MIT Linguistics

Redundancy under Discussion[★]

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Puzzle

Data. Assuming material implication, **sentences (1-3) are logically equivalent, yet lead to distinct judgments**. This contrast cannot be captured by Local Contexts (Schlenker, 2009), or Local Redundancy (Katzir & Singh, 2014).

(1) # Either Ido is at SuB, or he is at SuB or he is in Boston. $\mathbf{p}\lor(\mathbf{p}\lor\mathbf{q})$

(2) # If Ido is not at SuB, then he is at SuB or he is in Boston. $\neg\mathbf{p}\rightarrow(\mathbf{p}\lor\mathbf{q})$

(3) Either Ido is at SuB, or if he is not at SuB then he is in Boston. $\mathbf{p}\lor(\neg\mathbf{p}\rightarrow\mathbf{q})$

Upshot. (1-3) evoke distinct QuDs (Roberts, 2012; Van Kuppevelt, 1995), because **disjunction makes both disjuncts at-issue while conditionals focus on the issue raised by the consequent, granted the antecedent**. This, plus a notion of QuD redundancy, captures the contrast.

Formal machinery: Qtrees

Following insights from Katzir and Singh (2015), **we propose a model to compositionally derive, from a Logical Form, the QuDs this LF can address. A sentence connected to no QuD is deemed odd.** Building on Büring (2003), Riester (2019), Onea (2019), and in particular Zhang (2024), we model QuDs as *parse trees* ("**Qtrees**") of the Context Set (**CS**, Stalnaker, 1974). T is a Qtree iff:

- T's nodes are sets of worlds (i.e. propositions) and its root denotes the CS;
- any of T's intermediate nodes is partitioned by its children.

Qtrees can receive the following interpretation:

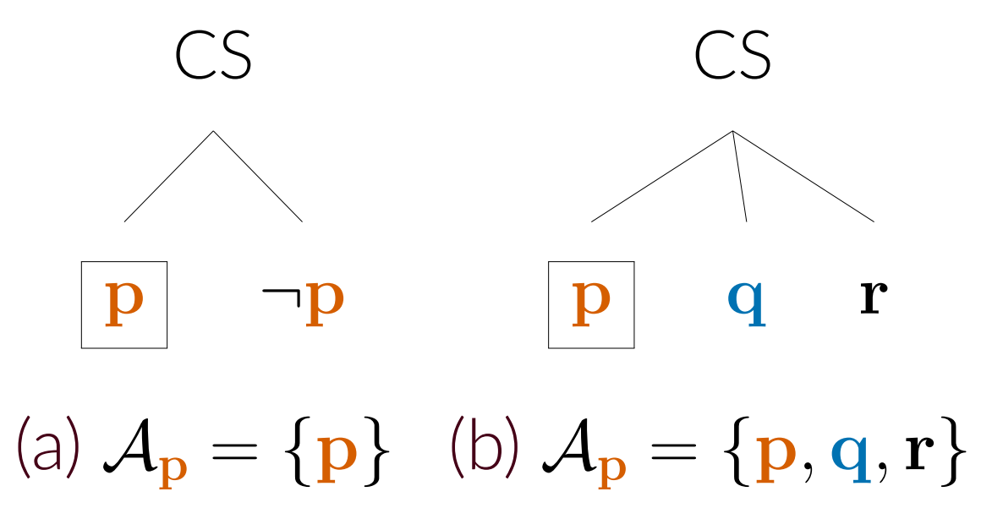
- Any set of same-level nodes covering the CS is a standard question in the sense of Hamblin (1973).
- A set of **verifying nodes**, defined inductively, keeps track of the answer provided by the utterance the Qtree is associated with. **Any path from the root to a verifying node represents a strategy of inquiry.**

Composing Qtrees

Simplex case. We assume $\mathbf{p}$, $\mathbf{q}$ and $\mathbf{r}$ are exclusive alternatives. Qtrees for $\mathbf{p}$ are given in Fig. (I). They are obtained by forming the Qtrees...

