Redundancy under Discussion[1]

Adèle HÉNOT-MORTIER — *Massachusetts Institute of Technology*

Abstract. We present novel data derived from a the structure $(p \vee p \vee q)$ *via* the *or*-to-*if* tautology and core properties of disjunction (commutativity, associativity). The sentences at stake display unexpected felicity contrasts–posing a challenge for existing theories of oddness. Building on the QuD-informed model of oddness presented in the current volume (Hénot-Mortier, to appear), and much previous work, in particular Ippolito (2019) and Zhang (2022), we propose a solution covering the data, and which can extend to other classic cases of oddness, including Hurford phenomena (Hurford, 1974; Singh, 2008; Mandelkern and Romoli, 2018).

Keywords: oddness, redundancy, disjunction, conditionals, question under discussion.

1. Introduction

The disjunctive sentences in (1), which are logically related to each other *via* applications of $\vee$-commutativity and $\vee$-associativity, appear sharply infelicitous.[2] Such sentences can be seen as odd due to them being contextually equivalent to their complex disjunct, $p \vee q$ or $q \vee p$ (Katzir and Singh, 2014;Mayr and Romoli, 2016 i.a.).

(1) *Context: Jo got a paper accepted at SuB, but maybe he will not come in person.*

a. # Either Jo is at SuB, or else he is at SuB or in Boston. $p \vee (p \vee q)$

b. # Either Jo is at SuB, or else he is in Boston or at SuB. $p \vee (q \vee p)$

c. # Either Jo is at SuB or in Boston, or else he is at SuB. $(p \vee q) \vee p$

d. # Either Jo is in Boston or at SuB, or else he is at SuB. $(q \vee p) \vee p$

(2-5) show variants of (1a-1d) obtained *via* the *or*-to-*if* tautology. In each pair of sentences, the a. instances are derived by modifying the outer disjunction, while the the b. instances are derived by modifying the inner disjunction.[3]. Surprisingly, those variants exhibit different degrees of oddness: (2b) and (4b) escape infelicity, while the other variants do not.[4] This is unexpected given that all the sentences in (2-5) have same logical structure as the infelicitous sentences in (1a-1d), assuming implications are material. Particularly puzzling is the existence of a contrast *between* the different b. examples in (2-5), which are derived from (1a-1d) using the same transformation.

(2) Derived from (1a):

a. # If Jo is not at SuB then he is at SuB or in Boston. $\neg p \to (p \vee q)$

[1]Many thanks to Amir Anvari, Athulya Aravind, Omri Doron, Danny Fox, Martin Hackl, Nina Haslinger, Viola Schmitt and Jad Wehbe for their input on that project. Thanks also to the audience and reviewers of SuB29 and of the 2024 BerlinBrnoVienna Workshop for relevant questions, datapoints and suggestions.

[2]More variants could be derived, for instance $q \vee (p \vee p)$. Here, we focus on the less obvious variants where two instances of p do not directly combine together.

[3]One could also apply the *or*-to-*if* tautology to *both* the inner and the outer disjunction in the sentences in (1). Nested conditionals however, are hard to judge. We will briefly cover them in Section 6.2.

[4](4b) sounds more degraded than (2b) however–even in the best case where antecedent and consequent are flipped. We will come back to this contrast in Section 6.1.

b. Either Jo is at SuB or if he is not at SuB then he is in Boston. $p \vee (\neg p \to q)$

(3) Derived from (1b):

a. # If Jo is not at SuB then he is in Boston or at SuB. $\neg p \to (q \vee p)$

b. # Either Jo is at SuB or if he is not in Boston then he is at SuB. $p \vee (\neg q \to p)$

(4) Derived from (1c):

a. # If it's not true that Jo is at SuB or in Boston, then he is at SuB. $\neg(p \vee q) \to p$

b. ? Either Jo is in Boston if not at SuB, or he is at SuB. $(\neg p \to q) \vee p$

(5) Derived from (1d):

a. # If it's not true that Jo is in Boston or at SuB, then he is at SuB. $\neg(q \vee p) \to p$

b. # Either Jo is at SuB if not in Boston, or he is at SuB. $(\neg q \to p) \vee p$

The intuitive generalization seems to be the following: the sentences in (2-5) that retain an outer disjunction, and whose complex (conditional) disjunct has the negation of their simple disjunct as antecedent, are rescued. Building on the machinery laid out in Hénot-Mortier (to appear) and Hénot-Mortier (to appear), we propose that this descriptive generalization follows from the idea that oddness arises when sentences cannot evoke any well-formed accommodated Questions under Discussion (henceforth QuD, Van Kuppevelt, 1995; Roberts, 1996); and that disjunctions and conditionals give rise to different QuDs. Specifically, we submit that disjunctions raise QuDs making both disjuncts at issue *in parallel* (Simons, 2001; Zhang, 2022), while conditionals "stack" the QuDs of their antecedent and consequent, and only treat the latter as topical. Assuming that the sole application $\vee$-commutativity does not affect oddness, we now focus on sentences (1a), (2a), (2b), (3b), and (4a), repeated in (6).

(6) a. # Either Jo is at SuB, or else he is at SuB or in Boston. $p \vee (p \vee q)$

b. # If Jo is not at SuB then he is at SuB or in Boston. $\neg p \to (p \vee q)$

c. Either Jo is at SuB or if he is not at SuB then he is in Boston. $p \vee (\neg p \to q)$

d. # Either Jo is at SuB or if he is not in Boston then he is at SuB. $p \vee (\neg q \to p)$

e. # If it's not true that Jo is at SuB or in Boston, then he is at SuB. $\neg(p \vee q) \to p$

The rest of this paper is structured as follows. The next Section reviews why some of the sentences in (6) are problematic for existing accounts of oddness. Section 3 introduces the model of accommodated QuDs laid out in Hénot-Mortier (to appear) and Hénot-Mortier (to appear) and shows how it derives different QuDs for disjunctions and conditionals. Section 4 defines a new REDUNDANCY constraint targeting pairs formed by LFs and their accommodated QuD, and shows how this constraint captures the contrasts in (6). Section 5 compares the constraint to those posited by similar earlier accounts and further connects it to Grice's MAXIM OF MANNER. Section 6 discusses a few additional datapoints related to (6), and Section 7 concludes.

2. Previous accounts

This Section presents three existing accounts of oddness: LOCAL REDUNDANCY CHECKING, SUPER-REDUNDANCY, and NON-TRIVIALITY. The first two accounts are shown to fall short in explaining the contrast between the felicitous (6c) and the infelicitous (6b), (6d), and (6e).

The last account *can* capture the pattern in (6), but at the cost of mispredicting the classic pattern of Hurford Disjunctions (Hurford, 1974).

