

Is Multiple Fronting Necessary for Multiple Sluicing? The View from Hungarian

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1. Introduction

Hungarian multiple sluicing has been claimed to only be allowed in contexts that set up a pair-list, but not a single-pair reading. This has been taken as evidence that multiple sluicing is derived from multiple wh-fronting questions, which only license pair-list, but not single-pair answers. Providing novel experimental evidence, we show that all three relevant constructions in Hungarian—multiple sluicing, single wh-fronting questions, and multiple wh-fronting questions—in fact pattern alike in their answerhood conditions: there is a uniform preference for single-pair readings. Additionally, multiple sluicing occupies the middle ground between the two kinds of questions in terms of its preferred interpretation. We thus argue that answerhood conditions are not sufficient to determine the source of multiple sluicing.

The structure of this paper is as follows. Section 2 provides a brief background on Hungarian multiple wh-questions and multiple sluicing (Section 2.1), as well as their possible interpretations (Section 2.2). Section 3 reports on the acceptability judgement experiment we conducted, and Section 4 describes the forced choice experiment. Section 5 discusses the results of the two experiments, and Section 6 concludes.

2. Background

2.1. Multiple wh-questions and multiple sluicing in Hungarian

Multiple sluicing, i.e. ellipsis with more than one wh-phrase remnant, is allowed in Hungarian, as the example in (1) shows¹:

- (1) Valaki meghívott valakit, de nem tudom ki kit.
someone invited someone.ACC but not know.I who.NOM who.ACC
'Someone invited someone, but I don't know who whom.'

As for multiple wh-questions, they either display single wh-fronting, as in (2-a), or multiple wh-fronting, as in (2-b):

- (2) a. Ki hívott meg kit? SINGLE WH-FRONTING
who.NOM invited PRT who.ACC
Literal: 'Who invited whom?'

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¹ The examples are glossed in accordance with the Leipzig conventions, and all examples from the literature cited have been adapted accordingly.

- b. Ki kit hívott meg? MULTIPLE WH-FRONTING
 who.NOM who.ACC invited PRT
 Literal: ‘Who whom invited?’

We take as our starting point that an ellipsis site contains structure that is deleted or left unpronounced (Merchant, 2018), and furthermore that the ellipsis site is an isomorphic wh-question. Given that both single wh-fronting (2-a) and multiple wh-fronting (2-b) questions are available in Hungarian, multiple sluicing could in principle be derived from either of them. Our main goal in this paper is to adjudicate between these two sources, illustrated in Structures A and B below:

- (3) a. Valaki meghívott valakit, de nem tudom, ...
 someone invited someone.ACC but not I.know
 ‘Someone invited someone. But I don’t know...’
 Structure A: ... ki hívott meg kit. SINGLE WH-FRONTING
 who.NOM invited PRT who.ACC
 ‘... who whom.’
 Structure B: ... ki kit hívott meg. MULTIPLE WH-FRONTING
 who.NOM who.ACC invited PRT
 ‘... who whom.’

In this paper, we report on two experiments testing the interpretation of single and multiple wh-fronting questions, as well as the interpretation of multiple sluicing. Assuming that the interpretation of a sluice should match the interpretation of its (non-elliptical) source, we should find that the interpretation of multiple sluicing patterns like that of either single or multiple wh-fronting questions.

2.2. *The interpretation of multiple questions and multiple sluicing in Hungarian*

It has been claimed (i.a. Tancredi, 1992) that the properties of non-elliptical sentences should predict the properties of elliptical ones. For instance, Merchant (2001) shows that languages that allow multiple wh-movement also allow multiple sluicing (e.g. Bulgarian, Hungarian, Polish, and Russian)—though this of course does not mean that only languages that allow multiple wh-movement allow multiple sluicing. This correlation has been extended to the possible interpretations that these structures have. For instance, van Craenenbroeck & Lipták (2013) claim that the interpretations of multiple sluicing in Hungarian are the same as those of multiple wh-fronting questions. According to them, this is evidence that multiple sluicing is derived from multiple wh-fronting questions. That is, if multiple sluicing questions have the same interpretation as multiple wh-fronting multiple questions, but not as single wh-fronting multiple questions, then the former must be the source for the elliptical construction.