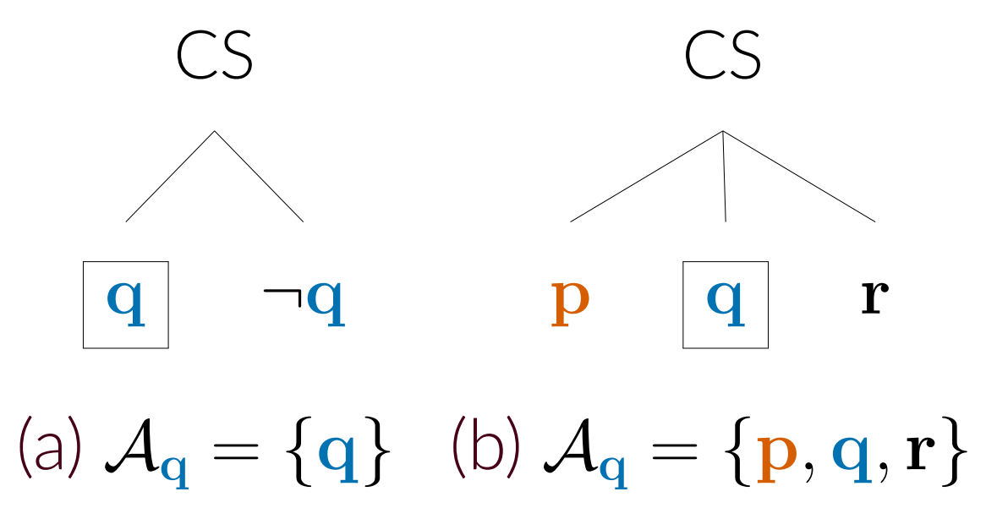
- whose leaves correspond to the Hamblin partition generated by possible alternatives to $\mathbf{p}$, $\mathcal{A}_{\mathbf{p}}$ – either just $\{\mathbf{p}\}$, or $\{\mathbf{p}, \mathbf{q}, \mathbf{r}\}$;
- whose verifying leaves (in $\boxed{\text{boxes}}$) are the $\mathbf{p}$-leaves.

Same is done for $\mathbf{q}$ in Fig. (II).



(a) $\mathcal{A}_{\mathbf{p}} = \{\mathbf{p}\}$ (b) $\mathcal{A}_{\mathbf{p}} = \{\mathbf{p}, \mathbf{q}, \mathbf{r}\}$

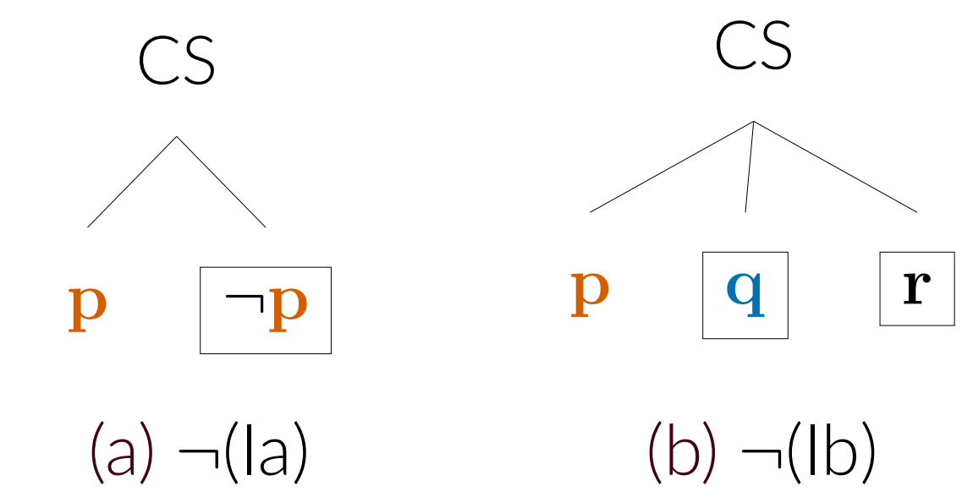
Fig. I. Qtrees for $\mathbf{p}$.



(a) $\mathcal{A}_{\mathbf{q}} = \{\mathbf{q}\}$ (b) $\mathcal{A}_{\mathbf{q}} = \{\mathbf{p}, \mathbf{q}, \mathbf{r}\}$

Fig. II. Qtrees for $\mathbf{q}$.

Negation. Qtrees for negated LFs (such as $\neg\mathbf{p}$) are given in Fig. (III). There are obtained by flipping the verifying nodes of the input Qtrees.



(a) ¬(Ia) (b) ¬(Ib)

Fig. III. Qtrees for $\neg\mathbf{p}$.

