Two types of scalar additives in Russian and other languages

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Abstract

This paper deals with the use of Russian particles *ešče* (additive *more, still*) and *daže* (*even*) with comparative constructions and the norm-related effect the two produce. We show that norm-relatedness is produced via different mechanisms in the case of two particles. More specifically, norm-relatedness is a derived effect in the case of *ešče* and an inherent presupposition in the case with *daže*. Our findings shed light on the larger question of the varieties of scalarity and additivity in the meaning of the two particles and their equivalents in other languages.

1 Introduction and main data

Translational equivalents of English *even*, on the one hand, and of *still* or additive *more* (*more*$_{add}$ henceforth) on the other hand (e.g. German *sogar* vs. *noch*, Hebrew *afilu* vs. *od*) have both been classified in various theories as 'scalar additives' (see Karttunen and Peters 1979, Rooth 1985, 1992, König 1991 for English *even*-like particles, König 1991, Umbach 2009, 2012 for German *noch*-like particles). However, the notions of scalarity and additiviy in their meaning are not of the same variety (cf. Thomas 2018).

Indeed, in most contexts the two types of particles convey different meaning (contrast (1) and (2)) and only produce similar truth conditional effects in languages like German, Hebrew and Russian, where they associate with comparatives (3-5):

(1) John won the silver medal. Bill even won the gold medal.

(2) 4 children danced. 3 more children sang.

(3) **German**
Bill ist noch/sogar größer also John.
'Bill is more$_{add}$/even taller than John.'
(='Bill is even taller than John')

(4) **Hebrew**
Bil od/afilu yoter gavo'a mi Jon.
'Bill is more$_{add}$/even taller than John.'
(='Bill is even taller than John')

(5) **Russian**
Bill ešče/daže vyše Dzona/bolee vysokij, čem Džon.
'Bill is more$_{add}$/even taller than John.'
(='Bill is even taller than John')

In such cases both particles must be translated into English as *even*. Moreover, both seem to have a similar 'norm-related' effect. So, in the absence of these particles, neither John nor Bill have to be considered tall (e.g. Kennedy and McNally 2005), but when they are present – we infer that both are tall, and the sentences become infelicitous if we continue them with ('but both of them are short').

We plan to define more precisely what it means for *even*-like and *more*-like particles to be 'scalar' and 'additive' by concentrating on the Russian data. Russian is especially well-suited for examining this question, since standard Russian equivalent for *even*, *daže* is necessarily additive, unlike, for example, Hebrew *afilu*. We can, therefore, compare not only scalarity, but also additivity in the meaning of two types of particles.

We will look at *daže* (*even*) and *ešče* (*more*$_{add}$), both of which (as stated above) are translated into English *even* and create norm-related effect when they occur with comparative constructions (5). Notice that this 'norm-relatedness' effect is found not only with the analytical form of comparatives (e.g. *bolee vysokij*), which are independently norm-related (Pancheva 2006, Krasikova 2009), but crucially also for the synthetic one (e.g. *vyše*). Nonetheless, the two particles are not synonymous, and they pattern differently in various contexts. Some felicity differences are seen in (6-

7) (where *p* refers to the 'prejacent'):

(6) (**Source of the comparison is below the standard: *ešče/#daže***)
(Context: Mary is not tall, John is taller than her, but still not tall)
Bill ešče/#daže vyše Džona.
'Bill is more$_{add}$/#even taller than John.'

(7) (**Distinct subjects in *p* and salient anaphor: *#daže/ešče***)
Mat' vyše otca, a Džon #daže/ešče vyše materi.
'The mother is taller than the father and John is #even/more$_{add}$ taller than the mother.'

(8) (***p*>anaphor: *ešče/daže***)
a. Mèri probežala stometrovky, a zatem daže/ešče 500-metrovuju distanciju.
'Mary ran a 100-meters distance and then even/more$_{add}$ 500-meter distance.'
(***p*<anaphor: *#daže/ešče***)
b. Mèri probežala 500-metrovuju distanciju, a zatem #daže/ešče stometrovky.
'Mary ran a 500-meters distance and then #even/more$_{add}$ 100-meter distance.'

