*Ed studied in **Paris** or at least in **France***.



(b) QuD tree for (4a)=*If Ed did**n't** study in **Paris**, he at least studied in **France***.

Figure 4: Deriving QuDs for HDs and HCs repaired by *at least*.

Note that further disjoining the Qtree in Fig. 4a, with a Qtree for *Paris*, to create a Qtree for the repaired HD in (3a), gives back Fig. 4a. This is because any suitable Qtree for *Paris* is strictly contained (in terms of structure *and* flagged nodes) in Fig. 4a. Therefore, Fig. 4a depicts a Qtree evoked by both *at least France* (assuming

a city-antecedent is available), and the repaired HD (3a). We now argue that this equivalence does *not* cause (3a) to be *Redundant* in the sense of HM25. To be *Redundant*, (3a)'s Qtree should be equivalent to a Qtree evoked by a *simplification* of (3a). The only promising simplification for that matter is (3a)'s second disjunct, *Ed at least studied in France*. But assuming simplification feeds Qtree computation, *at least* in now out-of-the-blue and without a crucial finer-grained antecedent (like *Paris*) that would help derive a Qtree like Fig. 4a. In brief, the HD in (3a), evoking the Qtree in Fig. 4a, does not have any proper simplification evoking an equivalent Qtree, and as such escapes *Redundancy*.

When it comes to the repaired HC in (4a), one needs to derive a "repaired" Qtree by refining a Qtree for the conditional's antecedent *not Paris* (e.g. Fig. 3b), using the Qtree for *at least France* in Fig. 4a. This is done in Fig. 4b, which ends up having its *not Paris*-node subdivided into *France but not Paris* and all other countries, themselves subdidivded into all cities, but *Paris*. It is easy to see that this Qtree is not *Redundant*, since it is the only one we have derived so far that has three layers. And crucially, this Qtree also satisfies *Relevance*: the consequent's Qtree (Fig. 4a) used to form it exhibits only one at-issue layer, namely its city-level leaf layer, and this layer is relevantly filtered by the intersection operation performed in Fig. 4b, since a leaf like *Paris* is fully excluded, while a leaf like *Lyon* is fully retained.

Essentially, we have proposed a model of *at least* whereby *Paris [...] at least France* forces an interpretation of *France*, as a disjunction over French cities, which produces a Qtree with diverging paths (fixing *Redundancy* issues in (3a)), and makes *France* intuitively as fine-grained as *Paris* (fixing *Relevance* issues in (4a)).

3.3 *But*

Unlike *at least*, *but* is a symmetric rescuer in HDs (see (5)) and besides fails to rescue HCs (see (6)). To account for this pattern, we build on Tomioka (2021)'s observation that *but*, just like *or*, is a contrastive operator giving rise to (asymmetric) Hurford-like effects–see (9). Although this paper does not come with a full account of (9), these examples suggest that *but* is sensitive to the relative degrees of specificity conveyed by its two arguments (favoring weak-to-strong orderings, just like HCs[9]), while keeping its two arguments at-issue (just like HDs). We also observe that unlike *at least*, *but* appears felicitous out-of-the-blue, and can answer questions about its first argument, when the second argument is also somehow important.[10] This is supported by the question-answer pairs in (13).

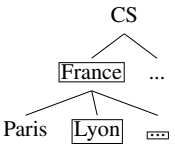
(13) a. Jo: In which **country** did Ed study? #I don't care which **city**.
Al: Ed studied in **France** but not **Paris**

b. Jo: In which **city** #(or **country**) did Ed study?
Al: Ed studied in **France** but not **Paris**

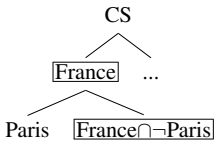
[9]Interestingly, *but* can be replaced by *if* in (9), while retaining a similar interpretation.

[10]The first argument still has some extra prominence as opposed to the second, because any overt question answered by *but has* to mention the level of specificity of *but*'s first argument (cf. (13b)), even if the second argument is more specific (and therefore settling it settles everything). We abstract over any difference in prominence here, and simply treat both arguments of *but* as at-issue.

