On the semantics of multiple wh-exclamatives in Bangla

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Introduction. Although exclamatives are studied since Elliott (1974), Grimshaw (1979), and the study has been cross-linguistically extended to Paduan (Zanuttini & Portner, 2003), Hungarian (Lipták, 2005), Catalan (Villalba, 2001; Miró, 2006) and so on, the phenomenon of multiple wh-exclamative structures is rarely cited. This paper aims to cite and propose a unified syntacto-semantic analysis for multiple wh-exclamatives, with a focus on Bangla (*aka.* Bengali; Indo-Aryan). On the onset of analysing wh-exclamatives there are two dominating approaches *viz. the proposition-set theory* approach (D'Avis, 2002; Zanuttini & Portner, 2003; Chernilovskaya, 2010) that views wh-exclamatives as having a question based semantics, and *the degree approach* (Miró, 2006; Rett, 2008, 2011) that claims wh-exclamatives bear a degree component in its domain which is responsible for the surprising element of the clause. The degree approach (Rett, 2008, 2011) on wh-exclamatives rejects the idea of exclamatives with multiple wh-clauses. However, this paper shows cross-linguistic evidences in favor of multiple wh-exclamative clauses, and while analysing them we embrace the *widening* approach by Zanuttini & Portner (2003) (ZP, henceforth).

Observing the multiple wh-exclamatives. While English wh-exclamatives are restricted to '*what-a*', '*what*' and '*how*'- exclamatives, Bangla is flexible. It allows a wide range of wh-words to form exclamatives. Therefore, Bangla exhibits a long list of different combination in forming multiple wh-exclamative clauses, a few of which are cited below:

(1) *kon   loke   kothae gache!*
    which people where go.PRF.PRS.3
    'Who went where!'

(2) *kara   kishob khacche!*
    who.PL what.PL eat.PROG.3
    'Who(pl) are eating what(pl)!'

(3) *koto   loke   koto   khawar*
    how many people how much food
    khacche!
    eat.PROG.PRS.3
    'How much food how many people are eating!'

(4) *ki   baje ekta bari   koto*
    what bad one house how much
    daam-e bikocche!
    price-at sell.PROG.PRS.3
    'What a bad house is being sold at how much price!'

Let us explain the contexts in which the above sentences can be uttered. (1) expresses speaker's surprise at the unexpectedness of someone visiting some place. (2) is felicitous where the phenomenon of some people having some food is itself unexpected. (3) expresses speaker's surprise towards a situation with a large number of people eating a large quantity of food. And in (4), the speaker is surprised that a terribly bad house is being sold at a high price. Our aim is to provide a suitable formal explanation for these exclamative structures.

Modification of ZP's widening. Since Bangla shows a variety of wh-exclamative structures, the existing widening approach cannot account for all. As pointed out by Balusu (2019), the ZP account is based on Karttunen's (1977) set of true answers. Hence, in ZP's account the domain 1 or D_1 cannot undergo widening with respect to a data like, *Rishi kake biye koreche!* 'Intended: You won't believe whom Rishi married!'. Suppose the alternatives denoted by *kake* 'whom' are {Kavya, Ruhi, Arushi} and the true answer is {Kavya}. Since the initial domain already has the true answer (here, Kavya), the widening from D_1 to D_2 collapses ($D_2 - D_1 =$???). Another problem occurs along the line of ZP (as per which, widening acts on wh-operators) while we try to formulate an ordering scale for wh-words like *kake* 'whom', *kothae* 'where' that are particularly non-scalar. To resolve these two problems, we base our analysis on Balusu's (2019) rendition of widening which acts over set of propositions, but not on wh-words. Balusu suggested that instead of following Karttunen alternatives (*i.e.*, set of *true* answers) if we follow Hamblin (1973) alternatives (*i.e.*, set of *possible* answers), the widening account works uniformly for all readings of exclamative clauses. Working out on the second problem, he used the notion of *Expectation Set* (ES) (cf. Rett, 2011; Rett & Murray, 2013) which encodes speaker's expectations as sets of possible worlds. Now, the widening

acts on the entire wh-clause. As per Balusu, for any exclamative clause S widen the initial domain ES to a new domain D_2 such that: (i)
$$[\![S]\!]_{w,D_2 \prec_{likelihood/degree}} - [\![S]\!]_{w,D_{\text{ES}} \prec_{likelihood/degree}} \neq \varnothing, \text{(ii)}$$
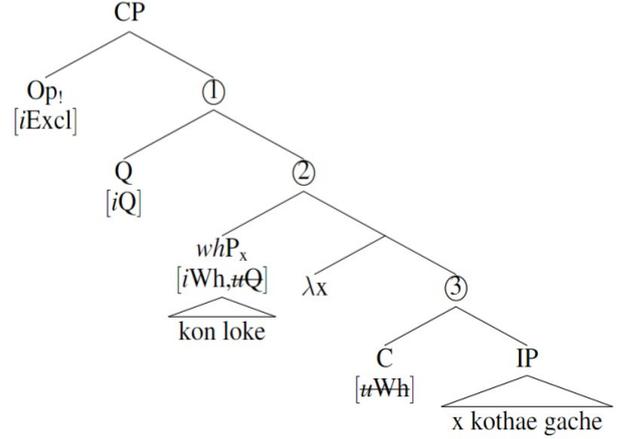$$\forall x \forall y [(x \in D_{\text{ES}} \ \& \ y \in (D_2 - D_{\text{ES}})) \to x \prec_{likelihood/degree} y], \text{(iii)}$$
$$\exists p \in [\![S]\!]_{w,D_2 \prec_{likelihood/degree}} - [\![S]\!]_{w,D_{\text{ES}} \prec_{likelihood/degree}} \text{ is presupposed to be true. The last}$$
condition accounts for factivity.