However, there has been some disagreement in the existing literature on Hungarian regarding the available interpretations, which, along with some possible confounding factors in the examples provided, complicate the proposed parallelism between elliptical structures and their non-elliptical counterparts. In what follows, we review the relevant claims reported in prior work.

Multiple questions can elicit two types of answers: (a) ‘single-pair’ answers provide a unique pair of individuals, and (b) ‘pair-list’ answers provide multiple pairs of individuals. According to É. Kiss (2002), Hungarian single wh-fronting questions must have a single-pair answer, as shown in (4), and multiple wh-fronting questions must have a pair-list answer, as shown in (5)—the interpretation of each question is given by the possible answer to it:

- (4) A: János kit mutatott be kinek? (É. Kiss, 2002, ex. 68)
 John who.ACC introduced PRT who.to
 ‘Who did John introduce to whom?’
 B: Pétert mutatta be Marinak.
 Peter.ACC introduced PRT Mary.to
 ‘He introduced Peter to Mary.’
 (5) A: János kit kinek mutatott be? (É. Kiss, 2002, ex. 69)
 John who.ACC who.to introduced PRT
 ‘Who did John introduce to whom?’

B: Pétert Marinak és Évának, Zoltánt Évának és Júliának, Istvánt pedig Peter.ACC Mary.to and Eva.to Zoltan.ACC Eva.to and Julia.to Istvan.ACC and Júliának és Marinak mutatta be.
 Julia.to and Mary.to introduced PRT
 'He introduced Peter to Mary and Eva, Zoltan to Eva and Julia, and Istvan to Julia and Mary.'

Contrasting with É. Kiss's judgements, Surányi (2006) claims that single wh-fronting questions license both a pair-list and a single-pair answer, as (6) shows. However, he shares É. Kiss's judgement that multiple wh-fronting questions must have a pair-list answer, as in (7):

(6) A: Ki nézett rá kire? (Surányi, 2006, ex. 28)
 who looked PRT who.on
 'Who looked at who?'

B: János nézett rá Marira, Pali Gabira,...
 John looked PRT Mary.on Paul Gaby.on
 'John looked at Mary, Paul looked at Gaby, ...'

B': János nézett rá Marira.
 John looked PRT Mary.on
 'John looked at Mary.'

(7) A: Ki melyik tárgyat tanítja? (Surányi, 2006, ex. 27)
 who which subject.ACC teaches
 'Who teaches which subject?'

B: Pál a szintaxist tanítja, Márk a szintaxist és a morfológiát,...
 Paul the syntax.ACC teaches Mark the syntax.ACC and the morphology.ACC
 'Paul teaches syntax, Mark teaches syntax and morphology, ...'

B': #Pál a szintaxist tanítja.
 Paul the syntax.ACC teaches
 'Paul teaches syntax.'

Finally, van Craenenbroeck & Lipták (2013) agree with the previous authors: multiple wh-fronting questions must have a pair-list answer, as the paraphrases to the question in example (8) illustrate (see also É. Kiss, 1993):

(8) Ki kinek hagyott egy üzenetet? (van Craenenbroeck & Lipták, 2013, ex. 66)
 who who.to left a message.ACC
 'Who left a message for whom?'

- a. Everyone left a message for someone. I wonder who each person left a message for.
- b. *A single person left a message for someone. I wonder who the person was and for whom he left a message.

Crucially, according to van Craenenbroeck & Lipták, multiple sluicing is only compatible with a pair-list interpretation (9), promoted by *mindenki* 'everyone' in their examples (see also Nishigauchi (1998) for similar examples in Japanese and Merchant (2001) for similar examples in English):

- (9) a. Mindenki hagyott egy üzenetet valakinek. Nem tudom, hogy ki kinek.
 everyone left a message.ACC someone.to not I.know that who who.to
 'Everyone left a message for someone. I don't know who for whom.'
 - b. *Valaki hagyott egy üzenetet valakinek. Nem tudom, hogy ki kinek.
 someone left a message.ACC someone.to not I.know that who who.to
 'Someone left a message for someone. I don't know who for whom.'
- (van Craenenbroeck & Lipták, 2013, ex. 67-68)

Following the assumption that there is a strict parallel between elliptical constructions and their non-elliptical counterparts, van Craenenbroeck & Lipták claim that multiple sluicing must be derived from multiple wh-fronting.