2 Main claim

We propose that the apparent similarities between the two types of particles showed in (3-5) are indeed only apparent, and that they have a different semantics. As mentioned above, both kinds of particles were analyzed as 'scalar additives'. However, our analysis will help clarifying the distinct nature of additivity and scalarity that each of these particles conveys, and the distinct relationship between scalarity and additivity in each of them (and potentially in other correlates of these particles cross linguistically).

More specifically, we will show that Russian *daže* and *ešče*, have differen semantics, which can explain the differences in (6-8). In particular, *ešče* will be analyzed similarly to *more*$_{add}$ and its equivalents in other languages (e.g. German *noch*, Hebrew *od*, etc.) under the analyses of Greenberg (2010), Thomas (2010) and in particular that of Thomas (2018). We will analyze sentences like (6) and (7) by taking this use of *ešče* to be similar to 'comparative *noch*' under the analysis of Umbach (2009). In contrast, *daže* will be analyzed as an *even*-like operator along the lines of Greenberg (2017) with an additional obligatory existential presupposition (ps.) (cf. Miashkur 2017).

3 Suggestions for *daže* and *ešče*

3.1 Existing claims on *daže*

We take *daže* to be an *even*-like operator (see Miashkur 2017) which is like English *even* in terms of scalarity, but differs from it in being obligatorily additive. In particular, although *even* was taken by e.g. Horn (1969), Karttunen and Peters (1979), Rooth (1992) to be similar to *also* in triggering an existential ps., this has been debated in e.g. Rullmann (1997), Wagner (2014), Greenberg (2016) based on the felicity with e.g. incompatible and entailed alternatives:

(9) John won the silver medal. Bill even/#also won the gold medal.

(10) The queen gave birth. She even/#also gave birth to a boy.

Miashkur (2017), however, shows that unlike *even*, *daže* is a true additive, i.e. it obligatorily triggers an existential ps. (*daže* is infelicitous in the Russian versions of the examples above (11-12); compare the infelicity of (13 a.) and the improved felicity of (13 b.) when existential ps. is met:.

(11) Džon vyigral serebrjanuju medal'. Bil #daže vyigral zolotuju.
John won the silver medal. Bill #even won the gold medal.

(12) Koroleva rodila rebenka. Ona #daže rodila mal'čika.
The queen gave birth. She #even gave birth to a boy.

(13) a. (each student only solved one task) #Džon rešil zadanie srednej složnosti, Bill resul daže samoe složnoe zadanie.
'John solved the moderate task, Bill solved even the hardest task.'
b. Džon rešil zadanie srednej složnosti i daže samoe složnoe zadanie.
'John solved the moderate task and even the hardest task.'

Turning now to the scalarity of *even* and *daže*, a popular view takes *even* to presuppose that *p* is less likely than all distinct alternatives *q* in *C*. But given several issues for this 'likelihood-based' view, Greenberg (2016, 2017) suggests a

'gradability-based' analysis of *even* presupposing that the degree of a non-focused entity *x* in *p* on a contextually supplied gradable scale *G* is higher given *p* than given *q*-and-not-*p*. For example, '*John won bronze, Bill even won silver*' presupposes that Bill's degree on the scale measuring success is higher in the accessible worlds where he won silver than in those where he won gold. Crucially, Greenberg also adds an 'evaluative' component to this presupposition, requiring the degree of *x* for both *p* and *q* to be higher than the standard on the scale *G*. For example, Bill must be considered pos successful both when winning silver and when winning bronze (and not silver). This last move is motivated by entailments as in (14) and felicity contrasts as in (15):

(14) John is 1.70m tall and Bill is even taller (Entails: both are tall)

(15) (The standard norm of tallness is 1.80)
a. John is 1.85m tall, and Bill is (even) 1.87m / taller.
b. John is 1.72m tall, and Bill is (#even) 1.87m / taller.
c. John is 1.72m tall, and Bill is (#even) 1.75m / taller.