Our analysis for multiple wh-exclamatives. Since Rett's degree approach rejects the idea of multiple wh-exclamatives, we base our analysis on question-approach. Let us take (1) as an example. The LF of it is shown in Figure 1. Since we are following Upward Agree (Zeijlstra, 2012), the movement of only one wh-phrase, viz. *kon loke* 'who' (obviously, the closest one of C) should suffice in order to check and delete the [uWh] on C. Even if no fronting of *kothae* 'where' occurs, the word order is still retained in Bangla (see (1)). Thus, no syntactic movement of *kothae* is necessary for us here. This no movement policy in this case can also be claimed to be reasonable, because semantically wh-fronting is not required if Hamblin semantics is followed. We will also assume that all wh-words will bear an [uQ] fearure which gets checked and deleted by the [iQ] on Q-operator which is liable for interrogative semantics. C is considered to be vacuous in Hamblin semantics. Now coming to the semantics, the crucial compositional steps are as follows:

Figure 1: Anatomy of (1)

(5)   a. $[\![kothae]\!]^f = \{y : place(y)\}$; $[\![kothae]\!]^o = $ undefined

b. $[\![③]\!]^f_g = \{\lambda w. \text{went}_w(g(x), y) : place(y)\}$ (via PFA)

c. $[\![kon\ loke]\!]^f = \{x : person(x)\}$; $[\![kon\ loke]\!]^o = $ undefined

d. $[\![②]\!]^f = \{\lambda w. \text{went}_w(x, y) : person(y) \wedge place(y)\}$ (via PFA)

e. $[\![Q\ ②]\!]^o = [\![②]\!]^f$; $[\![Q\ ②]\!]^f = \{[\![Q\ ②]\!]^o\}$

f. $[\![①]\!]^o = \{\lambda w. \text{went}_w(x, y) : person(x) \wedge place(y)\}$

The above LF stands in favour of a question semantics. The Q operator takes the focused value of ② and return us the ordinary value of it. Now let us assume, we have the corresponding ES for ① - {Raghu went to Barren Island, Rajiv went to Barren Island, Ravi went to Barren Island, Raghu went to Sahara Desert, Rajiv went to Sahara Desert, Ravi went to Sahara Desert}. Now, the exclamatory operator Op$_!$ will act on this ES, widening it (cf. Roberts & Sasaki, 2021).

(6) $[\![Op_!]\!]^{c,w} = \lambda Q_{\langle st,t \rangle} : \exists p[p = ans_1(K(Q_c^+)(w)) \wedge p \notin ES_c \wedge p(w) = 1].\{p : p = ans_1(K(Q_c^+)(w)) \wedge p \notin ES_c \wedge p(w) = 1\}$ where $Q_c^+ = $ widened ES$_c$; $c = $ context

We define the operator, K in (6) as Karttunen operator which takes a set of Hamblin alternatives and returns us the set of true answers, *i.e.,* Karttunen alternatives $(K = \lambda Q_{\langle st,t \rangle} \lambda w_s \lambda p_{st}.p \in Q \wedge p(w) = 1)$. Now, Heim's (1994) ans_1 can apply to the set of true answers in order to get us the maximal true answer. With respect to the contextually relevant ES defined for ①, we get the following Q_c^+ set: {Raghu went to Barren Island, Rajiv went to Barren Island, Ravi went to Barren Island, Raghu went to Sahara Desert, Rajiv went to Sahara Desert, Ravi went to Sahara Desert, **Raghu went to Everest, Rajiv went to Everest, Ravi went to Everest**}. Now assume that the maximal true answer is 'Rajiv to go to Everest'. Therefore w.r.t. ①, CP will denote the following: $[\![CP]\!]^{c,w} = \exists p[p = $ Rajiv went to Everest $\wedge p \notin ES_c \wedge$ Rajiv went to Everest in $w].\{$Rajiv went to Everest$\}$. Note, one can also make use of the Ans-D (Dayal, 1996) operator to get the maximal informative true answer.

Summary. To sum up, there are cross-linguistic evidences in favour of multiple wh-exclamatives. The degree approach fails to capture the readings of multiple wh-exclamatives (cf. Rett, 2008, 2011), hence we base our analysis on the question approach. We analysed them in syntax-semantics interface in a compositional way.
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