Similative Plurals in Persian: Alternatives, Homogeneity, or Strongest Meanings?

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1. Similative plurals: What are they? Why are they interesting?

Similative plurality is a morphosyntactic operation on expressions that changes their meaning so that it includes entities that are similar to those denoted by the basic expression (Daniel & Moravcsik 2013). It involves a modified reduplication of the core expression ("echo formation", Abbi 2016). Similative plurals occur in many Asian languages, where they appear to have spread partly by language contact (Stolz 2008); they clearly have iconic aspects (cf. Schroeder 1989). For an overview, see Mauri & Sansò (2021).

(1)   a. Hindi   *cay* 'tea'   *cay **v**ay* 'tea and related items'
        b. Tamil   *puli* 'tiger'   *puli **gi**li* 'tiger and such'
        c. Punjabi   *kam* 'work'   *kam **k**um* 'work and such'
        d. Turkish   *bulut* 'cloud(s)' *bulut **m**ulut* 'clouds and the like'
        e. Vietnamese *tivi* 'TV'   *tivi ti-**v**iếc* 'TVs and all' (Tue Trinh, pers. comm.)

We will consider Persian, which has acquired similative plurals in the form of m-reduplication, probably from Turkish. See as core examples (2)(a,b), and see (c) and (d) for the case the basic noun starts with a vowel, or with *m*.

(2)   a. *ketāb **m**etāb* 'book(s) and the like'   c. *otagh **m**otagh* 'room(s) and the like'
        b. *chai **m**ai* 'tea and the like'   d. *majaleh **p**ajaleh* 'magazine(s) and the like'

Similative plurals are of semantic interest for the similarity relation that they involve, cf. Abbi (2016). But in this article we will focus on the issue of the quantity of entities that they apply to.

2. The interpretation of clauses with m-reduplicated nominals in Persian

We consider here mainly nominals in object position, and more specifically, without the object marker *rā* that typically leads to a definite reading. They have an indefinite number-neutral interpretation, as in (3)(a). In contrast, if the object marker *rā* is present, this results in a singular definite interpretation, as in (b), and plurality has to be marked explicitly, as in (c). Cf. Modarresi & Krifka (2021) for discussion.

(3)   a. <u>*Ali ketāb khund*</u>.   b. *Ali ketāb rā khund*.   c. *Ali ketāb hā rā   khund*
           Ali book read.PAST   Ali book OM read.PAST   Ali book PL OM read.PAST
           'Ali read a book / books'   'Ali read the book'   'Ali read the books'

Smith (2020a,b) discusses the interpretations of m-reduplicated nominals in various contexts. The most prominent interpretation of a sentence with an m-reduplicated object is illustrated in (4):

(4)　　*Ali ketāb metāb khund.*　　　　'Ali read at least one book
　　　　Ali　book　mRED　read.PRT　　　and at least one book-like object, e.g. a magazine'

In (4), the similative plural *ketāb metāb* has a **conjunctive** interpretation: 'book(s) and book-like object(s)'. If Ali read just one or more books, or just one or more magazines, then (4) would not be appropriate in its most straightforward interpretation (but see (9) below for contexts in which the speaker is not fully informed). Notice that we have a similar interpretation for English *Ali read books and so on.*

Under the conjunctive interpretation, the negation of (4) would be true if Ali only read one or more books, or one or more magazines, or nothing at all. However, this is not what we find:

(5)　　*Ali ketāb metāb na-khund*　　　'Ali did not read a book or a book-like object',
　　　　Ali　book　mRED　NEG-read.PAST　i.e. he did not read any book, nor any book-like object.

In (5), the interpretation is **disjunctive**: *ketāb metāb* means 'book(s) or book-like object(s)'. We have a similar reading for the English *Ali did not read books and so on.*

The apparent flip in the local interpretation of *ketāb metāb* happens because negation creates a downward-entailing context. We observe the flip as well in examples with downward-entailing quantifiers, such as in the scope of *chand tā danesh-amooz* 'few students'. But disjunctive interpretations also show up in other cases that are not clearly upward-entailing. One example is the antecedent of conditionals, as in (6). According to Smith, there are slight differences between speakers that he calls "partially inclusive" and "fully inclusive", as indicated.