2.1. Local Redundancy Checking

Katzir and Singh (2014) propose that the semantic computation evaluates, at certain nodes, whether the composition principle that applies there is non-vacuous. This is spelled out in (7).

(7) LOCAL REDUNDANCY CHECKING. S is deviant if S contains γ s.t. $[\![\gamma]\!] = [\![O(\alpha,\beta)]\!] \equiv_c [\![\zeta]\!]$, $\zeta \in \{\alpha,\beta\}$.

This predicts the double disjunction (6a) to be deviant, because, at the level of the highest disjunction, it is contextually equivalent to its complex disjunct ($p \vee q$). But, assuming conditionals denote material implications, this also predicts (6b-6d) to be deviant, because, in each of these cases, the highest node (which denotes the whole expression) is equivalent to its right daughter (consequent in (6b); right disjunct in (6c-6d)). Thus, the felicity of (6c) is not derived. Additionally, (6e) is incorrectly predicted to be fine: at the root level, neither $\neg(p \vee q)$ nor p is equivalent to (6e); and within (6e)'s antecedent, neither p nor q is equivalent to $p \vee q$.

The issue in fact persists if we adopt a non-material analysis of conditionals–e.g. a (variably) strict analysis. Under this assumption, a conditional is a universal expression that is never contextually equivalent to its antecedent or consequent, regardless of what they denote. So, one can focus on disjunctive nodes when evaluating (7) against the sentences in (6). Because none of the disjunctive nodes in (6b-6e) are equivalent to one of their daughters, only (6a), which does not involve conditionals, is predicted to be deviant. Although the felicity of (6c) is captured, all the other conditional variants are incorrectly predicted to be felicitous.

2.2. Super-Redundancy

Kalomoiros (2024) introduced SUPER-REDUNDANCY, primarily to deal with Hurford Conditionals (Mandelkern and Romoli, 2018). Roughly, a sentence S is super-redundant if it features a binary operation taking a constituent C as argument, and moreover there is no way of strengthening C to C^+ that would make the resulting sentence S^+ non-redundant (i.e., non-equivalent to its counterpart where C^+ got deleted). This is summarized in (8).

(8) SUPER-REDUNDANCY. A sentence S is infelicitous if it contains $C * C'$ or $C' * C$, with $*$ a binary operation, s.t. $(S)^-_C$ is defined and for all D, $(S)^-_C \equiv S_{Str(C,D)}$. In this definition:
- $(S)^-_C$ refers to S where C got deleted;
- $Str(C,D)$ refers to a strengthening of C with D, defined inductively and whose key property is that it commutes with negation ($Str(\neg\alpha,D) = \neg(Str(\alpha,D))$), as well as with binary operators ($Str(O(\alpha,\beta),D) = O(Str(\alpha,D),Str(\beta,D))$);
- $S_{Str(C,D)}$ refers to S where C is replaced by $Str(C,D)$.

If we set C to be the first occurrence of p for $S \in \{$(6a)...(6e)$\}$, it can be shown that, assuming material implication, $S_{Str(C,D)}$ will always be $(p \wedge D) \vee (p \vee q)$, which turns out to be equivalent to $p \vee q \equiv \neg p \rightarrow q \equiv \neg q \rightarrow p \equiv (S)^-_C$, regardless of what D is. In other words, (6a-6e) are all super-redundant granted material implication. Assuming strict conditionals does not help. In that case, it can be shown that (6a), (6b) and (6e) are super-redundant, while (6c) and (6d) are not. Using a variably strict semantics may work better, but in any case would be problematic for the data SUPER-REDUNDANCY was originally designed to capture.

2.3. Non-triviality

Another line of work (Mayr and Romoli, 2016 i.a.), building on the notion of local contexts (Schlenker, 2009), associates oddness with triviality in the sense of (Stalnaker, 1999). This view is summarized in (9).

(9) NON-TRIVIALITY. A sentence S cannot be used in a context c if some part π of S is entailed or contradicted by the local context of π in c.

Assuming (i) that disjunctive local contexts are computed in a left-to-right fashion, i.e. that the local context of the first disjunct is the global context, and that the local context of the second disjunct corresponds to the negation of the first (intersected with the global context); and (ii) that the local context of the consequent of a conditional is the antecedent (intersected with the global context), the pattern in (6) is captured: in all cases but (6c), the second occurrence of p contradicts the local context set by the first occurrence of p. However, assuming that disjunctive local contexts are left-to-right poses issues for the kind of sentences NON-TRIVIALITY was originally designed to account for, namely Hurford Disjunctions (Hurford, 1974), of the form $r \vee r^+$ / $r^+ \vee r$, with $r^+ \vdash r$. Such sentences, exemplified in (10), are infelicitous in both orders, and can only be captured by NON-TRIVIALITY assuming *symmetric* local contexts.

(10) a. # Jo studies in Noto or Sicily. b. # Jo studies in Sicily or Noto.

But this assumption in turn makes wrong predictions in (6). Specifically, under symmetric local contexts, (6c) is predicted to be deviant, because the local context of its first disjunct (p), is taken to be $\neg(\neg p \to q) \equiv (\neg p) \wedge (\neg q)$, contradicting p.

We now introduce a QuD-based framework, in which the felicity of assertive sentences will be evaluated through the lens of their interaction with the possible QuDs they evoke–following insight from Katzir and Singh (2015).

3. Compositional QuDs as a source of oddness

3.1. Overview

Building on the model proposed for Hurford Sentences by Hénot-Mortier (to appear), previous work by Büring (2003); Katzir and Singh (2015); Onea (2016, 2019); Riester (2019); Ippolito (2019); Zhang (2022); Haslinger (2023), as well as current work represented in this volume (Zhang, to appear) we assume that Logical Forms evoke the implicit QuDs they could felicitously answer. Such QuDs are modeled as parse trees of the Context Set (henceforth CS, Stalnaker, 1974), following insights from Büring (2003); Ippolito (2019). We call such stuctures Qtrees, and propose that the Qtrees evoked by a complex LF be derived from the ones evoked by the LF's constitutive parts. Crucially, disjunctions and conditionals accommodate distinct Qtrees: disjunctions evoke trees that make both disjuncts at issue at the same time, while conditionals evoke trees that makes the consequent at issue in the domain(s) of the CS where the antecedent holds.

This compositional machinery is supplemented by LF-Qtree well-formedness constraints, which rule-out specific Qtrees, derived from specific LFs. The existence of such constraints, implies that certain LFs may be unable to evoke any well-formed Qtrees; and as such will be deemed odd. In this paper, we will focus on one such constraint, based on the concept of REDUNDANCY, and which will rule out Qtrees evoked by a sentence, if such Qtrees are also evoked by a simplification of the sentence. This will predict that the Qtrees evoked by (6a) are all ruled out because they are also evoked by (6a)'s simplification $p \vee q$. Likewise, the Qtrees evoked by (6b) will be ruled out because of the q / $\neg p \rightarrow q$ simplifications, and the one evoked by (6d) will be as well, because of the p simplification. Lastly, the Qtree evoked by (6e) will be deemed ill-formed due to being answerless.