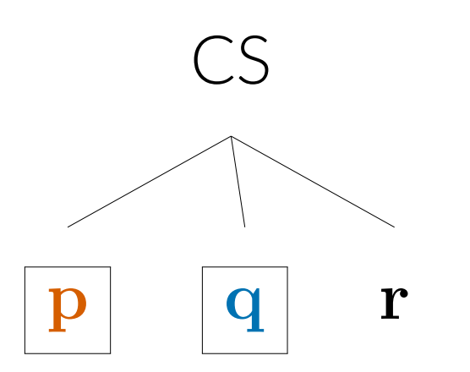


Fig. IV. Qtree for $\mathbf{p}\lor\mathbf{q}$, and also for $\mathbf{p}\lor(\mathbf{p}\lor\mathbf{q})$=(1).

Disjunction. $\lor$ **makes both disjuncts answer the same question in different ways** (Simons, 2001; Zhang, 2024). We take that $\lor$ returns all the well-formed (w.r.t. Qtreeness) unions of pairs of Qtrees coming from each disjunct; verifying nodes are also merged. This (commutative) operation imposes that the 2 disjuncts give rise to structurally parallel Qtrees (at least up to a certain depth). Fig. (IV) is the only Qtree for $\mathbf{p}\lor\mathbf{q}$, obtained by unioning (Ib) & (IIb). Unioning (IV) with (Ib) to form a Qtree for $\mathbf{p}\lor(\mathbf{p}\lor\mathbf{q})$=(1) returns again (IV).

Implication. **We take that $\rightarrow$ introduces a consequent-related question, in the domain(s) where the antecedent holds.** Thus, $\rightarrow$ returns all the possible Qtrees formed out of an antecedent Qtree whose verifying nodes (in dashed boxes) are replaced by their intersection with a consequent Qtree. Verifying nodes are inherited from the consequent Qtree used to form it. Qtrees for $\neg\mathbf{p}\rightarrow\mathbf{q}$, shown in Fig. (V) are formed by taking either (IIIa) or (IIIb) as antecedent Qtree, and intersecting the $\neg\mathbf{p}$ nodes with a Qtree for $\mathbf{q}$. Doing the same with the Qtree for $\mathbf{p}\lor\mathbf{q}$ (IV) instead, yields the same results, so Fig. (V) is also compatible with $\neg\mathbf{p}\rightarrow(\mathbf{p}\lor\mathbf{q})$=(2). Qtrees for $\mathbf{p}\lor(\neg\mathbf{p}\rightarrow\mathbf{q})$=(3), shown in Fig. (V), are obtained by disjoining the Qtrees for $\neg\mathbf{p}\rightarrow\mathbf{q}$ in (V) with those for $\mathbf{p}$ in (I).

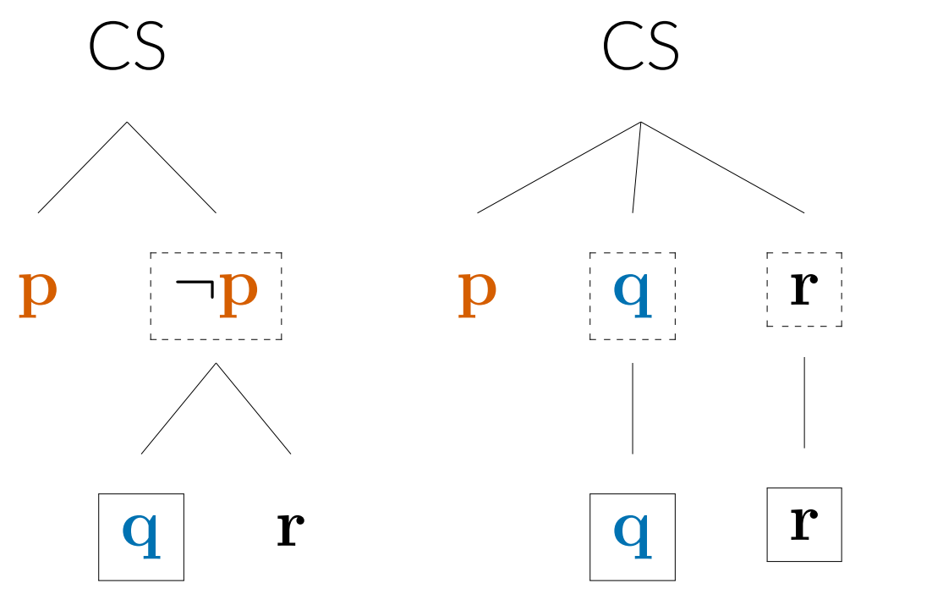


Fig. V. Qtrees for $\neg\mathbf{p}\rightarrow\mathbf{q}$, and also for $\neg\mathbf{p}\rightarrow(\mathbf{p}\lor\mathbf{q})$=(2).