(6)　　*age sib　mib　mi-khor-i,　　　be man be-gu!*
　　　　if　apple　mRED　DUR-eat.PRES-2.SG　to　1SG　SUBJ-say
　　　　'If you eat an apple (and <u>possibly</u> something else like that), tell me!' ("partially inclusive")
　　　　'If you eat an apple or something like that, tell me!' ("fully inclusive")

Another case are polar question, where the disjunctive interpretation is revealed by the answers:

(7)　　A: *Emruz sib　mib　khord-i?*　　　B: *Āre, ye sib / do tā sib / ye porteqāl khord-am.*
　　　　　today　apple　mRED　eat.PAST-2SG?　　yes, one apple / two CL apple / one orange ate-1SG
　　　　　'Did you eat an apple or so today?'　　　'Yes, I ate an apple / two apples / one orange.'

Also, the command (8) can be satisfied already if the speaker eats a single apple, or, for Smith's "fully inclusive" speakers, if the speaker eats a pear.

(8)　　*sib　mib　bo-khor!*　a)　'Eat an apple / apples (and possibly something else like that)!'
　　　　apple　mRED　SUBJ-eat　b)　'Eat an apple / apples or something like that!' (fully inclusive)

Even the situation in upward-entailing contexts is not clear. Smith observes when the speaker is not fully informed, as in the context of (9), we also find the disjunctive interpretation. The option to use the disjunctive interpretation also allows the speaker to stay vague, especially in contexts in which a high level of informativity is not required.

(9)　　You see Roya carrying a lunchbox, in which she usually keeps an apple for an afternoon snack, but sometimes brings other kind of fruit. You don't know how many and what kinds of fruits she has in the box today.
　　　　Royā sib　mib　dāre.
　　　　Roya　apple　mRED　have PAST-3SG
　　　　'Roya has at least an apple (and maybe something else like that).
　　　　'Roya has an apple or something else.' (for fully inclusive speakers)

In this paper we will discuss several proposals for deriving the selection of the conjunctive vs. the disjunctive reading. We will start with Smith (2020a,b), which is based on exhaustification. and we will raise several problems of this approach. We will then discuss a proposal that is also based on exhaustification, but this time applies it recursively, in the style that Bowler (2014) proposed for a coordinator in Warlpiri. This gives us the right predictions; however it requires an exceedingly complex exhaustification mechanism. Third, we will discuss a proposal based on the assumption of homogeneity in plural predications, where homogeneity is expressed as presupposition, as discussed as one option in Križ (2015). We will see that this runs into problems as well. Another approach to homogeneity based on exhaustification, following Magri (2014), also turns out to be problematic. At last, we will put forward the idea that m-reduplicated nominals like *ketāb metāb* can have two or a range of interpretations, and that there are pragmatic principles that selecting one of them. We hold this to be the most promising approach to *m*-reduplication and related phenomena, but we consider it important to leave no stone unturned in investigating the range of theoretical options.

3. The interpretation of m-reduplicated nominals

To facilitate discussion how different candidate interpretations of m-reduplicated nouns can be derived, let us assume a similarity operation ~, where P is the set of entities that are similar to the entities in P but are not P-entities themselves. In addition, we assume a weaker similarity operation $\simeq$ that includes the entities in P.

(10)　a.　~P　　:= the set of P-like objects, excluding P-objects
　　　　b.　$\simeq$P　　:= P ∪ ~P: the set of P-objects and P-like objects

The mereological operations are based on sum formation + and its generalization by the star operator *. Note that the elements in P+Q consist of the sums of two elements. The set *[P+Q] is called a "mixture" in Champollion (2016).

(11)　a.　x+y　　　:= sum individual consisting of x and y
　　　　b.　x⊑y　　　:= x+y = y, x is a part of y
　　　　c.　P+Q　　　:= {x+y | x∈P ∧ y∈Q}, set of sum individuals consisting of a P- and a Q-element
　　　　d.　*P　　　　:= set of (sum) individuals consisting of elements in P, cf. Link (1983)
　　　　e.　*[P+Q]　:= set of sum individuals consisting of P- and Q-like objects

With these operators, we define three candidate meanings for *ketāb metāb*, with B the set of books:

(12)　⟦*ketāb metāb*⟧:　i.　*[B+~B], the conjunctive interpretation
　　　　　　　　　　　　　　ii.　*[B+$\simeq$B], the intermediate interpretation
　　　　　　　　　　　　　　iii.　*[B∪~B], the disjunctive interpretation

To illustrate these notions, assume a universe with two books b_1 and b_2 and two magazines, as book-like objects, m_1 and m_2, the interpretations can be illustrated as follows; notice the indicated strength relationships.