3.2. Key assumptions

We model QuDs as parse trees of the Context Set (Stalnaker, 1974), which can also be seen as nested partitions. (11) defines these structures, which are very similar to Ippolito's "structured sets of alternatives".

(11) *Structure of Question-trees (Qtrees).*
Qtrees are trees whose nodes are all subsets of the CS and s.t.:
- Their root is the CS;
- Any intermediate node is partitioned by the set of its children.

In such trees, the root can be seen as a tautology over the CS, and any other node, as a possible answer to the global question denoted by the tree. Intermediate nodes can generally be seen as non-maximal answers, while leaves can generally be seen as maximal ones. Any subtree rooted in a node N can be understood as conditional question taking for granted the proposition denoted by N. Finally, a path from the root to any node N can be seen as a strategy of inquiry (or a sequence of conditional questions) leading to the answer denoted by N.

We assume that out-of-the-blue LFs trigger a Qtree accommodation process that "retro-engineers" a Qtree from the sentence's structure.[5] When evoking a given Qtree, an LF "flags" specific nodes on the tree as maximal true answers. These nodes, that we dub *verifying nodes*, are typically the leaves of the Qtree which are subsets of the proposition denoted by the LF. They will appear in $\boxed{\text{boxes}}$ in all subsequent Figures. Both Qtree structure and verifying nodes are compositionally derived. Moreover, an accommodated Qtree should allow the sentence evoking it to properly answer it; that is why we assume that any well-formed Qtree derived from a sentence should come with a non-empty set of verifying nodes; see (12). More generally, we assume that oddness arises when a sentence, through its LF, cannot give rise to any well-formed Qtree; see (13).

(12) EMPTY FLAGGING. If Qtree T evoked by a sentence S is characterized by an empty set verifying nodes, T is odd given S.

(13) *Oddness of a sentence.* A sentence S is odd if any Qtree it evokes is odd given S.

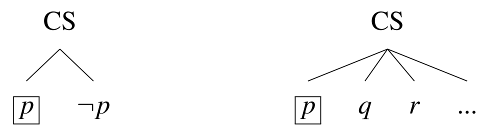
[5]Here, we do not cover the case of assertive sentences that are direct answers to an overt QuD. There is in fact an interesting line of work showing that overt QuDs can influence pragmatic oddness, especially when it comes to matters of REDUNDANCY (Haslinger, 2023).

We now proceed to define Qtrees evoked by “simplex” LFs, understood as LFs which do not contain a node of type t besides their root.

3.3. QuDs evoked by simplex LFs

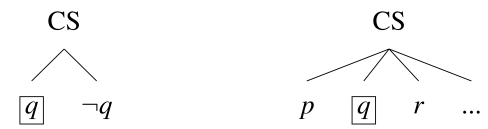
We assume that a simplex LF denoting a proposition p can give rise to two types of Qtree:[6] a “polar” Qtree whose leaves are the p and $\neg p$ worlds respectively; and a “*wh*” Qtree whose leaves are p and relevant, mutually exclusive alternatives to p.[7] Moreover, verifying nodes are defined on such trees as simply the p-leaf (if present).

Looking back at (6a-6e), where $S_p =$ *Jo is at SuB* denotes p and $S_q =$ *Jo is in Boston* denotes q, it is reasonable to think S_p and S_q are exclusive mutual alternatives. Other alternatives may be $S_r =$ *Jo is in Chicago* etc. As a result, the Qtrees compatible with S_p and S_q are given in Figures 1 and 2. The two Figures are equivalent *modulo* a permutation of p and q. Additionally, Figures 1B and 2B show that the “*wh*” Qtrees raised by S_p and S_q have similar structures, in the sense that their partitioning of the CS is the same, ignoring verifying nodes. The corresponding “polar” Qtrees in Figures 1A and 2A on the other hand, introduce different structures. We now define Qtrees raised by complex LFs, in particular, negated, disjunctive, and conditional LFs.



(A) “Polar” (B) “*Wh*”

Figure 1: Qtrees for $S_p =$ *Jo is at SuB*. $\boxed{\text{Boxed}}$ nodes are verifying.



(A) “Polar” (B) “*Wh*”

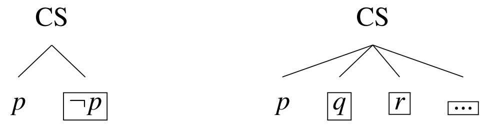
Figure 2: Qtrees for $S_q =$ *Jo is in Boston*. $\boxed{\text{Boxed}}$ nodes are verifying.

3.4. QuDs evoked by negated LFs

We take that a negated LF evokes the same kind of question as its positive counterpart, but identifies a disjoint set of true answers. Given an LF X, evoking T, a Qtree T' for $\neg X$ is obtained by retaining T’s structure (nodes and edges), and “flipping” T’s verifying nodes, i.e. by replacing any set of same-level verifying nodes in T by by its same-level complement set in T. If all the verifying nodes are leaves, this “flipping” simply amounts to set complementation in the leaf-domain. This is done for $\neg S_p$ and $\neg S_q$ in Figures 3 and 4.

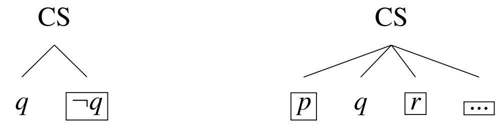
[6]This is a simplification; Hénot-Mortier (to appear) and Hénot-Mortier (to appear) assumes that even simplex LFs can give rise to layered Qtrees, whose layers are ordered by some notion of granularity. But this additional assumption is not relevant here, because we assume p and q are same-granularity alternatives.

[7]This can be generalized to non-exclusive alternatives *via* Hamblin-style partitions (Hamblin, 1973), but leads to more complexity. See extended definition in Hénot-Mortier (to appear) and Hénot-Mortier (to appear).



(A) "Polar" (B) "*Wh*"

Figure 3: Qtrees for $\neg S_p$ = *Jo is not at SuB*. Verifying nodes are all sisters of the *p*-node.



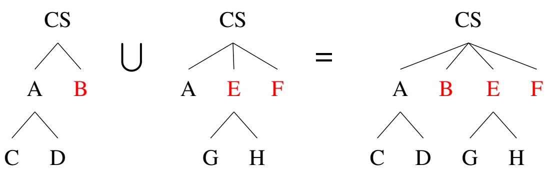
(A) "Polar" (B) "*Wh*"

Figure 4: Qtrees for $\neg S_q$ = *Jo is not in Boston*. Verifying nodes are all sisters of the *q*-node.