Based on the asymmetric effects in (9), we take that a Qtree for *X but Y* is "structurally conditional", i.e. obtained by refining a Qtree for X based on a Qtree for Y. Based on (13), we assume that the flagging strategy of this Qtree is disjunctive, i.e. the flagged nodes of *both* X's and Y's Qtrees are retained. In brief, *but* derives asymmetric, conditional QuDs, that assign equal at-issueness to both arguments. A Qtree for *Ed studied in France but not Paris*, is then a Qtree for *France*, in which the *France*-node is replaced by its intersection with a Qtree for *not Paris*, and such that both the *France*-node and the city-level nodes different from *Paris* are flagged. This is represented in Fig. 5.[11] Crucially, both tree in this Figure still flag *France* as a good answer.



(a) Based on Fig. 1c (for ***France***) and 1b (for *not* ***Paris***.)



(b) Based on Fig. 1c (for ***France***) and 3b (for *not* ***Paris***.)

Figure 5: QuDs for *Ed studied in* ***France*** *but not* ***Paris***.

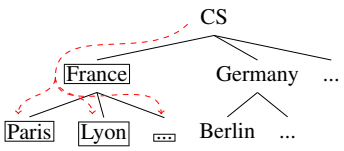


Figure 6: QuD for (5a)=*Ed studied in* ***Paris*** *or in* ***France*** *but not* ***Paris***, or (5b)=*Ed studied in* ***France*** *but not* ***Paris*** *or in* ***Paris***.

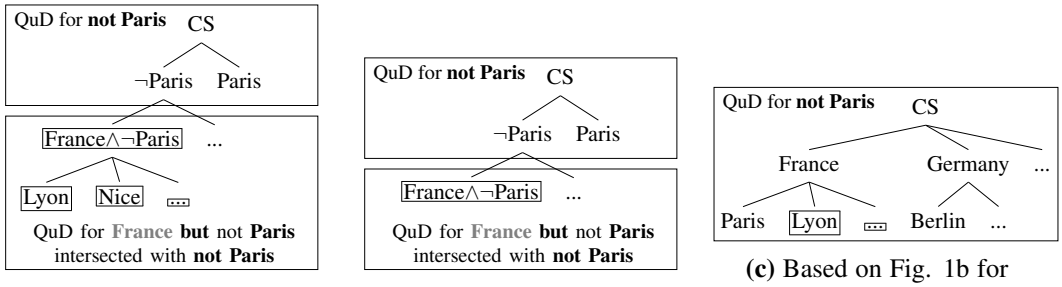
We first show how *but* uniformly rescues HDs. Fig. 6 shows the only possible Qtree obtained for the *but*-repaired HDs in (5). This Qtree is obtained by disjoining (i.e. fusing) the Qtree for *Ed studied in Paris* in Fig. 1a and the Qtree for *Ed studied in France but not Paris* in Fig. 5a.[12] The Qtree in Fig. 6 satisfies *Relevance* as it is not produced by intersection/restriction. And it also escapes *Redundancy*, meaning, no simplification of (5a)/(5b) evokes a Qtree both structurally equal to Fig. 6 and exhibiting the same minimal set of paths from the root to any flagged node. Indeed, the only simplifications of (5a)/(5b) evoking a structurally identical Qtree are *Ed studied in Paris* (see Fig. 1a) and its negation (see Fig. 1b). But crucially, neither of these trees display the same minimal set of paths as Fig. 6. In Fig. 6, the minimal set of root-originating paths covering all flagged nodes are paths to each French city (see red dashed arrows), while in Fig. 1a, this set is simply made of the path to the *Paris*-leaf, and in Fig. 1b, of the paths to any city-leaf different from *Paris*. In sum, none of the simplifications of (5a)/(5b) with Qtrees structurally equal to Fig. 6 display identical minimal strategies of inquiry, and so (5a)/(5b), along with their evoked Qtree in Fig. 6, are not *Redundant*. This explains the repair pattern in (5).

We now turn to *but*'s failure to repair the HC in (6a). Qtrees for (6a) are computed in Fig. 7. These trees combine different Qtrees for the antecedent (*Ed did not study in Paris*) and the consequent (*Ed studied in France but not Paris*), but all run into a *Relevance* issue. Indeed, whether the consequent's Qtree is assumed to be Fig. 5a or 5b, the layer of nodes involving *France* is always at-issue, because

[11] Other trees are possible, because **France** and **Paris** are themselves compatible with multiple trees. We omit these extra trees here because they do not jeopardize the final result.