(13)　*[B+~B]　　　conjunctive
　　　　*[B+$\simeq$B]　　intermediate
　　　　*[B∪~B]　　　disjunctive

　　　　Strength relationship:
　　　　*[B+~B] ⊂ *[B+$\simeq$B] ⊂ *[B∪~B]
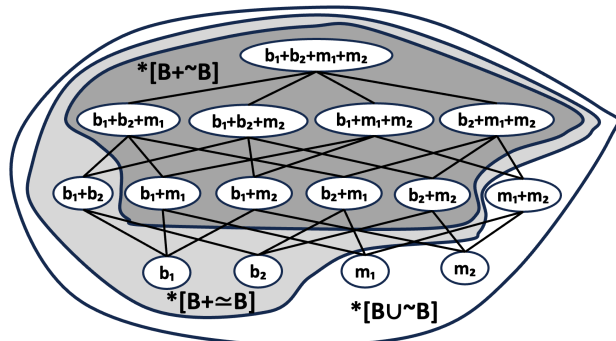
Now let us have a closer look at how these interpretations come about. We first notice that number-neutral interpretations of nouns arise when they occur as direct object without object marker, cf. (3)(a). Hence the operator * can be seen as a result of this syntactic configuration (cf. Modarresi & Krifka 2021 for an explanative account of this phenomenon).

To proceed further in full generality, we notice that there is a construction in Persian, as in many other Asian languages, so-called **coordinative compounds** (cf. Wälchli 2005, Arcodia et al. 2010 for additive coordinative compounds). They consist of juxtaposition of two semantically related nouns They also show conjunctive and a disjunctive interpretations, as illustrated in (14)(a,b).

(14)   a. *Ali ketāb majaleh khund.*   b. *Ali ketāb majaleh na-khund.*
           Ali book magazine read.PAST   Ali book magazine NEG- read.PAST
           'Ali read at least one book and magazine.'   'Ali did not read books or magazines.'

We assume the following interpretation rule for additive coordinative compounds:

(15)   ⟦*ketāb majaleh*⟧
       a. conjunctive: $[B+M] = \{b_1+m_1, b_1+m_2, b_2+m_1, b_2+m_2\}$
       b. disjunctive: $[B \cup M] = \{b_1, b_2, m_1, m_2\}$

In direct object position without object marker, a star operator is applied to these meanings, resulting in the dark subset in (13) and the set of all entities specified there, respectively. While $[B+M]$ and $[B \cup M]$ are not related by the subset relation (in fact, the two sets are disjoint), we have that $*[B+M] \subseteq *[B \cup M]$.

For m-reduplicated nouns in the context of a preceding noun we assume that their meaning is derived from the preceding noun. There are two possible interpretations, one stricter than the other one:

(16)   ⟦*metāb*⟧ in the context after *ketāb*:
       a. ~B   stricter interpretation: book-like objects, e.g. $\{m_1, m_2\}$
       b. ≃B   looser interpretation: books or book-like objects, e.g. $\{b_1, b_2, m_1, m_2\}$

Combining the interpretations of coordinate compounds and m-reduplication, we get the following results; as (c) and (d) lead to the same set, the two interpretations collapse into one.

(17)   ⟦*ketāb metāb*⟧
       a. Conjunctive interpretation: $[B+\sim B]$ = $\{b_1+m_1, b_1+m_2, b_2+m_1, b_2+m_2\}$
       b. Intermediate interpretation: $[B+\simeq B]$ = $\{b_1+m_1, b_1+m_2, b_2+m_1, b_2+m_2, b_1, b_2, b_1+b_2\}$
       c. Disjunctive interpretation: $[B \cup \sim B]$ = $\{b_1, b_2, m_1, m_2\}$
       d. Disjunctive interpretation: $[B \cup \simeq B]$ = $\{b_1, b_2, m_1, m_2\}$

Closure under sum operation, triggered in the position of the direct object without object marker, then results in the three sets specified in (13).

4. The exhaustification analysis

Smith (2020a, b), to whom we credit the basic observations in Section 2, posits one reading for m-reduplicated nominals, and assumes that this reading is pragmatically strengthened in the case of upward-entailing contexts as in (4). As the mechanism for this strengthening, he appeals to scalar implicatures, in the particular version of an exhaustification operation. This is the classical approach that explains why, for example, a disjunction, which has a basic inclusive interpretation, can be strengthened to an exclusive interpretation, as in (18)(a). This meaning enrichment does not occur under negation, as in (18)(b), as now the alternative is not stronger than what is said.

(18)   a. *It is cold or raining* implies that it is not the case that it is cold and raining,
           as the speaker did not make the stronger statement *It is cold <u>and</u> raining*.

b. *It is not the case that it is cold or raining* is not strengthened,
as *It is not the case that it is cold <u>and</u> raining* is not stronger.