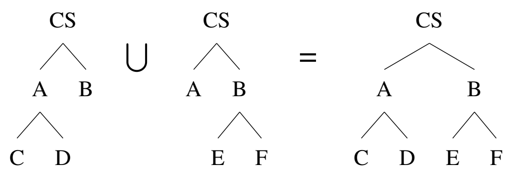
3.5. QuDs evoked by disjunctive LFs

A disjunctive Qtree should address the questions evoked by each disjunct *in parallel*, making them both at issue (Simons, 2001; Zhang, 2022). Structurally, disjunction thus returns all the well-formed unions of Qtrees evoked by its individual disjuncts. "Union" refers to that of nodes and edges; it is thus symmetric. The union of two Qtrees T and T' will be well-formed if there is no node N present in both T and T' that introduces different partitionings in T and T'. Ill- and well-formed unions of Qtrees are exemplified in (14) and (15).

(14) An ill-formed union of Qtrees. Nodes with different labels denote different sets. By construction, $E \cup F = B$. Therefore, A, B, E, and F do not properly partition the CS in the output.



(15) A well-formed union of Qtrees. A and B each introduce independent partitionings, which can be fused while retaining Qtree structure.



The sets of verifying nodes attached to the two disjoined Qtrees, are also unioned. The only possible Qtree for $S_p \vee S_q$ / $S_q \vee S_p$ is given in Figure 5. It is obtained from Qtrees 1B and 2B, which have similar structures and as such can be properly unioned. Other possible unions of Qtrees are shown in Figure 6 but are ill-formed, because their leaves do not partition the CS.

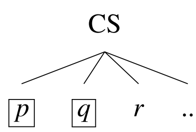
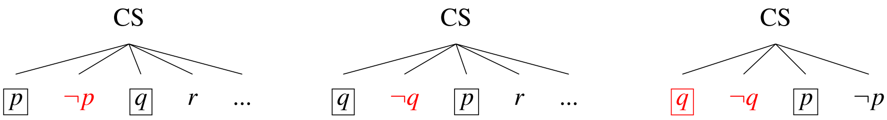


Figure 5: Only well-formed Qtree evoked by $S_p \vee S_q$ = *Jo is at SuB or in Boston*, obtained from Qtrees 1B and 2B. **This Qtree is also the only Qtree compatible with (6a)**.



(A) 1A $\vee$ 2B (B) 1B $\vee$ 2A (C) 1A $\vee$ 2A

Figure 6: Ill-formed Qtrees resulting from the union of the Qtrees in Figures 1 and 2. Red nodes are s.t. removing them would make the Qtrees well-formed.

Likewise, the Qtrees in Figures 1B (for S_p) and 5 (for $S_p \vee S_q$), can be unioned to derive the only possible Qtree for (6a) = $S_p \vee (S_p \vee S_q)$. Because Qtree 5 has same structure as Qtree 1B, and its set of verifying nodes contains those of Qtree 1B, the result of their union is simply Qtree 5. In sum, Qtree 5 turns out to be compatible with *both* the simple disjunction $S_p \vee S_q$ and the more complex disjunction (6a). We will show in the next Section that this makes Qtree 5 "redundant" given (6a)–an in turn, predicts (6a) to be odd.

3.6. QuDs evoked by conditional LFs

We assume that conditionals typically evoke conditional questions, i.e. questions pertaining to their consequent, set in the domain(s) of the CS where the antecedent holds. Additionally, we assume some form of "neglect-zero" effect (Aloni, 2022; Flachs, 2023) in conditional Qtrees, by proposing that only the consequent of a conditional contributes verifying nodes in the resulting conditional Qtree. In particular, nodes falsifying the antecedent are not considered verifying in the resulting conditional Qtree.[8] This will be crucial to derive (6c)'s felicity: in the Qtrees evoked by $\neg p \rightarrow q$ ((6c)'s right disjunct), p will *not* be treated as verifying; but further disjoining $\neg p \rightarrow q$ with p ((6c)'s left disjunct) will then create Qtrees where p *is* verifying. In other words, disjunction will be shown to have a non-redundant effect in (6c).

These intuitions are modeled by assuming that conditional Qtrees are derived by "plugging" a consequent Qtree T_C into the verifying nodes of antecedent Qtrees T_A. More concretely, for each verifying node N of T_A, N gets replaced by $N \cap T_C$. $\cap$ refers to tree-node intersection, defined in (16).[9]

(16) *Tree-node intersection.* Let T be a Qtree and N be a proposition. The tree-node intersection of N and T, noted $N \cap T$, is a tree T':
- whose nodes are the nodes of T intersected with N (excluding empty ones);
- whose verifying nodes are inherited from T (i.e. if N' is verifying in T and $N \cap N'$ is in T', then $N \cap N'$ is verifying in T');
- whose edges are inherited from T (i.e. if $N' - N''$ in T and both $N \cap N'$ and $N \cap N''$ are in T', then $N \cap N' - N \cap N''$ in T').

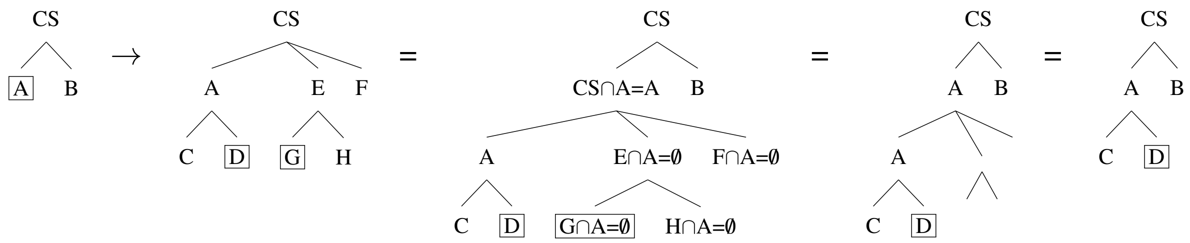
From an algorithmic standpoint, tree-node intersection can be achieved by (i) intersecting all nodes of T with N; (ii) removing resulting empty nodes; (iii) removing resulting dangling

[8]This predicts that a sentence whose antecedent is falsified in the CS, evokes a Qtree without any verifying node, and thus triggers the EMPTY FLAGGING condition (12)–causing oddness.

[9]This operation is structurally idle if N entails a leaf of T_C, because in this case, $N \cap T_C$ reduces to a root N, and replacing N by N in T_A is idle. However, it might still affect verifying nodes.

