Matching overtly-headed XPs in Irish phrasing

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Irish phonological phrasing has been the subject of a number of analyses in recent years [2,3,4,5], which have been influential in shaping Match Theory [10]. A ranking paradox in Irish phrasing, noticed by [4], remains unsolved in the context of parallel OT [8]. We resolve it by adding a Match constraint that counts only overtly-headed XPs, alongside Elfner's Match-XP.

Irish: In Connemara Irish, a rising tone marks the left edge of some XPs, and a falling tone marks the right edge of many XPs (Table 1). Elfner [4] interprets this to mean that a rising tone marks the left edge of phonological phrases that are *non-minimal*—phrases that contain at least one other phonological phrase. While sentences like (a, c) receive a prosody that closely mirrors the syntax, others (b) receive a rebracketed prosody, with φs that do not correspond to any XP.

Table 1: Irish sentences (from Elfner 2012)

Syntax + Tones	Phrasing	Example sentence
a. [V [[N_S [A_S]] [N_O]] LH LH HL HL	(V ((N_S A_S) N_O))	díolfaidh rúnaí dathúil blathanna 'A handsome secretary will sell flowers.'
b. [V [[N_S] [N_O [A_O]]] LH HL — HL	((V N_S) (N_O A_O))	cheannaigh múinteoirí málaí bána 'Teachers bought white bags.'
c. [V [[N_S [A_S]] [N_O [A_O]]]] LH LH HL — HL	(V ((N_S A_S) (N_O A_O)))	díolfaidh leabharlannaí dathúil blathanna áille 'A handsome librarian will sell beautiful flowers.'

Puzzle: [4,5] analyzes the prosody of these sentences using MatchXP, Binarity, and StrongStart, and finds that (b) cannot occur under the same ranking as (c). We will show this for the OT system S1. S1 is defined by the constraints in (1) and the inputs in Table 1, with outputs that allow recursive φs but not unary φs (following [4]). We generated the complete typology for S1 (Table 2) using SPOT [1] and OTWorkplace [9]. As expected based on [4], ((V N_S) (N_O A_O)) and (V ((N_S A_S) (N_O A_O))) cannot occur together under the same ranking (2). This is because Match-φ and Match-XP must outrank StrongStart for the correct phrasing of V-NA-NA to win, but StrongStart must outrank them both for the correct phrasing for V-N-NA to prevail.

(1) **S1.CON**: Constraints from [4] (BinMax(φ), StrongStart, Match-XP) + Match-φ

Table 2: Typology for S1 (Irish phrasings in green)

	[V [[N_S [A_S]] [N_O]]]	[V [[N_S] [N_O [A_O]]]]	[V [[N_S [A_S]] [N_O [A_O]]]]
L1	(V N_S A_S N_O)	(V N_S (N_O A_O))	(V N_S A_S (N_O A_O))
L2	(((V N_S) A_S) N_O) ~ ((V N_S) (A_S N_O))	((V N_S) (N_O A_O))	(((V N_S) A_S) (N_O A_O))
L3	(V ((N_S A_S) N_O))	(V (N_S (N_O A_O)))	(V ((N_S A_S) (N_O A_O)))

(2) **Irish ranking paradox in S1**

Input	**Winner**	**Loser**	**M-XP**	**M-φ**	**BinMax**	**StSt**
[V [[N_S] [N_O [A_O]]]]	((V N_S) (N_O A_O))	(V (N_S (N_O A_O)))	$L_{3\sim2}$	$L_{1\sim0}$	$e_{0\sim0}$	$W_{0\sim2}$

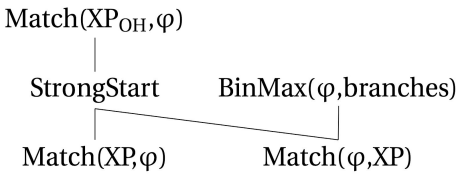
[V [[N_S [A_S]] [N_O [A_O]]]]	(V ((N_S A_S) (N_O A_O)))	(((V N_S) A_S) (N_O A_O))	$W_{2\sim4}$	$W_{0\sim2}$	$e_{0\sim0}$	$L_{1\sim0}$

Solution: To address this ranking paradox, we introduce the constraint Match-XP_{OH} (3), which ignores XPs whose heads are silent. The overt headedness condition is from the Lexical Category Condition [11]; see also [6, 7, 12]. Unlike [4]'s Match-XP, Match-XP_{OH} does not assign more violations to rebracketed ((V N_S) (N_O A_O)) than to faithful (V (N_S (N_O A_O))), since it ignores the silently-headed XP that contains [NNA] as its terminals (4). To verify that this solves the ranking paradox, we defined a new system S2 by adding MatchXP_{OH} to S1's CON. Unlike S1, S2's typology did contain a language with all three desired phrasings as optima.

(3) **Match($XP_{OvertlyHeaded}$,φ):** Assign one violation for every node of category XP in the syntactic tree such that XP is overtly headed and there is no node of category φ in the prosodic tree that dominates all and only the same terminal nodes as XP.

(4) MatchXP_{OH} solves the ranking paradox

Input	**Winner**	**Loser**	**M-XP_{OH}**	**SS**	**BinMax**	**M-XP**	**M-φ**
[V [$_{SH}$ [N_S] [N_O [A_O]]]]	((V N_S) (N_O A_O))	(V (N_S (N_O A_O)))	$e_{2\sim2}$	$W_{0\sim2}$	$e_{0\sim0}$	$L_{3\sim2}$	$L_{1\sim0}$
[V [$_{SH}$ [N_S [A_S]] [N_O [A_O]]]]	(V ((N_S A_S) (N_O A_O)))	(((V N_S) A_S) (N_O A_O))	$W_{2\sim3}$	$L_{1\sim0}$	$e_{0\sim0}$	$W_{2\sim4}$	$W_{0\sim2}$



(5) Ranking for Irish in S2 In the ranking for S2's Irish (5), Match$_{OH}$ outranks SS, meaning overtly headed XPs must be matched, even at the cost of a weak start. SS in turn outranks the regular Match-XP and Match-φ, just as in [4]'s constraint ranking (6), meaning silently headed XP will not be matched if matching would create a weak start. Unlike in (6), BinMax in (5) dominates only Match-φ only, not Match-XP or SS. That is, correspondentless φs will be inserted to avoid BinMax violations. [4] does not provide a ranking for Match-φ, although it plays a role in the ranking paradox, as shown in (2).

(6) Constraint ranking in [4]: BinMax >> StrongStart >> Match-XP

Conclusion: The ranking paradox of [4] is solvable in parallel OT if we extend the LCC into Match Theory. Previous uses of Match$_{OH}$ or Match$_{Lex}$ have treated the LCC as a language-wide parameter [7, 12]. Our analysis innovates in including multiple versions of Match within the same language. We also clarified the constraint interactions in Irish phrasing, using [1, 9].

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