The scalar presupposition of *even* and *daže*, then is formally seen in (16) (cf. Greenberg 2016, 2017):

(16) ∀w1,w2 [w1Rw ∧ w2Rw ∧ w2∈p ∧ w1∈[q∧¬p]] → DIFF (the max (λd2. (d2)(x)(w2), stand$_{,G}$) [DIFF (the max (λ d1.G(d1)(x)(w1), stand$_{,G}$) ∧ the max d1 (λ d1.G(d1)(x)(w1)) ≥ stand$_{1,G}$ ∧ the max (λ d2.G(d2)(x)(w2) ≥ stand$_{2,G}$

3.2 Analysis of *ešče*

We suggest that *ešče* has the same semantics as additive/incremental *more* in English and additive *noch* in German. Our suggestion regarding the data in (5-8) will be based on the integration of two moves, employing existing claims regarding these particles:

a. We follow Umbach (2009) who takes German equivalents of the example in (5) (i.e. (2)), to be instances of the additive use of *noch* combined with a comparative. Importantly, Umbach suggests that in such cases the anaphor of the prejacent of *noch* is another comparative.

b. For capturing the combination of additive + comparative as suggested in Umbach, and found also in the Russian (5) and (6), we suggest to analyze both *ešče* as well as the comparative *vyše* in (5) using Thomas (2018) analysis of additive and comparative particles, respectively.

This move will be useful since Thomas analyzes both types of particles using the same tools, namely as denoting rising scale segments. A key motivation for that is Thomas' observation of homophony for **comparison** and **additivity** (and continuity, which is beyond the scope of this paper) in many languages, as in English *more*, which has both an additive and a comparative use, seen in (17) and (18) (cf. Greenberg 2010, Thomas 2010):

(17) additive use: 4 children danced. 3 more children sang.

(18) comparative use: More boys than girls danced.

3.2.1 Additive *more* in Thomas 2018

Thomas argues that this particle requires that there is a rising segment on a salient scale (e.g. of cardinalities of the participants of the event, temporal duration of the event, etc.), which:

i) starts with a degree retrieved by measuring a salient anaphor

ii) ends with the sum of that degree and the degree obtained by measuring the prejacent.

Thus the measurement of the segment (the difference between its start and end) equals the degree obtained by measuring the prejacent. (19), for example, is analyzed as in (20):

(19) 4 children danced. 3 more children sang.

(20) $\exists\sigma[\nearrow(\sigma) \wedge \mu_\sigma = |\cdot|_{AT} \wedge \text{START}(\sigma, \mu_\sigma(g(1))) \wedge \text{END}(\sigma, \mu_\sigma(\bigoplus(\{x : \exists e[^*\text{child}(x)(x) \wedge \text{sing}(e,x)]\}) \bigoplus g(1))) \wedge \Delta(\sigma) \geq 3]$

In prose: '3 *more* children sang' entails there is a rising scale segment of cardinality of atomic individuals that:

i) starts with the measurement of the cardinality of contextually salient individuals (the children who danced) (4)

ii) ends with the cardinality which is result of summing the cardinality of the individuals in the prejacent of *more* (the children who sang) and the cardinality of the individuals in the salient anaphor (e.g. the children who danced), so the sum of the children who engaged in some performing event is 7 (4+3=7)

iii) the measurement of the segment equals the cardinality of the individuals in the prejacent of *more* (the children who sang) (3).

(cf. Thomas 2018:78(137-136))

3.2.2 Comparative *more* in Thomas 2018

Thomas suggests that comparatives are similar to additives in that they also involve rising scale segments that associate with contextually salient scale and start with the measurement of the anaphor. The end of the segment, however, is the measurement of the prejacent - unlike the additive in (19-20), where the end is the measurement of the sum of the prejacent and the anaphor. The truth-conditions for a sentence like (21), for example, are then in (22):

(21) More boys than girls danced.