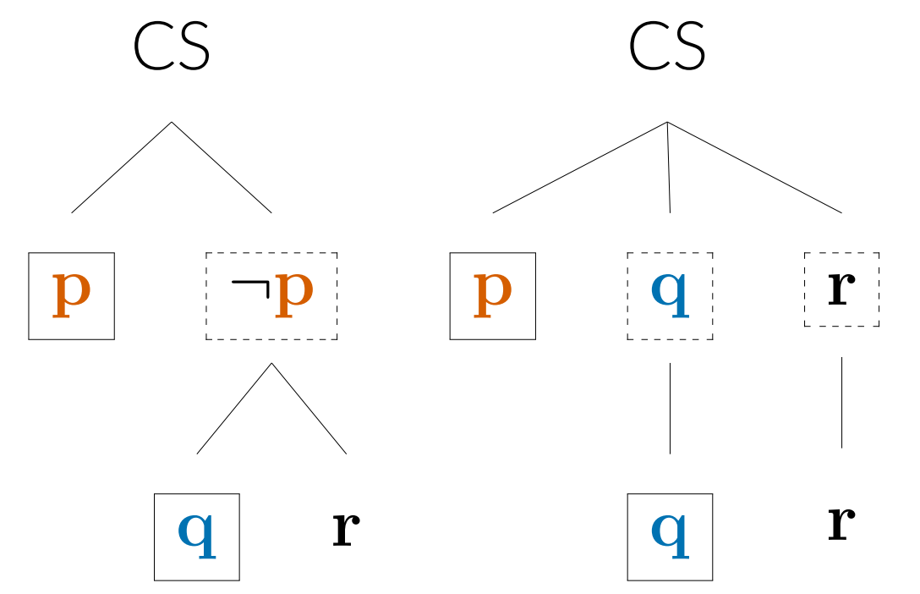


Fig. VI. Qtrees for $\mathbf{p}\lor(\neg\mathbf{p}\rightarrow\mathbf{q})$=(3).

QuD-driven REDUNDANCY

We suggest that (1) & (2) are odd, because **there exists a simplification of their LFs that yields equivalent Qtrees.**

(4) **Equivalent Qtrees (naive version)**: $T \equiv T'$ if T and T' have same structure and verifying nodes.

(5) **Equivalent Sets of Qtrees**: $S \leqq S'$ iff $\forall T \in S.\ \exists T' \in S'.\ T \equiv T'$ (note: it is an asymmetric relation!)

(6) **Q-Redundancy**: LF X is Q-Redundant iff there is a formal simplification X' of X obtained *via* constituent-to-subconstituent substitution, s.t. Qtrees(X) ≦ Qtrees(X').

This gets our target contrast: Fig. (IV) shows that **(1) is Q-Redundant with $\mathbf{p}\lor\mathbf{q}$**; and Fig. (V) that **(2) is Q-Redundant with $\neg\mathbf{p}\rightarrow\mathbf{q}$**. There is no plausible simplification of (3) (neither $\mathbf{p}\lor\mathbf{q}$ nor $\neg\mathbf{p}\rightarrow\mathbf{q}$) that yields Qtrees similar to those in Fig. (VI), so (3) is *not* Q-Redundant.

Interim conclusion. We devised a constrained, compositional model of disjunctive and conditional QuDs evoked by sentences, directly inspired from, and elaborating on Zhang (2024), which captures felicity contrasts between logically equivalent sentences.

Refining Q-REDUNDANCY

(7) is infelicitous, but its Qtree (VII) is not Q-Redundant. (8), a Hurford Disjunction (Hurford, 1974), is also problematic if we buy the idea that its stronger disjunct $\mathbf{s}^+$ is compatible with a layered Qtree involving a country-level (cf. Fig. (VIII)), and as such *can* be disjoined with the weaker disjunct to yield the non Q-Redundant Qtree in Fig. (IX).