To sum up, there is disagreement in the literature regarding the interpretations of single wh-fronting

multiple questions, viz. whether they license only a single-pair reading, or both single-pair and pair-list readings. With respect to multiple wh-fronting multiple questions, existing literature agrees that they allow only pair-list readings. Finally, multiple sluicing has been claimed to only be allowed with a pair-list interpretation. No previous work has, to our knowledge, reported explicit judgements on all three relevant constructions. The table in (10) summarizes the existing claims:

(10) Summary of existing claims regarding the available interpretations in Hungarian multiple sluicing and multiple questions

	É. Kiss (2002)	Surányi (2006)	van Craenenbroeck & Lipták (2013)
multiple wh-fronting	pair-list reading	pair-list reading	pair-list reading
single wh-fronting	single-pair reading	single-pair reading & pair-list reading	-
multiple sluicing	-	-	pair-list reading

It is important to note that none of the reported judgements have been subjected to rigorous experimental testing. Additionally, the examples provided in prior work did not always come in minimal pairs, which may have contributed confounding factors, calling into question the universality of the reported judgements. Some of these possibly confounding factors are (i) the use of D-linked wh-phrases (e.g. *which NP*) versus the use of non-D-linked wh-phrases (e.g. *who*) (see examples (6)-(7)), (ii) the use of transitive and ditransitive verbs (see examples (4)-(5) on the one hand, and examples (6)-(7) on the other hand), (iii) the presence or absence of a verb in the answer, (iv) the different available positions of the verb in the answer (Verb-Object versus Object-Verb), and (v) the presence or absence of a verbal particle, which in Hungarian indexes focus movement.

3. Experiment 1: acceptability rating

As mentioned before, the relevant judgements reported in existing literature and reviewed above have not been subjected to rigorous experimental testing. In Experiment 1, we report on an acceptability judgement study testing the interpretations of Hungarian multiple sluicing and multiple questions.

3.1. Participants

45 native speakers of Hungarian, recruited on social media, participated in the experiment, which was administered on the Ibex platform (Drummond, 2007). Participants were compensated 1000 HUF or €3.

3.2. Task, materials and procedure

Participants saw dialogues such as the one in (11), and had to rate on a 1-7 Likert scale how acceptable an single-pair or pair-list answer (i.e. B's answer) is to the relevant question (i.e. A's question). This methodology has been used successfully to test the answerhood conditions of questions in English (see i.a. Achimova et al., 2013).

- (11) A: {Valaki / Mindenki} meghívott valakit. Tudod, hogy...
 {Someone / Everyone} PRT.invited someone.ACC you.know that...
 a. ... ki kit?
 who who.ACC
 b. ... ki hívott meg kit?
 who invited PRT who.ACC
 c. ... ki kit hívott meg?
 who who.ACC invited PRT
 'Someone/Everyone invited someone. Do you know who (invited) who?'

B: {Mari Jánost. / Mari Jánost. Péter Zsuzsit. Ádám pedig Évát.}
 Mary John.ACC / Mary John.ACC Peter Susie.ACC Adam and Eva.ACC

The experiment had a 3×2 design: we tested three Constructions (multiple sluicing—11a, single wh-fronting questions—11b, multiple wh-fronting questions—11c) in two different Readings (single-pair and pair-list). Readings were promoted by a preceding sentence (*Someone...* for single-pair and *Everyone...* for pair-list), as well as, importantly, by a matching explicit single-pair/pair-list answer given in a dialogue context. Experimental items were identical to (11) in the following respects: verbs assigned the accusative case, verbs included a verbal particle (signalling focus movement, É. Kiss, 2002), and answers did not include the verb. The decision not to include the verb was motivated by the following: an SOV answer would have paralleled, and therefore biased toward, a multiple wh-fronting question, while an SVO answer would have paralleled and biased toward a single wh-fronting one.

