How to ask complex questions in Polish: The role of discourse context

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To date, no research has investigated how Polish adults process complex questions that convey the same information as *who do you think Mary is meeting?* Some linguists[1,2] have argued that Polish has multi-clausal questions (MCQ) which consist of an initial *wh*-word that indicates the scope of a medial *wh*-word, and possibly a complementizer. Alternatively, apparent MCQs may be 2 sequential questions (SQ).[3] We conducted 2 experiments to investigate the phenomenon.

Judgment Experiment. Fourteen native Polish-speaking adults silently read stories designed to elicit complex questions. After each one, they used a 5-point scale to rate how well 6 types of questions "fit" the story. As shown in the example, the 6 types were SQs with *jak* or *co*, MCQs lacking a complementizer (MCQ-comp) with *jak* or *co* and MCQs with the complementizer *że* (MCQ+comp) and *jak* or *co*. In 20 of the stories, the answer to the embedded question was known to the speaker ("closed") and in 12 the answer was unknown to the speaker ("open").[4] Acceptability ratings with participant as a random factor were analyzed via Bayesian ANOVAs in JASP v.0.18.2. A 3 (question type) x 2 (Jak/Co) ANOVA revealed main effects of *jak/co* (with *jak* questions being rated higher, $BF_{inc} = 2.5x10^{+14}$) and question type ($BF_{inc} = 2.5x10^{+14}$). Post hoc comparisons revealed SQs were rated highest, then MCQ-comps, with MCQ+comps rated lowest (all $BF_{10} > 2x10^{+5}$). The two factors also interacted ($BF_{inc} = 398$, Fig 1): SQs and MCQ-comps with *jak* were rated higher than those with *co* (both $BF_{10} > 3x10^{+7}$), whereas there was no *jak/co* effect for MCQ+comps ($BF_{10} < 1$). To assess the role of discourse context, a 3 (question type) x 2 (open/closed context) ANOVA was performed. It revealed main effects of context (with open context questions being rated higher, $BF_{inc} = 5526$) and question type as described above ($BF_{inc} > 1x10^{+50}$), and an interaction between the two ($BF_{inc} = 9384.7$). This interaction was due to higher ratings after open contexts for SQs ($BF_{10} = 1308$) and MCQ-comps ($BF_{10} = 4.1$), whereas there was no context effect for MCQ+comps ($BF_{10} < 3$).

Free Response Experiment. The experiment was same as Exp.1, except 12 native Polish-speaking adults simply asked whatever question they thought fit best after each story. A total of 117 responses were potentially SQ or MCQ because they had two verbs and two *wh*-words. Because SQs and MCQs don't differ lexically, we examined whether they differed prosodically. A native Polish-speaker and 4 Polish-naïve researchers listened to each production and judged whether it was SQ or MCQ. The Fleiss's kappa for the 5 raters was .38 and classifications were based on majority decision. Utterances were analyzed in Praat v.6.3.09.[5] F0 was normalized by participant, and the prosodic contours depict the mean normalized F0 with error ribbons corresponding to 1 standard error. Questions classified as SQ (Fig 3) had an F0 peak at 1500ms consistent with the start of a second question, whereas the F0 of questions classified as MCQ (Fig 3) steadily declined, consistent with them being a single sentence. Questions asked after open contexts (Fig 4) also had an F0 peak at 1500ms indicating they are two questions, while the F0 of those after closed contexts (Fig 4) steadily declined indicating they are single sentences.

Discussion. Analyses of participants' ratings in the judgment study and the acoustic characteristics of questions participants produced in the free response study indicate that Polish uses both SQs and MCQs: when the discourse context is open, people ask SQs and when the discourse context is closed, they ask MCQs. Thus, the disagreement among linguists about the basic structure of Polish questions that are equivalent to English questions like *who do you think Mary is meeting?* largely reflects context-dependent alternatives. This is consistent with previous cross-linguistic work which shows participants preferred SQs following open contexts and MCQs following closed contexts.[6] Speakers must, therefore, be aware of the relevant context to use the appropriate construction. In other words, the social situation affects the syntactic form chosen. These findings highlight the importance of context in language processing and the pitfalls of studying sentences presented in isolation when making linguistic and psycholinguistic claims.