(7) # Either Ido is at SuB, or if he is not in Boston then he is at SuB. $\mathbf{p}\lor(\neg\mathbf{q}\rightarrow\mathbf{p})$

(8) # Ido lives in the US or he lives in Boston. $\mathbf{s}\lor\mathbf{s}^+$

This calls for the a revision of Qtree Equivalence (4), in terms of **maximal verifying paths**.

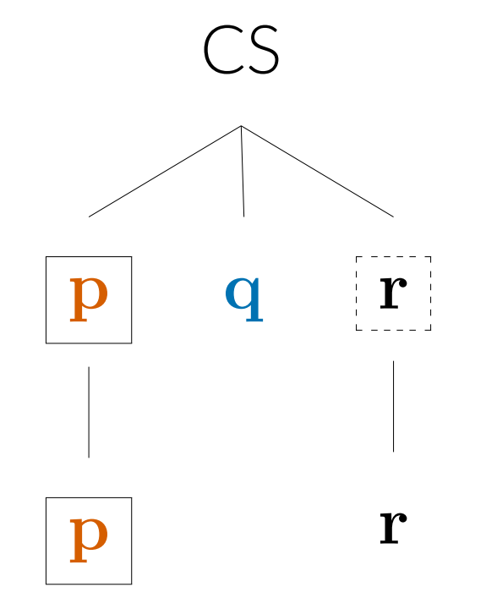


Fig. VII. Qtree for $\mathbf{p}\lor(\neg\mathbf{q}\rightarrow\mathbf{p})$=(7).

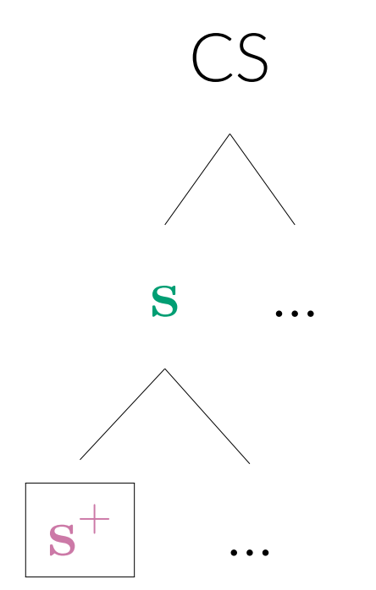


Fig. VIII. Qtree for $\mathbf{s}^+$ granted simplex sentences can lead to layered Qtrees.

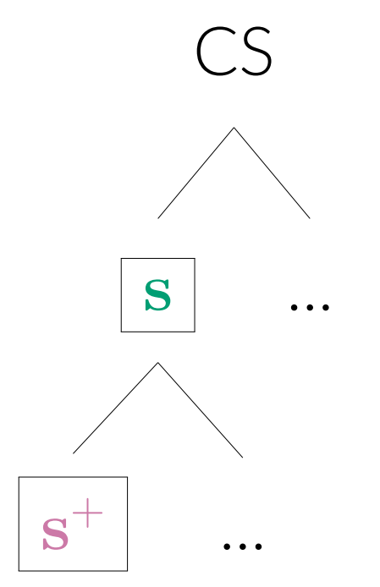


Fig. IX. Qtree for $\mathbf{s}\lor\mathbf{s}^+$=(8).

(4′) **Equivalent Qtrees (revised)**: $T \equiv T'$ iff $\mathcal{R}(T)$ and $\mathcal{R}(T')$ have same structure and maximal verifying paths.

(9) **Qtree reduction function $\mathcal{R}$**: collapsing all the only children in a Qtree, percolating the "verifying" property if needed.

(10) **Verifying paths**: set of paths (=ordered list of nodes) from the root to each verifying node.

(11) **Path containment**: $p \subseteq p'$ iff p is a prefix of p'.

(12) **Maximal Verifying Paths (P^*)**: if P is a set of verifying paths, P^* is the set of maximal elements of P w.r.t. path containment.

Given this, Tree (VII) gets reduced to (Ib) and has the same $P^* = \{[\text{CS}, \mathbf{p}]\}$, so is Q-Redundant with $\mathbf{p}$. Tree (IX) does not get reduced but has the same $P^* = \{[\text{CS}, \mathbf{s}, \mathbf{s}^+]\}$ as Tree (VIII), so is Q-Redundant with $\mathbf{s}^+$.