Before the start of the experiment, 3 practice trials were included to familiarize participants with the task. Each participant saw 18 experimental trials, administered in a Latin Square design, as well as 30 filler trials. Three types of fillers were included: good fillers, where the answer was an unambiguously good one (e.g. Q: *Today's exam was really hard. Did everyone fail?* A: *No, two people passed.*); bad fillers, where the answer clearly did not address the question (e.g. Q: *Every child went skiing in February. Do you know where?* A: *Over Christmas.*); and medium fillers, where the answer given was a partial answer (e.g. Q: *Oh my God, there isn't any cake left! Which girls ate it?* A: *Mary.*).

3.3. Results and discussion

Figure 1 shows the results of Experiment 1: mean acceptability ratings for single-pair/pair-list answers as potential responses to the three relevant constructions. For the statistical analysis, a linear mixed effects model (lmer from the lme4 package in R, Bates et al., 2015) was fit, predicting Ratings by Reading (single-pair vs. pair-list), Construction (multiple sluicing vs. single wh-fronting questions vs. multiple wh-fronting questions) and their interaction. The model included the maximal random effects structure supported by the data (Barr et al., 2013). Likelihood ratio tests were conducted between mixed effects models that differed in the presence or absence of the fixed effect Reading, the fixed effect Construction, or their interaction. We found a significant effect of Reading ($\chi^2 = 59.11, df = 1, p < 0.001$), while Construction ($\chi^2 = 0.57, df = 2, p = 0.75$) and the interaction ($\chi^2 = 1.58, df = 2, p = 0.45$) were not significant.

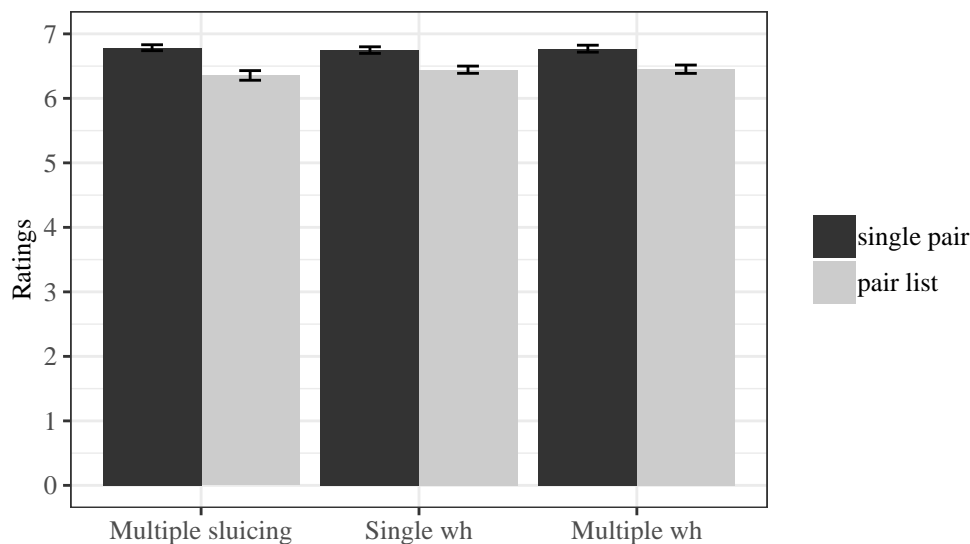


Figure 1: Mean acceptability ratings in Experiment 1. Error bars represent standard error.

As can be seen Figure 1, all conditions received high acceptability ratings across the board, despite

previous literature uniformly claiming that multiple sluicing and multiple wh-fronting questions do not license single-pair readings. Crucially, however, we also observed differences between the acceptability of single-pair and pair-list answers. In particular, single-pair answers were rated higher than pair-list answers for all constructions.

It should be noted that the overall high ratings are not due to participants' inability to do the task: bad fillers received low ratings (mean=1.59), while good fillers received high ratings (mean=6.75), suggesting that participants were able to determine whether an answer was an acceptable answer to a given question, and yet gave high ratings to all our critical stimuli sentences.

4. Experiment 2: forced choice

As we have seen, the findings of Experiment 1 did not align with judgements reported in existing theoretical work. To test whether the reported judgements are better understood as reflecting preferences rather than (un)available interpretations, Experiment 2 utilized a forced choice task. For instance, it is possible that single-pair readings are not unavailable with multiple sluicing, but are instead merely dispreferred as compared to pair-list readings. If this is the case, the findings of Experiment 2 should better align with judgements reported in the literature.

