

On the role of prosody in scope disambiguation

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Background and objective Prosody has been identified as one of the linguistic factors that can have a disambiguating effect on relative scope interpretation in otherwise scopally ambiguous sentences. A well-known case in point is the rising-falling intonation of sentences containing a left-peripheral quantifier phrase (QP) in languages like German and Hungarian (Krifka 1998). A common approach to these has been to derive the relevant scope-disambiguation effects from information structure (IS), rather than directly from prosodic properties (Ward 1985, Kadmon and Roberts 1986), by taking the inverse scope QPs at issue to be contrastive topics. In other cases the role of prosody in scope-disambiguation is more contested. In addition to relating it to IS, another option is to derive different scope readings along with observable differences in prosody from distinct surface syntactic structures (É. Kiss 1987, 2010). A further alternative is to posit a direct mapping between prosody and scope (Hunyadi 1999, 2002, Hirotsu 2004; Richards 2010). In this study we present three production experiments whose aim was to investigate the role of prosody and IS in the expression of scope in scopally ambiguous sentences in Hungarian.

Experiment 1 investigated the prosodic realization of two types of scopally ambiguous sentences, without context. Subexp.A involved doubly quantified sentences like (1) with a post-verbal universal quantifier ‘each’. Two schematic pictures were presented that depicted the two possible scopal readings of the target sentence. One of the two was highlighted. Participants’ (n=19) task was to utter the sentence on the highlighted reading in such a way that a potential listener could decide which one of the two readings was intended. Subexp.B involved sentences like (2), which contained a post-verbal existential indefinite and clausal negation. Participants’ task was identical to that in Subexp.A. In both subexperiments we analyzed the F0 midpoints (in semi-tones=STs) of the accented vowel in each accented word, using Linear Mixed Effects Models. The analysis revealed no differences between the realizations of the two interpretations in Subexp.A. In contrast, significant differences were found between the two readings in Subexp.B. On the surface narrow scope reading, both the indefinite and the verbal particle were realized with lower F0 than their wide scope counterparts, while no F0-difference was found on the negation marker (or on the sentence-final noun, realized with L%).

Experiment 2 was a production study involving the same doubly quantified sentences as in Subexp.1A, this time crossing Scope with IS Status as factors. The IS Status (GIVEN or FOCUS) of the universal QP was fixed by a context-setting dialogue, and its Scope interpretation (NARROW or WIDE) was controlled by a schematic picture. Speakers’ (n=8) recordings were analyzed using the method in Exp1. We found that IS status had a main effect, while Scope did not. Although an interaction was detected between the two factors, this was apparently caused by an arguably perceptually irrelevant difference between the two scope readings of the FOCUS condition that remains well below the level of a “Just Noticeable Difference” ($d < 1$ ST; JND=1.5–2 STs; ‘t Hart 1981).

Discussion In sum, no relevant intonational difference was found between the two scope interpretations of the doubly quantified sentences (1), neither without nor with context. This finding from production converges with Gyuris & Jackson’s (to app.) comparable result from perception. On the other hand, a clear difference emerged in the negated sentences (2). We argue that the latter prosodic distinction is not due directly to a scopal difference, but derives from speakers attributing two distinct focus structures to the two scope readings, taking the two interpretations to answer different Questions Under Discussion (QUD, Roberts 1998). A surface scope reading was generated when the QUD was taken to be “Did four printers break down?”, characterized by post-focal compression after negation. Inverse wide scope resulted from a QUD “What / How many printers didn’t break down?”, indicated by pitch reset on the numeral. The reason why distinct QUDs were posited in SubexpB but not in SubexpA is that negation is a focus sensitive operator (Beaver & Clark 2008). A syntactic alternative account of the prosodic difference in SubexpB is unavailable because the two scope interpretations do not have distinct overt syntax: existential indefinites do not move to their scope position in Hungarian (unlike universal QPs, É. Kiss 2002, 2010).

- (1) *Négy előadó is elénekelte mindegyik melódiát*
four singer DIST sang each melody
'Four singers sang each melody.' **a.** There are four singers who sang each melody.
b. For each melody it holds that it was sang by four singers.
- (2) *Nem romlott el négy nyomtató*
not broke PRT four printer
'Four printers did not break down.' **a.** It does not hold that four printers broke down.
b. For four printers it holds that they did not break down.

Conclusion Our results support the position (shared a.o. by Baltazani 2012, Luchkina & Inoin 2015) that prosody does not reflect scope interpretation directly: in the absence of a surface-syntactic difference, it is only via Information Structure that scope distinctions give rise to prosodic distinctions in the grammar.