Example of 6 Types of Polish Questions (with English translations in parentheses)

a. SQ jak. *Jak myślisz? Kogo Janek przyprowadzi?* (How do you think? Who will Janek bring?)
b. SQ *co*: *Co myślisz? Kogo Janek przyprowadzi?* (What do you think? Who will Janek bring?)
c. MCQ-comp *jak*: *Jak myślisz, kogo Janek przyprowadzi?* (How do you think, who will Janek bring?)
d. MCQ-comp *co*: *Co myślisz, kogo Janek przyprowadzi?* (What do you think, who will Janek bring?)
e. MCQ+comp *jak*: *Jak myślisz, że kogo Janek przyprowadzi?* (How do you think, that who will Janek bring?)
f. MCQ+comp *co*: *Co myślisz, że kogo Janek przyprowadzi*? (What do you think, that who will Janek bring?)

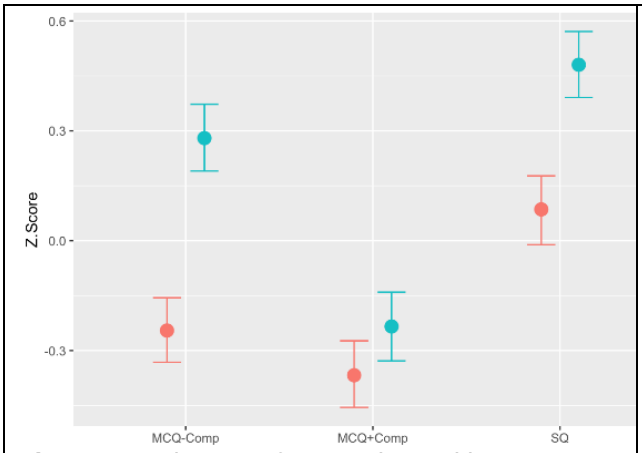

Figure 1. Judgments for questions with *co* (salmon) and *jak* (teal).

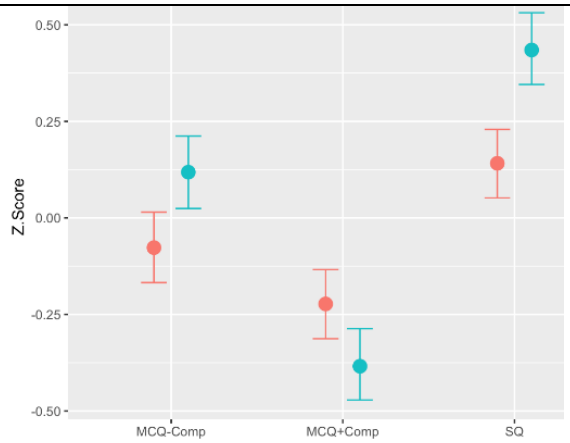

Figure 2. Judgments for questions said after closed (salmon) and open (teal) contexts

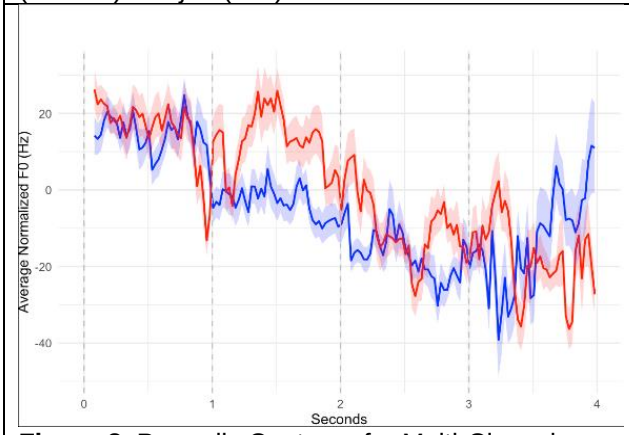

Figure 3. Prosodic Contours for Multi-Clausal Questions (blue) and Sequential Questions (red).

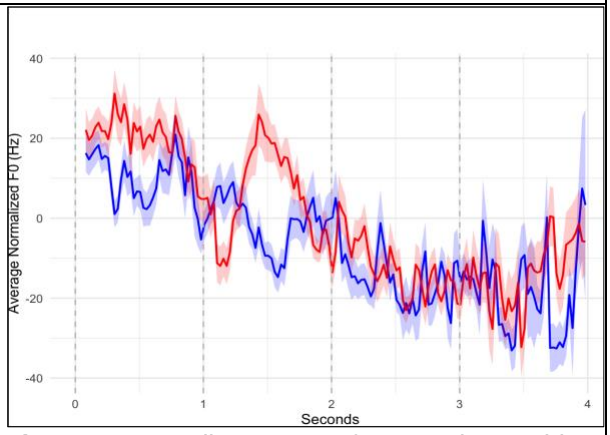

Figure 4. Prosodic Contours for Questions said after Closed (blue) and Open Contexts (red)

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