4.1. Participants

39 native speakers of Hungarian, recruited on social media, participated in the experiment, which was administered on the Ibex platform (Drummond, 2007). Participants were compensated 1000 HUF or €3.

4.2. Task, materials and procedure

Experiment 2 was a forced choice task: participants again saw dialogues such as the one in (12), but this time their task was to choose between a single-pair and a pair-list answer (i.e. B's answer) in response to a question (i.e. A's question).

- (12) A: Valaki, vagy valakik meghívtak valakit. Tudod, hogy...
 Someone.SG or someone.PL PRT.invited someone.ACC you.know that...
 a. ... ki kit?
 who who.ACC
 b. ... ki hívott meg kit?
 who invited PRT who.ACC
 c. ... ki kit hívott meg?
 who who.ACC invited PRT
 'Someone, or some people invited someone. Do you know who (invited) who?'
 B: {Mari Jánost. / Mari Jánost, Péter Zsuzsit, Ádám pedig Évát.}
 Mary John.ACC / Mary John.ACC Peter Susie.ACC Adam and Eva.ACC

Again, we manipulated the type of construction that the question contained: multiple sluicing (12a), single wh-fronting questions (12b), multiple wh-fronting questions (12c). The preceding context sentence was modified to allow for both single-pair and pair-list readings ("Someone.SG or Someone.PL invited..."). Experimental items were identical to those used in Experiment 1, with the only difference being in the preceding context sentence.

Before the start of the experiment, 3 practice trials were included to familiarize participants with the task. Each participant saw 18 experimental trials, administered in a Latin Square design, as well as 30 filler trials. Three types of fillers were included: questions where one potential answer was good and one was bad (e.g. Q: *There were lots of things in the mail today. Who wrote a letter to Fanni?* A1: *David.* A2: *Yesterday.*); questions where both answers were potentially good answers (e.g. Q: *I had ice cream yesterday. Guess which flavor!* A1: *Maybe vanilla.* A2: *Maybe vanilla and chocolate.*); and questions where both answers were good, but the choice potentially depended on interpretation (e.g. Q: *Oh my God, there isn't any cake left! Which girl or which girls ate it?* A1: *Mary.* A2: *Mary and Susan.*).

4.3. Results and discussion

Figure 2 shows the percentage of single-pair answers being chosen for each construction type in Experiment 2. For the statistical analysis, a logistic mixed effects model (lmer from the lme4 package in R, Bates et al. 2015) was fit, predicting Response (single-pair vs. pair-list) by Construction (multiple sluicing vs. single wh-fronting questions vs. multiple wh-fronting questions). Because our main prediction concerns the difference between multiple sluicing and the two non-elliptical question types, levels within the Construction variable were treatment coded, with multiple sluicing serving as the reference level. The model included the maximal random effects structure supported by the data (Barr et al., 2013). Neither single wh-fronting questions ($\beta = 0.32, z = 1.28, p = 0.2$), nor multiple wh-fronting questions ($\beta = -0.39, z = -1.6, p = 0.1$) were found to differ significantly from multiple sluicing. However, an additional pair comparison between the two non-elliptical questions revealed a significant difference ($\beta = -0.71, z = -2.85, p < 0.01$): single wh-fronting questions led to significantly more single-pair answers than multiple wh-fronting questions.