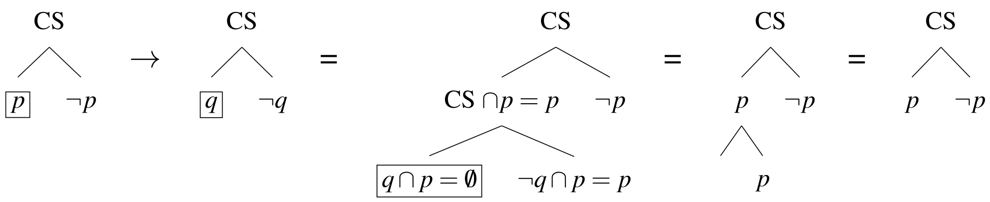
and unary edges while percolating the "verifying" property whenever needed. This definition of conditional Qtrees, ensures that their verifying nodes are exactly those contributed by the consequent *and* compatible with one of the antecedent's verifying nodes. The whole process is exemplified in (17).

(17) An example of conditional Qtree formation. In the antecedent Qtree, *A* is the only verifying node; it thus gets replaced by its intersection with the consequent Qtree. In the output Qtree, *A* is no longer verifying, but *D*, which was verifying in the consequent Qtree *and* is compatible with *A*, is.

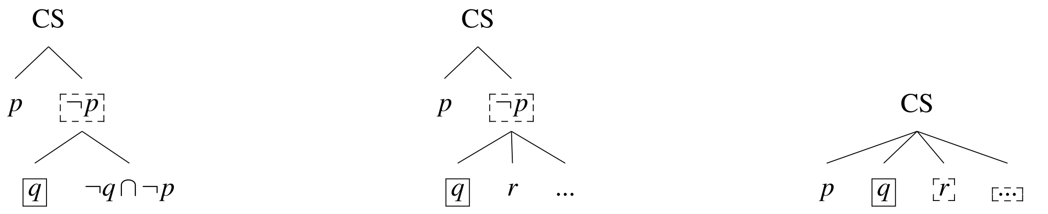


The core idea behind this operation is that conditionals introduce a hierarchy between antecedent (backgrounded) and consequent (at-issue): the consequent Qtree gets *restricted* by the antecedent Qtree. This predicts a conditional like *If Jo is at SuB then he is in Boston* = $S_p \rightarrow S_q$, whose antecedent and consequent are disjoint, to give rise to Qtrees without verifying nodes–leading to EMPTY FLAGGING (see (12)), and in turn, oddness. This is shown in (18).

(18) $S_p \rightarrow S_q$ (with p and q disjoint) triggers EMPTY FLAGGING and is thus odd. In the antecedent Qtree, p is the only verifying node; it thus gets replaced by its intersection with the consequent Qtree, whose only verifying node is q, disjoint from p. In the output Qtree, p is no longer verifying, and q got entirely filtered out by tree-node intersection. So no node is eventually verifying.

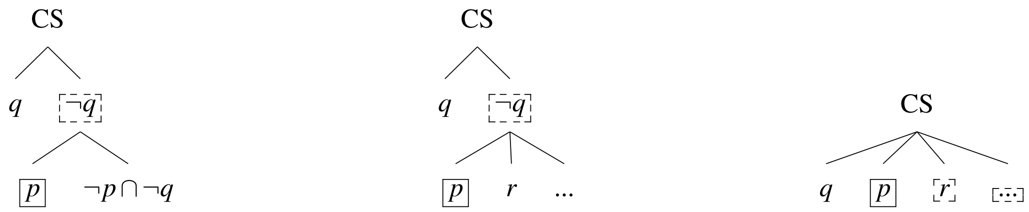


The same recipe is applied to $\neg S_p \rightarrow S_q$ in Figure 7, using Qtrees for $\neg S_p$ from Figure 3 and Qtrees for S_q from Figure 2. Figure 8 does the same for $\neg S_q \rightarrow S_p$. In these figures, nodes in dashed boxes refer to those that were verifying in the antecedent Qtree, but are no longer verifying in the conditional Qtree. They can be seen as "restrictor" nodes, which define the domain(s) of the CS in which the consequent Qtree is introduced. Nodes in solid boxes refer to the nodes that are verifying in the consequent Qtree, and are thus still verifying in the conditional Qtree.



(A) 3A → 2A. (B) 3A → 2B. (C) 3B → 2A / 2B.[10]

Figure 7: Qtrees for $\neg S_p \to S_q =$ *If Jo is not at SuB then he is in Boston*.



(A) 4A → 1A (B) 4A → 1B (C) 4B → 1A / 1B

Figure 8: Qtrees for $\neg S_q \to S_p =$ *If Jo is not in Boston then he is at SuB*; obtained *mutatis mutandis* from Figure 7.

4. Capturing the target cases

Now that the compositional QuD machinery is set up, it can be used to derive implicit QuD for all the sentences in (6). Before doing this, we introduce a new version of REDUNDANCY which applies to LF-Qtree pairs.

4.1. Redundancy as a constraint on LF-Qtree pairs

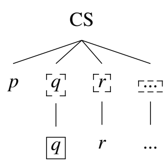
In the previous Section, we already noted that the Qtree evoked by (6a) $= S_p \vee S_p \vee S_q$ (in Figure 5), was the same as the Qtree evoked by the simpler sentence $S_p \vee S_q$. We now argue that such configurations constitute violations of a specific implementation of NON-REDUNDANCY operating on LF-Qtree pairs, instead of LF-meaning pairs. Basically, if a Qtree Q is evoked by a sentence S and also by one of the sentence's formal simplifications S' (in the sense of Katzir, 2007); then Q is deemed Q-REDUNDANT given S. This is formalized in (19a-19c).

(19) a. Q-REDUNDANCY. Let X be a LF and let $Qtrees(X)$ be the set of Qtrees evoked by X. $T \in Qtrees(X)$ is deemed Q-REDUNDANT given X (and thus odd given X) iff there exists a formal simplification of X, X', and $T' \in Qtrees(X')$, such that $T = T'$.

b. *Formal simplification*. X' is a formal simplification of X if X' can be derived from X *via* a series of constituent-to-subconstituent substitutions (Katzir, 2007).

[10](i) shows the structure obtained *before* the removal of empty nodes and dangling/unary-branching edges performed in Figure 7C. The removal of empty nodes and dangling/unary-branching edges collapses the two q-nodes and makes the resulting node verifying; collapses the two r-nodes and makes the resulting node non-verifying; and so on for all other nodes different from the p-node.

(i)



c. *Qtree equality*. $T = T'$ iff T and T' have same structure and same verifying nodes.[11]

A *sentence S* will be deemed Q-REDUNDANT if *all* the Qtrees it evokes, are Q-REDUNDANT given S. This constitutes a special case of sentence oddness (as defined in (13)). (6a) is thus odd, because the only possible Qtree it evokes (in Figure 5), is evoked by $S_p \vee S_q$ which can be obtained from (6a) by substitution (regardless of bracketing). We now derive the Qtrees evoked by the infelicitous sentences (6b), (6d), and 6e), and show that they also all appear problematic.