[12] Fusing any other pairs of Qtrees evoked by the disjuncts (e.g. Fig. 1a and 5b) can be shown to produce ill-formed outputs, i.e. trees that do not represent recursive partitions of the CS.

France is flagged in both trees. As per (8), this layer of nodes needs to be relevantly filtered in Fig. 7a, 7b and 7c for these trees to be felicitous. This is not the case in Fig. 7a and 7b: in both trees, the *France*-layer contains the same nodes as in Fig. 5a or 5b, except the *France*-node is slightly shrunk to exclude *Paris*. In other words, no node from the original at-issue layer is fully excluded, violating (8). Fig. 7c also violates (8): in that case, intersecting non-*Paris* city-nodes (*Lyon*, *Nice* etc) with the consequent's Qtree (whether Fig. 5a or 5b) simply yields the original city-nodes. And such nodes fail to fully include a node from the original at-issue *France*-layer contributed by the consequent's Qtree, meaning, (8) is once again violated.



(a) Based on Fig. 3b for the antecedent and Fig. 5a for the consequent.

(b) Based on Fig. 3b for the antecedent and Fig. 5b for the consequent.

(c) Based on Fig. 1b for the antecedent and Fig. 5a or 5b for the consequent.

Figure 7: QuDs for (6a)=#*If Ed did not study in* ***Paris*** *he studied in* ***France*** *but not* ***Paris***.

In sum, the three trees in Fig. 7 are deemed *Irrelevant*, capturing the persistent oddness of (6a). This result stems from the assumption that *but* retains the at-issueness of its first argument, making the corresponding Qtree layer at-issue, and subject to *Relevance* whenever restricted by a conditional antecedent.

Lastly, *but* ends up degrading the HC in (6b), because it produces Qtrees that are strictly identical (and hence equivalent) to the ones evoked by the repairless counterpart of (6b) in (2b). (6b), along with its evoked Qtrees is thus *Redundant*. To see that, recall that the formation of a conditional Qtree involves *replacing* the flagged nodes of the antecedent's Qtree by their intersection with a Qtree for the consequent. Besides, *Ed studied in France but not Paris* is assumed to flag *France* in its evoked Qtrees (see Fig. 5). When this sentence acts as the antecedent of (6b), its *France*-node (and anything below it) then gets replaced by a Qtree for *Ed did not study in Paris*, restricted to the *France*-domain. Whatever *but* added beyond *France* at the level of the antecedent's Qtree gets eventually overwritten after the conditional Qtree gets built. This effectively reproduces the Qtree in Fig. 2b derived from the repairless (2b). Since (2b) constitutes a formal simplification of (6b), and leads to the same Qtree as (6b), (6b) is *Redundant*. Once again, this result stems from the assumption that *but* retains the at-issueness of its first argument: this led the QuD-level contribution of the second argument of *but* to be overwritten when combining the antecedent's Qtree with the consequent's Qtree.

To summarize this Section, we proposed a model of *but* and *at least* at the QuD-level, whereby both operators operate on two arguments, but in distinct ways. *At*

least retains the Qtree structure of its first, implicit argument (e.g. *(not) Paris*) and flags leaves entailing its second, overt argument (e.g. *France*). This effectively amounts to treating the second argument as a disjunction of stronger, symmetric alternatives (e.g. seeing *France* as *Paris or Lyon or Nice...*), and, at the QuD level, allows HDs to escape *Redundancy* and HCs to satisfy *Relevance*, whenever *at least* is part of the second argument. *But* on the other hand, acts structurally as a conditional, "plugging" a Qtree for its second argument into the flagged leaves of a Qtree for its first argument. But, in terms of flagging, *but* behaves disjunctively, retaining the flagged nodes of both its arguments. This effectively amounts to treating *X but Y* as *X or if X then Y*, and was shown to uniformly alleviate *Redundancy* in HDs, but to maintain/trigger oddness in HCs.