This argument rests on the notion of admissible alternatives to what has been uttered (cf. Katzir 2007). The expression *It is cold and raining* is such an admissible alternative. In contrast, following Sauerland (2004), the expressions *It is cold* and *It is raining* should not count as relevant alternatives, as they together would entail the negation of what is said, namely *It is cold or it is raining*.

Let us have a closer look at Smith's approach. We assume (19)(a) as the semantic interpretation of (4). As the speaker has not uttered *Ali ketāb khund*, this interpretation is strengthened by (19)(b), that it is not the case that Ali read books. Smith also considers strengthening by the conceptual alternative of book-like object, which corresponds to the meaning of *metāb* in our analysis (16), leading to (19)(c).

(19) a. $[\![Ali\ ket\bar{a}b\ met\bar{a}b\ khund]\!] = \exists x[*[B \cup \sim B](x) \wedge READ(a,x)]$
      b. $\neg \exists x[*B(x) \wedge READ(a,x)]$
      c. $\neg \exists x[*\sim B(x) \wedge READ(a,x)]$

However, there is a problem: Whenever Ali read, say, b_1+m_1, then it also holds that Ali read b_1, and that Ali read m_1. This is due to the divisivity of predicates like *read*: Whenever $READ(a,x)$ holds, and y is a part of x, $y \sqsubseteq x$, then $READ(a,y)$ holds as well. Smith recognizes this and, following a proposal by Zweig (2009), suggests a solution in event semantics. This leads to the representation in (20), which states that there is a reading event e by Ali and an object x that falls under the disjunctive meaning $*[B \cup \sim B]$ and that is the theme of e. Smith argues that exhaustification is now possible to indicate that the reading event e is not just the reading of a book, or the reading of a book-like object, as in (21).

(20) $[\![Ali\ ket\bar{a}b\ met\bar{a}b\ khund]\!] = \exists e \exists x[*[B \cup \sim B](x) \wedge READ(e) \wedge TH(e,x) \wedge AG(e,a)]$

(21) $\exists e[\ \exists x[*[B \cup \sim B](x) \wedge READ(e) \wedge TH(e,x) \wedge AG(e,a)] \wedge$
      $\neg \exists x[*B(x) \wedge READ(e) \wedge TH(e,x) \wedge AG(e,a)] \wedge$
      $\neg \exists x[*\sim B(x) \wedge READ(e) \wedge TH(e,x) \wedge AG(e,a)]]$

As before, whenever Ali read b_1+m_1, Ali also read b_1, but the event of reading b_1+m_1 is different from the event of reading b_1, and the event of reading m_1. Hence, exhaustification is possible.

This arguments rests on the assumption that the theme relation is not divisive; it rather holds that whenever $TH(e,x)$ and y is a proper part of x, than $\neg TH(e,y)$ (this follows from the property of uniqueness of objects in Krifka 1992). However, this property does not necessarily hold for theme relations. For example, consider the verb 'see'. The same event of seeing can both apply to a whole and its parts; e.g. with the same act of seeing one can see a book and a magazine, and a book. But corresponding sentences in Persian are not interpreted differently from (4).

(22) *Ali ketāb metāb did.*
      'Ali saw at least one book and at least one book-like object'

Notice also that the exhaustification in (21) happens under the scope of the event quantifier, and hence not at the level of an utterance, as in the classical cases like (18). Once we assume that such local exhaustification is possible, there is another strategy, which does not rely on events: Exhaustification may happen locally, e.g. on the level of noun, as in (23). In words, there is an x that consists of a sum of books or book-like objects but not of a sum of books, or a sum of book-like objects, and Ali read x.

(23) $\exists x[[*[B \cup \sim B](x) \wedge \neg *B(x) \wedge \neg *\sim B(x)] \wedge READ(a,x)]$

In order to explain the difference in interpretation between non-negated and negated sentences like (4) and (5), we would have to show that exhaustification is prevented under negation. But negation is global, scoping over the event or object quantifier. We have to check whether wide-scope negation has the local effect of preventing exhaustification. We test this with (23), where negation percolates down

as in (24). As negation scopes over *[B∪~B](x) in the last line exclusion of *B(x) and ~B(x) is indeed prevented.

(24) ¬∃x[*[B∪~B](x) ∧ READ(a,x)]   = ∀x¬[*[B∪~B](x) ∧ READ(a,x)]
                                        = ∀x[¬*[B∪~B](x) ∨ ¬READ(a,x)]

Going back to non-negated sentences, it is still strange that exhaustification can apply in the very local way suggested in (21) and (23). While local exhaustification has been contemplated, cf. Krifka (1995) and Chierchia (2004), the contexts considered were dependent clauses, and not just nominal constructions. Notice that local exhaustification would not give us the right result for English sentences like (25), as this would result in an interpretation that excludes that Ali just read books, or just magazines.