4.2. Ruling out the infelicitous (6b), (6d), and (6e)

For conciseness, we now use p and q as shorthands for the sentences denoting p and q, previously noted S_p = *Jo is at SuB* and S_q = *Jo is in Boston*. We start with (6b) $= \neg p \rightarrow (p \vee q)$, whose Qtrees are given in Figure 9, and are derived using Figures 3 (for $\neg p$), 5 (for $p \vee q$), and the combination rule for conditional Qtrees. In both cases, the output Qtree is also evoked by a simpler expression, $\neg p \rightarrow q$ and q respectively. This stems from two features of conditional Qtree formation: (i) p in the disjunctive consequent of (6b) gets "ignored" at the Qtree level, due to the antecedent restricting the consequent Qtree to the $\neg p$-domain; and (ii) nodes falsifying the antecedent (here, p) are *not* treated as verifying. As a result, both Qtrees in Figure 9 are Q-REDUNDANT given (6b), and (6b) turns out to be a Q-REDUNDANT sentence.

(A) 3A $\rightarrow$ 5.
Same as Qtree 7B evoked by $\neg p \rightarrow q$.

(B) 3A $\rightarrow$ 5.
Same as Qtree 2B evoked by q.

Figure 9: Qtrees for (6b) $= \neg p \rightarrow (p \vee q)$

Turning to (6d) $= p \vee (\neg q \rightarrow p)$, its only possible Qtree, shown in Figure 10, is obtained using Figures 1 (for p) and 8 (for $\neg q \rightarrow p$) along with the union rule for disjunctive Qtrees. Other Qtree combinations for p and $\neg q \rightarrow p$ cannot be properly disjoined (unioned), because the partitionings introduced by p and that introduced by $(\neg q \rightarrow p)$ at depth 1 differ from each other, leading to the kind of ill-formedness issue described in Figure 6. Because both input Qtrees in Figures 1 and 8 are the same, the (well-formed) output Qtree in 10 is also similar. It is therefore Q-REDUNDANT given (6d), and (6d) is deemed odd.

Finally, the only possible Qtree associated with (6e), given in Figure 11, is such that no verifying node remains after the conditional rule applies. It is thus considered ill-formed due to EMPTY FLAGGING (see (12)) and (6e) is in turn predicted to be odd as per (13).

[11] This is sufficient for our purposes here, but needs to be generalized to cover other cases of oddness in this QuD-driven framework. The generalized concept of Qtree equality ("equivalence"), is based on structural equality, and equality between sets of minimal verifying paths; see Hénot-Mortier (to appear) and Hénot-Mortier (to appear).

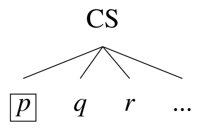


Figure 10: Only possible Qtree for (6d) $= p \vee (\neg q \to p)$, obtained from 1B $\vee$ 8C. **Same as Qtree 1B evoked by** p.

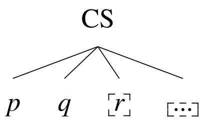
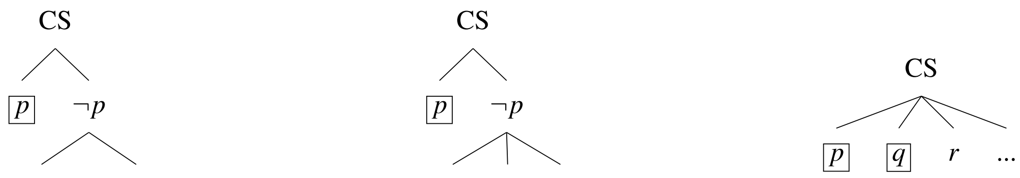


Figure 11: Only possible Qtree for (6e) $= \neg(p \vee q) \to p$, obtained from $\neg$ 5 $\to$ 1A / 1B. **EMPTY FLAGGING.**

4.3. Ruling in (6c)

We now show that Q-REDUNDANCY spares the felicitous (6c) $= p \vee (\neg p \to q)$. The relevant Qtrees, shown in Figure 12, are obtained using Figures 1 (for p) and 7 (for $\neg p \to q$), combined with the union rule for disjunctive Qtrees. Because the Qtrees evoked by p that are properly disjoinable with those evoked by $\neg p \to q$, are structurally contained in them, the Qtrees in Figure 12 are structurally similar to those from Figure 7 (corresponding to $\neg p \to q$), but, crucially, display an extra verifying p-leaf, contributed by the first disjunct of (6c).



(A) 1A $\vee$ 7A

(B) 1A $\vee$ 7B

(C) 1B $\vee$ 7C
Same as Qtree 5 evoked by $p \vee q$

Figure 12: Qtrees for (6c) $= p \vee (\neg p \to q)$

This extra leaf guarantees that Qtrees 12A and 12B *cannot* be evoked by a simplification of sentence (6c). To show this, let us review the nine possible simplifications of (6c), that we divide into three groups: p, q, $\neg p$, $p \vee q$, $p \vee p$, $p \vee \neg p$ (group 1); $\neg p \to q$ (group 2); $p \to q$, $p \vee (p \to q)$ (group 3). Starting with the simplifications in group 1, we notice that their corresponding Qtrees are always of depth 1, because they correspond to Figures 1, 2, or 5, or to slight variants thereof, where only the verifying nodes change (due to negation, or union). Such Qtrees are thus obviously distinct from Qtrees 12A and 12B, which have depth 2. So the simplifications in group 1 cannot make Qtrees 12A and 12B Q-REDUNDANT given (6c). Regarding the $\neg p \to q$ simplification (group 2), it was shown to gives rise to the Qtrees in Figure 7. Crucially, these Qtrees do not count the p-leaf as verifying–unlike those in Figures 12A and 12B. So they cannot be used to justify Q-REDUNDANCY. As for the simplifications in group 3, we showed in (18) that the Qtree for $p \to q$ had only one layer, and moreover displayed EMPTY FLAGGING. Again, this is clearly distinct from Qtrees 12A and 12B. Disjunction with a Qtree for p, to form a Qtree for $p \vee (p \to q)$, does not help either: the resulting Qtree gains one verifying p-leaf, but retains one single layer, making it distinct from Qtrees 12A and 12B. Therefore, no simplification of (6c) gives rise to Qtrees like 12A and 12B, and, as a result, such Qtrees are *not* Q-REDUNDANT given (6c). This means that (6b) should not be deemed odd on the basis of Q-REDUNDANCY, in line with intuitions.