4 Conclusion and outlook

Before concluding this paper, a few additional remarks on *at least*. The current model of this operator entertains broad conceptual connections with previous approaches, in particular Krifka (2024). In our model, *at least* "shifts" the implicit question to something more specific than what was originally raised by the prejacent– e.g. shifts a country-level question to a city-level one. Nevertheless, the flagging strategy of *at least* remains faithful to the prejacent; it just "break" it into smaller pieces (e.g. breaks *France* into a disjunction of French cities). This interaction between the message and its packaging by *at least* is reminiscent of Krifka's idea of Speech Act strengthening: as *at least* increases the specificity of the implicit QuD, the message conveyed by its prejacent becomes less determinate. This is however not to say that our account of *at least* is "corrective", i.e. "erases" the preceding Speech Act (a view entertained by Singh (2008b)). While Zhang (2022) already puts forth arguments against this view in English, we add an argument from French, in which corrective and non-corrective uses of *at least* may be teased apart by the lexicon. French can express *at least* using two different prepositions: *(tout) du moins* (lit. of-the (very) least) and *(tout) au moins* (lit. at-the (very) least). The former strategy seems purely corrective, in that it cannot be used in simplex answers to overt questions (14a); while the latter strategy is less restricted: it can be used in simplex answers (14a) and also as a repair in both HDs (14b) and HCs (14c). While *(tout) au moins* may still be ambiguous between a corrective and a non-corrective interpretation, the existence of the purely corrective competitor *(tout) du moins* makes this possibility less likely, and suggests that a non-corrective account of (14b-14c) along the lines of what we proposed in this paper is on the right track.

(14) Dans quelle **ville** Ed a étudié?
In which **city** Ed has studied?
'In which **city** did Ed study?'
a. Il a (tout) au/#du moins étudié en **France**.
He has (all) at/of least studied in **France**.
'He has at least studied in **France**.'
b. Ed a étudié à **Paris**, ou (tout) au/du moins en **France**.
Ed has studied in **Paris**, or (all) at/of least in **France**.

'Ed studied in **Paris** or <u>at least</u> in **France**.'

c. Si Ed n'a pas étudié à **Paris**, il a (tout) <u>au/du moins</u>
If Ed NEG-has NEG studied in **Paris**, he has (all) <u>at/of least</u>
étudié en **France**.
studied in **France**.
'If Ed hasn't studied in **Paris**, he has <u>at least</u> studied in **France**.'

Beyond basic HDs repaired with *at least*, Krifka (2024) (drawing from Simons 2001) points out the sentence in (15) as a potential challenge. (16) was brought to my attention by a member of the CLS61 audience.

(15) # Ed was born in **Paris** or in a city in **France**.

(16) # Ed was born in **Berlin** or <u>at least</u> **France**.

The current account intuitively assigns the same "inquisitive" contribution to *at least France* and *a city in France*, whenever *at least* is provided with a city-level antecedent. But (15) shows that the latter expression, unlike *at least France*, does not constitute a good repair in HDs. This might be explained by the fact that *in a city in France* is strictly more complex than *at least France*, so that (15) ends up being *Redundant* due to it evoking the same Qtrees as the simpler, felicitous (3a). (16) poses a deeper problem: we currently predict this sentence to be just as felicitous as (3a) because *Berlin*, just like *Paris* in (3a), provides *at least* with the crucial city-level Qtree repairing *Redundancy* issues. This suggests that the link between *at least*'s first, implicit argument, and its prejacent, should be made tighter–perhaps using the notion of entailment. We leave this for future work.

In summary, this paper introduced a two-body problem: a set of repairless Hurford Sentences (HDs, HCs), displaying intricate oddness asymmetries that are notably challenging to capture with minimal assumptions; and counterparts of these sentences, uniformly repaired by *at least* but non-uniformly repaired by *but*–another intricate asymmetry. To deal with these data, we proposed a sensible QuD-level model of *at least* and *but* interacting with a pre-existing model of repairless HDs and HCs. This interaction was shown to produce the expected asymmetric felicity profile in *repaired* Hurford Sentences modulo a few extra assumptions,[13] while retaining satisfactory predictions for repairless HDs and HCs. This makes way for the study of a wider range of repair operators (*still*, *maybe*, *even*, the many cross-linguistic variants of *but*...) in the context of Hurford Sentences, through the lens of pragmatic oddness and QuD approaches. This also calls for an account of plain conjunction: is *and* "structurally conditional", like *but*?[14] Is it rather "structurally disjunctive" like *or*, thus forcing its arguments to answer the same overall QuD? Or is it a mix of both, disjunctive whenever possible, and if not, conditional?

[13] Most notably, that formal simplification feeds Qtree computation–used to explain why (3a) was *not* made *Redundant* by its second disjunct.

[14] Of interest may also be the use of *and* in combination with an imperative to convey a conditional meaning.

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