(22) $\exists\sigma[\nearrow(\sigma) \wedge \mu_\sigma = |\cdot|_{AT} \wedge$ START$(\sigma, \mu_\sigma(\bigoplus(\{x : *\text{girls}(x)\} \cap \{x : \exists e[\text{dance}(e,x)]\}))) \wedge$END$(\sigma, \mu_\sigma(\bigoplus(\{x : *\text{boys}(x)\} \cap \{x : \exists e[\text{dance}(e,x)]\})))]$

In prose: '*more* boys than girls' danced entails there is a rising segment on the scale of cardinality of atomic individuals that:
i) starts with the cardinality of the girls who danced
ii) ends with the cardinality of the boys who danced.

(cf. Thomas 2018:64(105-106))

For adjectival comparison, as in (23), Thomas (2018) provides the analysis in (24):

(23) John is taller than Mary is.

(24) $\exists\sigma[\nearrow(\sigma) \wedge \mu_\sigma =$ HEIGHT$\wedge$ START$(\sigma, \mu_\sigma(\text{Mary})) \wedge$END$(\sigma, \mu_\sigma(\text{John}))]$

(cf. Thomas 2018:60(80,82))

In prose: There is a rising scale segment on the scale of height that
i) starts with Mary's degree of height
ii) ends with John's degree of height.

3.2.3 Novel suggestion: additive *ešče* with comparatives

We can now analyze a case where additive *ešče* combines with a comparative, as in (25) by assuming that *ešče* has the semantics of $more_{add}$, and *vyše* has the semantics of comparative *more*:

(25) Meri vyše Dzona a Bill ešče vyše nee/Meri.
'Mary is taller than John and Bill is still taller than her/Mary.'

We propose that in this case the prejacent of the additive *ešče* is the comparative '*Bill is taller than Mary*', which denotes a rising scale segment whose start is Mary's height and whose end is Bill's height. The relevant measurement of this prejacent, then, is the difference between Bill's height and Mary's height, i.e. a scale segment whose measurement is Δ (Height (Bill) - Height (Mary)).

Following Umbach (2009), we take the anaphor here to be another comparative, in this case '*Mary is taller than John*', which also denotes a rising scale segment, this time one whose start is John's height and whose end is Mary's height. The measurement of this anaphor scale segment is the difference between Mary's height and John's height, i.e. Δ (Height(Mary) - Height ((John)).

Now, given the semantics of $more_{add}$ in Thomas, '*Bill esce vyše nee/Meri*' entails that there is a rising scale segment that

i) starts with the measurement of the anaphor comparative, i.e. starts with Δ (Height(Mary) - Height ((John))

ii) ends with the sum of the measurements of the prejacent comparative and the anaphor comparative, i.e. ends with Δ (Height (Bill) - Height (Mary)) $\bigoplus$ Δ (Height(Mary) - Height ((John))

iii) the measurement of the segment (the difference between its start and end) equals the degree obtained by measuring the prejacent, i.e. it is the measurement of Δ (Height (Bill) - Height (Mary)).

We can now turn to (5) and (6) above. We follow Umbach (2009) who observes that the effect produced by *noch* with comparatives differs in two contexts, and we observe that the same holds for the case with *ešče* as well. In the type of contexts where there is an overtly pronounced comparative antecedent to a third person or a measure phrase, as in (6) above, there are no 'norm-related' effects, e.g. neither of the participants in (6) must be taken to be tall. In contrast, when no overtly pronounced comparative exists in the context, such a comparative must be accommodated. Crucially, we tend to accommodate comparison to the standard (e.g. that John in (5) is taller than the standard, hence the norm-related effect).

4 Accounting for the data

4.1 Accounting for similarites and differences in norm-relatedness effects of *ešče* vs. *daže* in (5) and (6)

Above we observed that in (5) both *ešče* and *daže* have 'norm related' effect, i.e. both give rise to the inference that both source and target of the comparison are tall.

Crucially, however, we can now argue that the similar effects are due to two different mechanisms. In particular, following Umbach (2009) we suggested that the norm-relatedness of *ešče/noch* in (5) is not hardwired into its semantics, but taken to be derived from its additive/anaphoric ps. and from accommodation of an antecedent comparative. In contrast, the norm-relatedness of *even/daže* is an inherent part of its scalar ps.