To sum up, we accounted for the pattern in (6) by appealing to a model of compositional QuDs assigning disjunctions and conditionals different "inquisitive" contributions, and by redefining REDUNDANCY on pairs formed by sentences and their possible implicit QuD. We now discuss how this new model relates to earlier similar approaches and to the MAXIM OF MANNER.

5. Taking stock

5.1. Comparison with similar approaches

Pragmatic oddness has been extensively studied through the lens of Hurford phenomena (Hurford, 1974; Marty and Romoli, 2022; Mandelkern and Romoli, 2018 i.a.). Two recent approaches to such phenomena, Ippolito (2019) and Zhang (2022), exploit ideas similar to those presented here. In particular, both use structures very close to Qtrees, and propose that oddness arises from specific configurations in these structures. In Zhang's framework, this takes the form of a distinctness constraint between answers to the same question; in Ippolito's, this is cashed out in terms of matching specificity between disjoined alternatives. In both cases, the constraints posited solely depend on the structure of *the* implicit alternative set/QuD evoked by any given sentence. Despite being quite reasonable and intuitive, such constraints remains partly stipulative and are not directly motivated by familiar, competition-based, pragmatic principles. As we will soon argue, our implementation of Q-REDUNDANCY fills this gap and provides a perhaps more explanatory account of QuD-driven cases of oddness.[12] Additionally, previous accounts were mostly focused on disjunctions, or more generally, configurations where two subconstituents could be taken to answer the same QuD.[13] But it remained unclear how the overarching QuD was derived in each case, and whether it should be derived in the first place. Our system also fills this gap, in providing a set of constrained recipes to compositionally derive implicit QuDs, instead of taking them for granted. Together with Q-REDUNDANCY, this machinery captured the target contrasts.

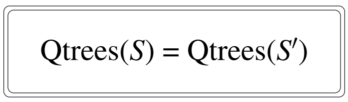
Our approach also differs from Inquisitive Semantics (henceforth **IS**; Mascarenhas, 2008; Ciardelli, 2009; Groenendijk and Roelofsen, 2009; Ciardelli and Roelofsen, 2017; Ciardelli et al., 2018; Zhang, to appear). In IS, assertive sentences and questions are fundamentally the same kinds of objects (sets of alternatives), while under the current view, sentences retain a propositional component, and evoke Qtrees at a distinct, "inquisitive" level of meaning. While the semantic module is sensitive to truth conditions, the pragmatic module is sensitive to the interaction between form, meaning, and inquisitive content. So our approach may be seen as a form of "inquisitive pragmatics". At a more technical level, the difference between our framework and IS is particularly visible when it comes to negation: in IS, negation removes structure by collecting and collapsing all information states incompatible with those of the prejacent. In our framework, negation retains structure, and simply flips verifying nodes. More broadly, our definition of Qtrees as recursive partitions of the CS, differs from that of inquisitive propositions in IS, which are downward closed sets of propositions.

5.2. An "inquisitive" Maxim of Manner?

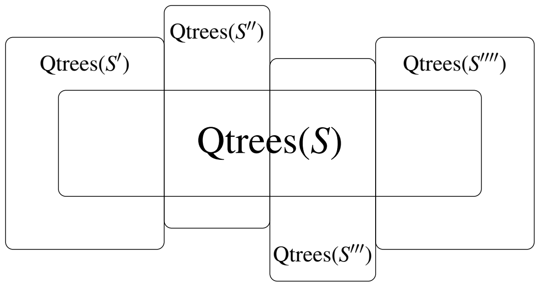
Earlier definitions of REDUNDANCY were linking this notion to Grice's MAXIM OF MANNER (MANNER for short), which roughly states that if two sentences have the same logical contri-

[12] Zhang (to appear) proposes a different account that also goes in this direction.
[13] Ippolito (2019) in fact argues that this comprises Sobel Sequences and sequences of superlatives.

bution, then the more concise one should be preferred. Is Q-REDUNDANCY a proper extension of MANNER at the QuD level? At first blush, not exactly. In particular, Q-REDUNDANCY does not state that, for a sentence S to be Q-REDUNDANT, *all* Qtrees compatible with S should be identified (*via* a bijective operation) to *all* Qtrees compatible with some simplification of S. This perhaps would have been the most intuitive extension of MANNER as the QuD level, and is depicted in Figure 13A. Instead, Q-REDUNDANCY states that for a sentence S to be Q-REDUNDANT, *each* Qtree compatible with S should be identified with *some* Qtree generated by *some* simplification of S. This configuration, depicted in Figure 13B, is significantly less strong, i.e. predicts *more* sentences to be redundant. For instance, we concluded that (6b) was Q-REDUNDANT because each of its Qtrees could be identified with Qtrees evoked by *distinct* simplifications of (6b)–namely q and $\neg p \rightarrow q$. Moreover, q and $\neg p \rightarrow q$ themselves led to Qtrees that were *not* compatible with (6b).



(A) What a more "intuitive" version of Q-REDUNDANCY could have been (S' refers to some simplification of S).



(B) What it takes for S to be Q-REDUNDANT (S', S'', S''', and S'''' refer to simplifications of S).

Figure 13: Comparing Q-REDUNDANCY to a more "intuitive" extension of MANNER to the QuD domain.

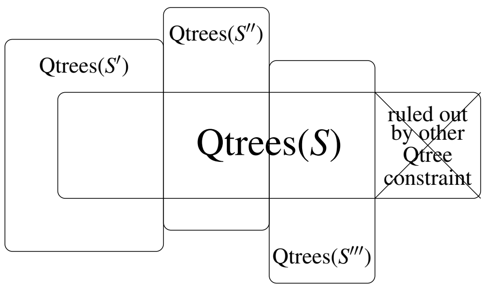


Figure 14: What it means for S to be odd partly due to Q-REDUNDANCY, partly due to other Qtree well-formedness constraints, e.g. EMPTY FLAGGING or Q-RELEVANCE.

Our definition of Q-REDUNDANCY also leaves space for other Qtree well-formedness constraints to contribute to a sentence's oddness. EMPTY FLAGGING (see (12)) is one such constraint. Following Hénot-Mortier (to appear), we can also assume that RELEVANCE filters out Qtrees.[14] A sentence S may then be deemed odd because *some* Qtrees compatible with S are

[14]Roughly, this constraint bans Qtrees whose derivation involves "shrinking" verifying nodes. It does not interfere with our current data, because the propositions we consider here are mutually exclusive, s.t. each time a verifying node gets intersected, it is not "shrunk", but instead reduced to the empty set. For yet another approach to RELEVANCE, see Hénot-Mortier (to appear).

Q-REDUNDANT given S, and the other Qtrees compatible with S are ruled-out by independent constraints. This mixed-oddness profile is schematized in Figure 14.