(25) *Ali read books or magazines*.

Smith actually does not only consider the disjunctive interpretation *[B∪~B] but also the intermediate interpretation *[B+≃B], and possible strengthening by excluding *B. We want to point out a problem with this idea if we also assume the semantic account of negative polarity items of Kadmon & Landman (1993) and Krifka (1995). According to that, the meaning of an NPI like *any book* invokes a broader interpretation than *a book*, with alternatives that are more narrow interpretations. This is a similar constellation as the one between *ketāb metāb*, interpreted as *[B+≃B], and *ketāb*, interpreted as *B. This would predict that *ketāb metāb* is a negative polarity item, which is not the case. To be sure, this is not a strict counterargument against the exhaustivity analysis but it raises the issue about the nature of lexical expressions that come with grammaticality determined alternatives.

We would also like to point out that it is problematic to assume that *~B is an alternative. While this alternative can be expressed by the meaning of *metāb* in our analysis, cf. (16), notice that the string **Ali metāb khund* is ungrammatical, as *metāb* is not a lexical item of the language. We would either need "conceptual" alternatives that are constructed by the difference between the disjunctive interpretation of *ketāb metāb* and *ketāb*, *[B∪~B] – *B (cf. Buccola et al. 2022 for a defense of such alternatives). Or we might argue that *metāb* has an interpretation in the construction of alternatives, as the noun *ketāb* was used in the sentence that triggered the interpretation. In the case of coordinative compounds like *ketāb majaleh* these issues do not arise, as both parts are present in the lexicon.

5. Recursive exhaustification

There are approaches that apply exhaustification recursively, and we should consider whether this might be a viable option for explaining the data of m-reduplication and coordinative coordination. One such proposal that is particularly relevant for us is the analysis that has been suggested for the coordinator *manu* or Warlpiri by Bowler (2014). This coordinator creates a similar configuration as m-reduplication and coordinative compounds, as it does not come with an alternative in the lexicon of the language, such as *or* and *and*. Bowler proposes that *manu* basically has a disjunctive meaning but that it is strengthened by double application of exhaustification on the alternatives, cf. Fox (2007). The basic reasoning is as follows: The basic meaning [p ∨ q] cannot be strengthened by the equally ranked alternatives p and q, as [p ∨ q] ∧ ¬p ∧ ¬q is contradictory. However, when the alternatives p and q are strengthened with each other to [p ∧ ¬q] and [q ∧¬p], strengthening of the disjunction is possible, to [p ∨ q] ∧ ¬[p ∧ ¬q] ∧ [q ∧ ¬p], which is equivalent to [p ∧ q]. Applying double exhaustification to our example we a similar result:

(26) ⟦*Ali ketāb metāb khund*⟧
    a. Basic meaning of alternatives: ∃x[*B(x) ∧ READ(a,x)], ∃x[*~B(x) ∧ READ(a,x)]
    b. Exhaustification of disjunction with strengthened meaning of alternatives:
        ∃x[*[B∪~B](x) ∧ READ(a,x)] ∧ ¬[∃x[*B(x) ∧ READ(a,x)] ∧ ¬∃x[*~B(x) ∧ READ(a,x)]]
                                    ∧ ¬[∃x[*~B(x) ∧ READ(a,x)] ∧ ¬∃x[*B(x) ∧ READ(a,x)]]]
        = ∃x[*[B+~B](x) ∧ READ(a,x)]

Double exhaustification gives us the correct result, under the welcome assumption that exhaustification applies at the utterance level. We consider this as a viable option. However, we have the impression that the double application of exhaustification puts a high demand on the pragmatic machinery, and so we will consider other options as well.

6. The homogeneity analysis

Let us consider an alternative analysis that assumes the conjunctive reading of m-reduplicated nouns and derives the different interpretations in positive and negated cases like (4) and (5) from another general principle, homogeneity. This principle was first observed by Fodor (1970), and explored in Löbner (2000), and is illustrated in (27)(a) and (b).

(27) a. *Ali read the books.*   b. *Ali did not read the books*.
     'Ali read all of the books'   'Ali read none of the books'
     not 'Ali read at least some of the books'   not 'Ali did not read all of the books'

The homogeneity hypothesis explains these facts by assuming that whenever a divisive predicate PRED is applied to a sum individual x, there is a condition that PRED either applies to all parts of x, or to no part of x. This condition can be implemented as a presupposition or, according to the in-depth analysis of Križ (2015), as an implicature. Under the presuppositional analysis, we have the following representation, where in λx PRES(x) : PRED(x), the part PRES(x) identifies the presupposition.