This explains the difference in (6) above: *ešče* is indeed felicitous in cases where its anaphoricity is satisfied with no need of an accommodation even when the source of the comparison in the anaphor is specified to be not norm-related, in contrast, *daže* is bad in such cases.

4.2 Accounting for the differences in (7-8)

The felicity difference between *daže* and *ešče* in (7) above is due to the different additive nature of *ešče* and *daže*. The hardwired existential presupposition of *daže* requires that there is another focus alternative, distinct from p only in the focused element which is replaced by elements of the same semantic type (Rooth 1985, 1992). In contrast, with *ešče* (similarly to German *noch*) no such requirement is made, and the prejacent and anaphor can have different subjects.

The difference illustrated in (8) shows that only *daže* triggers the regular scalar presupposition of *even*-like particles, requiring the prejacent to be stronger than its alternatives. This presupposition fails in (8 b.) leading to the infelicity of *daže*, because running 100 meters cannot be considered 'stronger' than the alternative involving running 500 meters. In contrast, all that *ešče* requires is that the degree measuring the prejacent is summed with that of the anaphor, so only the sum must have a higher degree, while the prejacent by itself need not be 'stronger' than its anaphor.

5 Conclusion

We argued that translational equivalents of English *even* and $more_{add}$ (e.g. *sogar* and *noch* in German, *afilu* and *od* in Hebrew, *daže* and *ešče* in Russian) both involve additivity and scalarity, but in different ways. We groudned our claims on the examination of Russian data. In addition to accounting for the data above, we can now make more general conclusions.

First, even though both types of particles involve operations over scales, unlike *daže*, *ešče* does not require a specific ordering on the degrees in its prejacent and anaphor. We expect the same to be true of other languages, such as e.g. German or Hebrew. **Second**, *daže* is additive like *also* in that it triggers an existential presupposition, which is, crucially, independent of the scalar presupposition. *Ešče*, in contrast, presupposes the existence of an anaphor measured by a certain degree or segment on a salient scale, and it is the degree/scale segment indicated by the prejacent that is then 'added' to that of the anaphor, leading to a summed degree whose measured degree is higher on the scale (as it is the sum of the measured degrees). Unlike the scalarity of *daže* (and *even*), then, the scalarity of *ešče* is NOT independent of its additivity – the additivity it expresses is instantiated by adding (summing) degrees on a scale. Indeed, the claim that the scalar presupposition of *daže* is independent of existential one is supported by the existence of particles which trigger scalar presupposition, but not existential one in the cross-linguistics data (e.g. English *even*, as pointed out above, Hebrew *afilu* cf. Greenberg and Orenstein 2016).

6 Open questions and directions for further research

In future research we would like to investigate the suggestions above in light of cross linguistic data. For example, there are distributional similarities between *even*-like and *noch*-like particles. A number of languages use the same morphemes for equivalents of both *even* and *noch*/*still*: (Finnish: *vieläpä* and *jopa* (*even*) derived from *vielä* (*still*) and jo (*already*) (König 1991); Greek: *akome ke* (*even*), *akome* (*more*)), which lays ground for potential parametric research comparing scalar and incremental particles.

In addition, we plan to further investigate the behavior of *ešče* in the examples with the same subject in the prejacent and the anaphor, as in (26) below (as contrasted to (7) above; the felcity of *daže* in (26) is explained in section 4.2 above).

(26) a. (**Same subject in *p* and the anaphor: *daže/??ešče***)
Džon vyše materi i daže/??ešče vyše otca.
'John is taller than the mother and even/??more$_{add}$ taller than the father'.

We have received mixed judgements about the felicity of the examples like (26) and leave this data for further research.

Finally, we would like to examine whether our suggestion for *ešče* can be extended to other uses that it has, giving rise to *even*-like effects, e.g. when it occurs with *i* (a conjunctive/additive particle similar to *also*):

(27) Na Kannskom festivale fil'm polučil pomimo Zolotoj pal'movoj vetvi *ešče* i priz zritel'skix simpatij.
'At the Cannes festival, the film received beside the 'Golden palm' also-even the Audience's choice awards.'

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