If Q-REDUNDANCY at the sentential level is not an intuitive extension of MANNER, Q-REDUNDANCY defined on LF-Qtree pairs (see 19a), seems to be. To see this, one must define the simplification of a LF-Qtree pair (S,T), where T is a Qtree evoked by S, as a pair (S', T') where S' is a formal simplification of S in the sense of (19b), and T' is a Qtree evoked by S'. Additionally, one must define equivalence between LF-Qtree pairs as equivalence between their Qtree-component. This yields a definition of Q-RELEVANCE-as-MANNER, given in (20) that is set as a two-dimensional optimization problem on both LFs (which calibrate conciseness, and, indirectly, informativeness) and Qtrees (which calibrate informativeness).

(20) a. *LF-Qtree pair.* (S,T) is a well-formed LF-Qtree pair iff S evokes T.
b. Q-REDUNDANCY *as* MANNER. If (S,T) and (S', T') are two LF-Qtree pairs that are equivalent to each other, then the most concise of the two should be preferred.
c. *Conciseness of a LF-Qtree pair.* If (S,T) and (S', T') are two LF-Qtree pairs, (S', T') is more concise than (S,T) iff S' is a formal simplification of S as per (19b).
d. *Equivalence between LF-Qtree pairs.* If (S,T) and (S', T') are two LF-Qtree pairs, (S', T') is equivalent to (S,T) iff $T = T'$.

6. Exploring elaborations of the target sentences

Now that we have better situated Q-REDUNDANCY as part of the existing work on pragmatic oddness, let us briefly explore its predictions beyond the data in (6).

6.1. Effect of disjunct ordering in the felicitous case

Let us come back to the pair (4b)-(2b), repeated in (21). Because we predicted (21a) to be felicitous, and (21b) only differs from it terms of disjunct ordering disjuncts, (21b) is also predicted to escape Q-REDUNDANCY, and more generally oddness. Yet, (21b) sounds worse than (21a), and even more so if the conditional disjunct did not feature inversion.

(21) a. Either Jo is at SuB or if he is not at SuB then he is in Boston. $p \vee (\neg p \to q)$
b. ? Either Jo is in Boston if not at SuB, or he is at SuB. $(\neg p \to q) \vee p$

We suggest this contrast is caused by an independent, incremental constraint targeting Qtree derivations. As observed in Section 4.3, the Qtrees evoked by p that are properly disjoinable with those evoked by $\neg p \to q$, are structurally contained in them, i.e. are less "specific". Therefore, the disjunction in (21a) takes two Qtrees of increasing specificity as input (from left to right), while the disjunction in (21b) takes two Qtrees of decreasing specificity. And it is reasonable to think that the latter order should be preferred. This is supported by the sequences of questions in (22): it appears more natural to ask a less specific question (e.g., about countries), before a more specific one (e.g., about cities), than the other way around. The latter ordering in fact seems to suggest that the more specific question would not allow one to infer the exact answer to the less specific one.

(22) a. In which country does Jo live? And in which city?

b. ? In which city does Jo live? And in which country?

Assuming that the country-level question in (22) is structurally contained in the city-level question (Hénot-Mortier, to appear),[15] we derive the following generalization, which can be taken to apply to both (21) and (22).[16]

(23) INCREMENTAL QTREE CONTAINMENT. Let X and Y be LFs, and $\circ$ be a binary operator. If $X \circ Y$ and $Y \circ X$ have same meaning and same evoked Qtrees, and if $\forall T \in Qtrees(X \circ Y)$, T is obtained from $T' \in Qtrees(X)$ and $T'' \in Qtrees(Y)$ with $T' \subset T''$, then $X \circ Y$ should be preferred over $Y \circ X$.

6.2. Double or-to-if

Finally, let us very succinctly discuss more complex variants of (1), derived *via* two applications of the *or-to-if* tautology, and complied in (24). (24a) sounds clearly redundant, while (24b) and (24b) somehow feel contradictory. (24d) and (24d) appear very tough to make sense of.

(24) a. # If Jo isn't at SuB then, if he isn't at SuB then he is in Boston. $\neg p \to (\neg p \to q)$
b. # If Jo isn't at SuB then, if he isn't in Boston then he is at SuB. $\neg p \to (\neg q \to p)$
c. ?? If it's not that Jo is in Boston if not at SuB, then he isn't at SuB. $\neg(\neg p \to q) \to p$
d. # If it's not that Jo is at SuB if not in Boston, then Jo is at SuB. $\neg(\neg q \to p) \to p$

The model laid out in this paper predicts all the sentences in (24) to be odd, for different reasons. (24a) turns out Q-REDUNDANT, because all the Qtrees it gives rise to are the same as the ones generated by its consequent $\neg p \to q$ (see Figure 7). Both (24b) and (24d) generate Qtrees that invariably display EMPTY FLAGGING–essentially because the "restrictor" nodes with which the consequent Qtree gets intersected, are sets of $\neg p$-worlds, contradicting the consequent. Lastly, (24c) represents a mixed case of oddness: most of the Qtrees it evokes display EMPTY FLAGGING, and one tree turns out Q-REDUNDANT due to the p-simplification of the sentence.

7. Conclusion and outlook

We presented novel data based on logical variants of $p \vee p \vee q$, that appeared challenging to account for while retaining classic results on other families of odd sentences, in particular Hurford Disjunctions and Conditionals. We proposed an account of this paradigm in the QuD-framework, based on the intuitive idea that sentences have to be good answer to good questions (Katzir and Singh, 2015), and that disjunctions and conditionals have distinct "inquisitive" contributions. In that framework, sentences compositionally evoke QuD-trees, and the interaction between sentences and evoked QuDs is evaluated to determine pragmatic oddness. This was shown to differ from Inquisitive Semantics in the sense that a sentence's "inquisitive" contribution is not meant to replace its truth-conditional meaning. Hénot-Mortier (to appear) and Hénot-Mortier (to appear) further extend this framework to capture Hurford Disjunctions and

[15]More specifically, a country-question will take the form of a partition of the CS according to countries, while a city-question may take the form of a"tiered" Qtree, whose first layer is a by-country partition, and whose second layer is a by-city partition, properly connected to the first layer.
[16](22) may seem reminiscent of Hurford Disjunctions (Hurford, 1974). It is worth mentioning that Hénot-Mortier (to appear) predicts Hurford Disjunctions to be odd in both orders, independently of the constraint in (23).

Conditionals, as well as some of their more complex variants. Beyond the data discussed, this framework suggests that oddness come in different "flavors" and that sentences may be odd due to a conspiration of these various factors. Future work, whether theoretical or experimental, will determine if these predictions indeed hold.

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