(28) λx. ∀y⊑xPRED(y) ∨ ∀y⊑x¬PRED(y) : PRED(x)

If the presupposition is not satisfied, the application has an undefined truth value #. This creates a truth-value gap for the predication. The two examples (4) and (5) get the interpretation as in (29)(a,b). We assume the conjunctive interpretation *[B+~B] of the m-reduplicated nominal in both cases.

(29) a. *Ali ketāb metāb khund.*
     ∃x[*[B+~B](x) ∧ ∀y⊑xPRED(y) ∨ ∀y⊑x¬PRED(y) : READ(a,x)]
   b. *Ali ketāb metāb na-khund.*
     ¬∃x[*[B+~B](x) ∧ ∀y⊑xPRED(y) ∨ ∀y⊑x¬PRED(y) : READ(a,x)]
     = ∀x¬[*[B+~B](x) ∧ ∀y⊑xPRED(y) ∨ ∀y⊑x¬PRED(y) : READ(a,x)]

In order to find out about the truth values of these clauses in different scenarios, we must be clear about how the presuppositions project over the quantified clauses. The interpretation rule for negations, conjunctions and disjunctions are as follows (these are the so-called "Strong Kleene rules" of three-valued logic).

(30)

p	1	0	#
¬p	0	1	#

p	1	1	1	0	0	0	#	#	#
q	1	0	#	1	0	#	1	0	#
p ∨ q	1	1	1	1	0	#	1	#	#
p ∧ q	1	0	#	0	0	0	#	0	#

Existential and universal quantifiers are understood as generalized conjunctions and disjunctions, respectively. Let us concentrate on the case in which the predicate applies to some parts of the sum individual (the other two cases, when it applies to all or no parts, are straightforward). To keep the considerations of cases manageable, let us work with a very simple model of one book b, and one magazine m, and let us assume that Ali read b, but not m. This result in the following interpretation:

(31) ⟦*Ali ketāb metāb khund*⟧
   = [*[B+~B](b) ∧ ∀y⊑bREAD(a,y) ∨ ∀y⊑b¬READ(a,y) : READ(a,b)]] ∨   0
     [*[B+~B](m) ∧ ∀y⊑mREAD(a,y) ∨ ∀y⊑m¬READ(a,y) : READ(a,m)]] ∨   0
     [*[B+~B](b+m) ∧ ∀y⊑bREAD(a,y) ∨ ∀y⊑b+m¬READ(a,y) : READ(a,b+m)]]   #
     Undefined, as there is no disjunct that is true and one disjunct is undefined.

(32) 〚*Ali ketāb metāb na-khund*〛
   = ¬[*[B+~B](b) ∧ ∀y⊑bREAD(a,y) ∨ ∀y⊑x¬READ(a,y) : READ(a,b)]] ∧   1
      ¬[*[B+~B](m) ∧ ∀y⊑mREAD(a,y) ∨ ∀y⊑m¬READ(a,y) : READ(a,m)]] ∧   1
      ¬[*[B+~B](b+m) ∧ ∀y⊑mREAD(a,y) ∨ ∀y⊑m¬READ(a,y) : READ(a,b+m)]]   #
   Undefined, as there is no conjunct that is false and one conjunct is undefined.

The first result, (31), can be understood in a way that homogeneity is a promising model for m-reduplication. A sentence like (4) tends not to be uttered when the speaker knows that Ali read only one book. As we have seen, it might be uttered in so-called ignorance contexts, as in (9); such cases would need additional motivation. But the second result, (32), is not what we find. If Ali read just one book, than the negated sentence (5) is generally considered false, and not undefined.

There is another problem for this approach. In example (33), an m-reduplicated nominal occurs in the antecedent of a conditional, and is taken up by a singular anaphor in the consequent. However, as the current accounts assumes the conjunctive reading, it only allows for plural antecedents (which are possible as well).

(33)   *Age gorbeh morbeh kharidi   be gardan-esh   zangooleh be-band*
       if   cat   mRED buy.2SG.PRS to neck-LNK.3SG bell   SUBJ-tie
       'If you have a cat or so, tie a bell around its neck.'

We conclude that the homogeneity account, paired with the conjunctive interpretation, is not a viable option to explain the readings of m-reduplicated nominals.