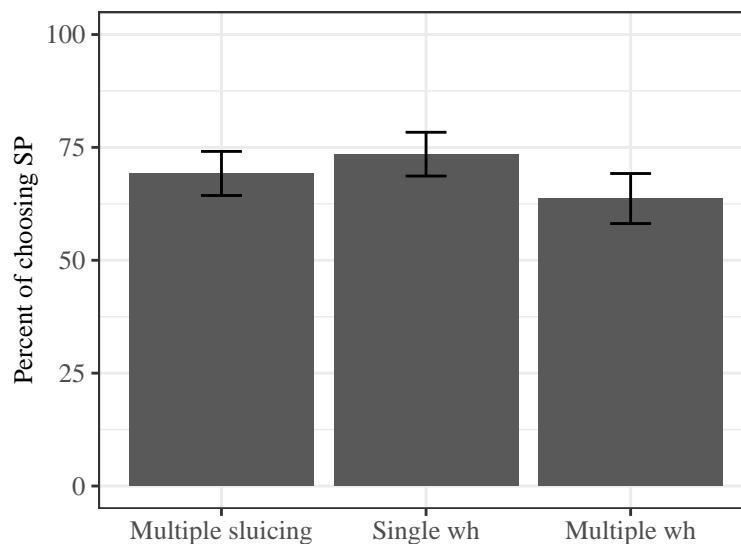


Figure 2: Percent of choosing single-pair answers in Experiment 2. Error bars represent standard error.

In Experiment 2, just like in Experiment 1, all three constructions patterned alike in showing a preference for single-pair answers; the single-pair answer was chosen at a rate above 50% for all constructions. Additionally, we see that multiple sluicing does not clearly align with either type of non-elliptical question in how strong the single-pair preference is. Altogether, neither experiment's results are in line with the claims made in existing literature regarding the availability of single-pair and pair-list readings in the three relevant constructions.

5. General discussion: optionality of sources

To reiterate, previously reported judgements regarding the interpretations of multiple sluicing and single- and multiple wh-fronting questions in Hungarian were not confirmed by our findings. Specifically, existing literature uniformly claims that multiple sluicing and multiple wh-fronting questions are only compatible with pair-list readings, but this was not borne out in our experimental data. The question arises whether dialectal variation might explain the discrepancy between our findings and judgements from the literature; however, we did not find any evidence for there being distinct dialectal (or other) groups in either experiment.

Instead, we found that Hungarian multiple sluicing, single wh-fronting questions, and multiple wh-fronting questions pattern alike with respect to their answerhood conditions: single-pair answers are preferred over pair-list ones across the board, though both answer types are generally available.

Additionally, Experiment 2 revealed that multiple sluicing does not clearly align with either type of question in the strength of the preference for a single-pair interpretation; rather, it is in between the two types of questions. This raises the possibility that multiple sluicing represents a middle ground when it comes to interpretation, which in turn might suggest that both kinds of questions are available as its source.

These findings complicate our view of the syntax of multiple sluicing in Hungarian. Assuming that properties of non-elliptical sentences predict properties of elliptical ones, there is no reason, in principle, to prefer analyzing multiple sluicing as deriving from either type of multiple wh-question. We provide the syntax for this potential optionality of sources in (13).

- (13) Valaki/Mindenki meghívott valakit. De nem tudom, ki kit.
 someone/everyone invited someone.ACC but not I.know who.NOM who.ACC
 ‘Someone/Everyone invited someone. But I don’t know who whom.’
- a. ... De nem tudom, ki kit [C hívott meg]. → move-and-delete approach
 ... but not I.know who.NOM who.ACC invited PRT
- b. ... De nem tudom, ki [C hívott meg [kit]_F]. → in-situ approach
 ... but not I.know who.NOM invited PRT who.ACC

Example (13-a) is the structure representing the scenario where multiple sluicing is derived from multiple wh-fronting questions. This can be captured under the move-and-delete approach to ellipsis, which posits that both wh-phrases are moved, and thus both escape deletion, which targets the complement of C (i.a. Merchant, 2001; van Craenenbroeck & Lipták, 2013). On the other hand, if multiple sluicing is derived from single wh-fronting questions, that structure points to an in-situ approach to ellipsis, where one of the wh-phrases escapes deletion without needing to move (i.a. Abe, 2015, 2016), as shown in (13-b).

6. Conclusion

Claims about the answerhood conditions of Hungarian multiple sluicing and single/multiple wh-fronting questions have been made on the basis of heterogeneous examples. Our novel experimental data suggests that in fact all relevant structures pattern alike in that they license both single-pair and pair-list answers, with a preference for single-pair. However, multiple sluicing is in between the two types of questions in terms of how strong a preference it has for single-pair. Therefore, answerhood conditions cannot distinguish between the two possible sources for the ellipsis site in multiple sluicing, and they therefore do not provide evidence for multiple sluicing deriving from multiple wh-fronting.

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