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References

Büring, D. (2003). On d-trees, beans, and b-accents. *Linguistics & Philosophy*, *26*(5), 511–545.

Ciardelli, I., Groenendijk, J., & Roelofsen, F. (2019). *Inquisitive semantics*. Oxford University Press.

Groenendijk, J., & Stokhof, M. (1984). *Studies in the semantics of questions and the pragmatics of answers* (Doctoral dissertation) [(Unpublished doctoral dissertation)]. University of Amsterdam.

Hamblin, C. L. (1973). Questions in montague english. *Foundations of Language*, *10*(1), 41–53.

Hurford, J. R. (1974). Exclusive or inclusive disjunction. *Foundations of language*, *11*(3), 409–411.

Karttunen, L. (1977). Syntax and semantics of questions. *Linguistics and Philosophy*, *1*(1), 3–44. https://doi.org/10.1007/bf00351935

Katzir, R., & Singh, R. (2014). Hurford's disjunctions: Embedded exhaustification and structural economy. In U. Etxeberria, A. Fălăuş, A. Irurtzun, & B. Leferman (Eds.), *Proceedings of sinn und bedeutung 18* (pp. 201–216).

Katzir, R., & Singh, R. (2015). Economy of structure and information: Oddness, questions, and answers. In E. Csipak & H. Zeijlstra (Eds.), *Proceedings of sinn und bedeutung 19* (pp. 322–339). Georg August Universität Göttingen.

Mandelkern, M., & Romoli, J. (2018). Hurford conditionals. *Journal of Semantics*, *35*(2), 357–367. https://doi.org/10.1093/jos/ffx022

Marty, P., & Romoli, J. (2022). Varieties of hurford disjunctions. *Semantics and Pragmatics*, *15*(3), 1–25. https://doi.org/10.3765/sp.15.3

Onea, E. (2016). *Potential questions at the semantics-pragmatics interface*. Brill.

Onea, E. (2019). Underneath rhetorical relations: The case of result. In *Questions in discourse* (pp. 194–250). BRILL. https://doi.org/10.1163/9789004378322_008

Riester, A. (2019). Constructing qud trees. In *Questions in discourse* (pp. 164–193). BRILL. https://doi.org/10.1163/9789004378322_007

Roberts, C. (2012). Information structure in discourse: Towards an integrated formal theory of pragmatics. *Semantics and Pragmatics*, *5*. https://doi.org/10.3765/sp.5.6

Rooth, M. (1992). A Theory of Focus Interpretation. *Natural Language Semantics*, *1*(1), 75–116. https://doi.org/10.1007/bf02342617

Schlenker, P. (2009). Local contexts. *Semantics and Pragmatics*, *2*. https://doi.org/10.3765/sp.2.3

Schoubye, A. J. (2009). Descriptions, truth value intuitions, and questions. *Linguistics and Philosophy*, *32*(6), 583–617. https://doi.org/10.1007/s10988-010-9069-y

Simons, M., Tonhauser, D., J.and Beaver, & Roberts, C. (2010). What projects and why. In D. Lutz & N. Li (Eds.).

Simons, M. (2001). Disjunction and alternativeness. *Linguistics and Philosophy*, *24*(5), 597–619. https://doi.org/10.1023/a:1017597811833

Stalnaker, R. (1974). Pragmatic presuppositions. In *Context and content* (pp. 47–62). Oxford University Press.

Van Kuppevelt, J. (1995). Main structure and side structure in discourse. *Linguistics*, *33*(4), 809–833. https://doi.org/10.1515/ling.1995.33.4.809

von Fintel, K. (2001). Conditional strengthening: A case study in implicature [Unpublished manuscript, MIT].

Wason, P. C. (1968). Reasoning about a rule. *Quarterly Journal of Experimental Psychology*, *20*(3), 273–281. https://doi.org/10.1080/14640746808400161

Westera, M. (2018). A pragmatic approach to hurford disjunctions.

Zhang, Y. (2024). A questions-under-discussion-based account of redundancy. *Unpublished manuscript.*

Zondervan, A., & Meroni, A., L.and Gualmini. (2008). Experiments on the role of the question under discussion for ambiguity resolution and implicature computation in adults. *Semantics and linguistic theory*, *18*, 765–777.