8. The strongest meaning hypothesis

We now proceed to a third approach to m-reduplicated nominals. It assumes that they have the range of readings introduced in (17). In particular, they can be interpreted as conjunctively, or as disjunctively, and they also may have the intermediate interpretation. The selection of the optimal interpretation is governed by a rule that prefers the interpretation that leads to the overall strongest meaning, on the level of utterance or speech act. This can be justified pragmatically, as it leads to the most informative utterance. It is the same principle as the one behind scalar implicatures in general. We will come back to its motivation after we have illustrated how this principle operates in the case of m-reduplicated nominals.

In positive sentences such as (4), the conjunctive interpretation leads to the strongest interpretation. (34) states that Ali read at least one book and at least one book-like object, whereas the alternative interpretations would also be true if Ali read just a book, or just a book-like object.

(34)   〚*Ali ketāb metāb khund*〛 = ∃x[*[B+~B](x) ∧ READ(a,x)],
       as this is stronger than ∃x[*[B∪~B](x) ∧ READ(a,x)] and ∃x[*[B+≃B](x) ∧ READ(a,x)]

In negated sentences such as (5), it is the disjunctive interpretation that leads to the strongest interpretation. (35) states that Ali did neither read a book, nor a book-like object. The alternatives would have been compatible with Ali reading just books, or just book-like objects.

(35)   〚*Ali ketāb metāb na-khund*〛 = ¬∃x[*[B∪~B](x) ∧ READ(a,x)],
       as this is stronger than ¬∃x[*[B+~B](x) ∧ READ(a,x)] and ∃x[*[B+≃B](x) ∧ READ(a,x)]

The problem we noticed with singular anaphora as in (33) does not obtain in the strongest meaning hypothesis. When we assume that the strongest meaning is selected that is compatible with the morpho-syntactic context of the sentence, the conjunctive interpretation is ruled out because it does not apply to atoms; its smallest elements consist of two atoms. The disjunctive reading, on the other hand, applies to atoms as well, and hence is selected.

The disjunctive interpretation is also selected in the cases we have discussed, following Smith (2020a,b), with examples (6) to (9). In the conditional sentence (6), the conjunctive interpretation would express a generalization over a more limited number of cases than either the disjunctive or the

intermediate interpretation. The choice between the latter two interpretations is open to contextual variation; the slightly stricter intermediate interpretation seems to capture the interpretation of *ketāb metāb*as an extension of the meaning of *ketāb* better.

The disjunctive interpretation of m-reduplicated nouns in polar questions, as in (7), which we also find with coordinated compounds, can be explained by a general tendency for a wide interpretation of such questions, as they lead to the most informative responses. This principle is responsible for the occurrence of negative polarity items in questions as in *Did you eat any apple?* (cf. Krifka 1995, van Rooij 2003), and for the interpretation of bare plurals as including reference to singular entities, as in *Do you have children?* (cf. Krifka 1989, Sauerland et al. 2004).

In commands as in (8), the intermediate or disjunctive interpretation of m-reduplicated nouns appears problematic if we understand that commands should preferably be understood as strict. However, the linguistic expressions for commands, for example imperatives, can be used in a wider range of circumstances, e.g. in suggestions or in offers, and in such uses a broader interpretation of m-reduplicated nominals is pragmatically warranted.

In case the speaker is not well-informed, as in (9), we may say that the disjunctive interpretation is the strongest that the speaker could apply. In order for the addressee to identify this reading, the context must provide clues that the speaker might not be fully informed, or that maximal informativity is not a primary goal of the conversation.

Selection of the strongest meanings out of a range of meanings has been proposed before. It was introduced by Dalrymple et al. (1998) to explain the interpretations for reciprocals in cases like (36):

(36)   a. *The children know each other.*   'Every child knows every other child.'
          b. *The children took each other by the hand.* 'Every child took at least one child by the hand.'
          c. *The children do not know each other.*   'It is not the case that a child knows another child.'

The interpretation of (36)(a) suggests that reciprocals impose a total relation. However, examples like (b) show that a weaker relation suffices if a total relation is physically impossible (a child has only two hands, and can take maximally two other children by the hand). In case of negation – not considered by Dalrymple et al. (1998) – we can assume a weakest relation in order to get the interpretation in (c).

The strongest meaning hypothesis has also been suggested in Krifka (1996) for the explanation of the data of predications on sum individuals that motivated the homogeneity hypothesis, cf. (27). The idea is that when a predicate is applied to a sum individual, this predication can be spelled out: as a total or as a partial application:

(37)   Total predication: TPRED(P,x) iff $\forall y \sqsubseteq x[P(y)]$
       Partial predication: PPRED(P,x) iff $\exists y \sqsubseteq x[P(y)]$

When applied in a concrete case, the predication is selected that yields the overall strongest interpretation. This means that in a non-negated sentence, the total predication will be selected, whereas in a negated sentence, we find the partial interpretation. This is illustrated in (38)(a) and (b), where A stands for the predicate 'apple'; recall that +*A is the sum of all individuals that are in the closure *A of this set under sum formation, which is an individual that is itself an element of *A.

(38)   a. *The apples are red.*   TPRED(RED, +*A) $\Leftrightarrow$ $\forall y \sqsubseteq$ +*A[RED(y)]
          b. *The apples are not red.*   ¬PPRED(RED, +*A)) $\Leftrightarrow$ ¬$\exists y \sqsubseteq$ +*A[RED(y)]

Križ & Spector (2021) develop the strongest meaning hypothesis further by proposing that there may be several "candidate interpretations", and that a clause is true if all, and false if none, of the candidate interpretations are true, This leads to improved predictions in cases with non-upward or downward entailing quantifiers.

9. M-reduplication in definite nominals

The cases of m-reduplication and coordinative plurals considered so far where indefinite. As definites, e.g. when marked by the *rā*, cf. (5)(b), they typically carry the plural marker *hā* (cf. Smith 2020a,b). In the indefinite case, the plural marker is absent, cf. (39)(b) (for exceptions cf. Modarresi 2014).

(39) a. *Ali ketāb metāb *(hā) rā (na-)khund.*   b. *Ali ketāb metāb (*hā) (na-)khund.*
          Ali book mRED PL OM NEG-read.PAST   Ali book mRED PL NEG-read.PAST
          'Ali read / did not read the books and such'   'Ali read / did not read the books and such'

The presence of *hā*-marking in (39)(a) can be explained by assuming that *rā*-marked objects are lifted to referring expressions by the sum-formation operation + (a process that might also involve a syntactic change from a nominal or NP to a DP), and that the plural operator *hā* has to be applied to this sum whenever it is not atomic. We can interpret *hā* as identity function that presupposes non-atomicity.

(40) a. $\llbracket h\bar{a} \rrbracket = \lambda x . \neg atom(x) : x$
      b. $\llbracket [_{DP} \, ket\bar{a}b] \rrbracket = + \llbracket ket\bar{a}b \rrbracket$
      c. $\llbracket [_{DP} \, [_{DP} \, ket\bar{a}b] \, h\bar{a}] \rrbracket = \llbracket h\bar{a} \rrbracket (+ \llbracket ket\bar{a}b \rrbracket) = \neg atom(+B) : +B$

In the case of simple object nouns, as in (3)(b) and (c), the presence of *hā* distinguishes between singular and plural reference. In the case of definite m-reduplicated DPs as in (39)(a), we have the conjunctive interpretation, as the noun phrase is not in the scope of negation. The conjunctive interpretation necessarily applies to sums of two or more entities, cf. (13), hence the plural marker *hā* has to be used. Object nominals without *rā* marker as in (3)(a) and (39)(b) are not referring, and hence the condition for the application of *hā* is not met.

As we have seen, *hā*-marking in cases like (39)(a) is obligatory under the conjunctive interpretation. In the disjunctive interpretation, reference to atomic entities is possible. One case to be considered is the reference to a single object that is classified as book-like, perhaps because the speaker does not find a better description or indicates that reference to entities that belong to the core entity are included. Cases of m-reduplicated definite objects without *hā*-marker exist, as in (41), and this topic needs further study.

(41) *khooneh mooneh rā   tamiz kard-am*
      house   mRED   OM clean do.PAST-1SG
      'I cleaned the house and things that are related to it, e.g. the cellar, the street, etc.'

10. Conclusion

In this paper we have discussed the interpretation of similative plurals in Persian that are expressed by m-reduplication. such as *ketāb metāb* 'books and so'. We concentrated on the disjunctive vs. conjunctive interpretation of these constructions in various contexts, considering a number of theoretical accounts that have been developed for related phenomena, e.g. of definite plurals such as *the books*. In particular, we discussed various versions of exhaustification of a single meaning (like the conjunctive or disjunctive interpretation) and the assumption of single meaning together with homogeneity. We think that the most promising account assumes that m-reduplicated nominals offer a range of meanings, and that there are pragmatic principles at work by which speakers, and addressees, select the strongest overall interpretation. We are aware that this conclusion might be premature, but we hope to have shown that it is worth-while to draw similative plurals and coordinative compounds into the discussion of the proper account for these phenomena at the semantic/pragmatic interface.

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