

### The semantics and pragmatics of Persian m-reduplication

**Introduction:** Persian possesses a type of full root reduplication that, when applied to a noun, results in a non-homogeneous plural interpretation; a reduplicated nominal is understood to refer to one or more objects in the denotation of the predicate denoted by the bare noun, as well as one or more objects that are similar in some respect to the bare noun (Armoskaite & Kutlu 2013). (1) is felicitous if Ali read one or more books, in addition to similar things, such as magazines.

1) Ali ketâb metâb xund  
Ali book Red read.Pst  
'Ali read books and the like.'

At first glance, m-reduplicated nominals seem to entail the existence of a non-homogeneous plurality: they are compatible with collective predicated (2) and, unless marked by the specific plural marker -*hâ*, are unacceptable with -*râ*, which when applied to bare nouns results in a specific, singular interpretation.

2) Ali gol mol jam' kard kard Ali ketâb metâb \*(-hâ)-ro xund  
Ali flower Red collection do.Pst Ali book Red -Sp.PI-Dom read.Pst  
'Ali gathered flowers and the like.' *Intended:* 'Ali read the books and the like.'

Nevertheless, I show that reduplication does *not* entail the non-homogeneity of the plurality it denotes. I propose that, semantically, m-reduplication denotes a *mereological mixture* of the set denoted by the bare nominal and a set of similar objects in the context. I then propose that the non-homogeneous plural reading is derived via scalar implicature. The analysis requires that the alternatives be the set denoted by the bare nominal and the similarity set; the latter is an abstract alternative that does not correspond to a particular lexical item. The phenomenon thus causes a problem for structural approaches to alternatives (Katzir 2007, a.o.).

**Implicature-cancelling environments:** While the non-uniformity inference is attested in upward-entailing environments as in (1), it vanishes in implicature-cancelling environments, such as under negation (4), in the antecedent of a conditional (5), in polar questions (6), and in the scope of a possibility modal (7). (4) is understood to mean that Ali didn't read any books or similar things, rather than merely that he didn't read both books and something else. Likewise, in (5), the addressee may tell the speaker even if she has eaten only one or two apples, or a similar fruit.

4) Ali ketâb metâb na- xund 5) age sib mib bo- xor -i be man be- gu!  
Ali book Red Neg-read.Pst if apple Red Sbjv-eat.Prs-2.Sg to 1.Sg Sbjv-say  
'Ali didn't read books or anything' 'If you eat an apple or something, tell me!'

One may felicitously answer 'yes' to the polar question in (6) even if one only ate one or two apples or a similar fruit; a negative answer is not felicitous. Finally, (7) allows for the possibility that Roya ate only an apple or two, or something similar.

6) Q: sib mib xord -i 7) Royâ shâyad sib mib bo- xor -e  
apple Red eat.Pst -2.Sg Roya might apple Red Sbjv- eat.Prs -3.Sg  
'Did you eat an apple or something?' 'Roya might eat an apple or something'

A: Âre, ye/do tâ sib xord -am  
Yes one/two CL apple eat.Pst-1.Sg  
'Yes, I ate one/two apples'

The interpretation of m-reduplication thus shows sensitivity to the direction of entailment, just like English bare plurals (Krifka 2004; Spector 2007; Zweig 2009).

**Ignorance contexts:** Even in upward-entailing contexts, the non-homogeneity inference can be eliminated in contexts establishing speaker ignorance, as in (9).

9) Context: you see Sepideh carrying a lunchbox, in which she often carries an apple for an afternoon snack, but sometimes brings other fruits along with it. You don't know exactly how many fruits she has in the box, nor are you sure if she has anything but apples or in it.

Sepideh sib mib dâr -e  
Sepideh apple Red have.Prs-3.Sg  
'Sepideh has an apple or something.'

Here, the speaker is not necessarily committed to Sepideh having more than one apple, nor is she committed to her having anything but apples or just a similar kind of fruit.

**Analysis:** I propose that m-reduplicated nominals be analyzed as *mereological mixtures* of the set denoted by the bare nominal and the set of objects similar to it in the context. First, the similarity set

will simply be a set of objects with some property similar to the bare nominal, and will be denoted  $P^\sim$ . Here, the similarity set is defined not to include the set denoted by the bare nominal itself.

$$10) \llbracket P^\sim \rrbracket = \{x \mid \exists Q: Q \sim_c P \ \& \ Q(x) \ \& \ P \neq Q\}$$

Second, I define a *mixture* of two sets  $P$  and  $Q$  as the set of sums of elements from the cumulative closures of  $P$  and  $Q$ . A mixture will thus include both  $*P$  and  $*Q$  as subsets, in addition to sums of elements from each set. I further treat the mixture as a predicate.

$$11) \text{ a. } \llbracket \text{Mix}(P, Q) \rrbracket = \{X \oplus Y \mid X, Y \in *P \cup *Q\} \quad \text{b. } \llbracket \text{Mix}(P, Q)(t) \rrbracket = 1 \text{ iff } \llbracket t \rrbracket \in \llbracket \text{Mix}(P, Q) \rrbracket$$

I propose that m-reduplication denotes the mixture of the set denoted by the bare nominal and its similarity set, as in (12a), with a translation of (1) given in (12b). This gets the interpretation of m-reduplication in implicature-cancelling environments and ignorance contexts.

$$12) \text{ a. } \llbracket \text{RED} \rrbracket = \lambda P. \lambda X. \text{Mix}(P, P^\sim)(X) \quad \text{b. } \exists X[\text{Mix}(\text{Book}, \text{Book}^\sim)(X) \ \& \ * \text{Read}(X)(a)]$$

To derive the non-homogeneous plural interpretation, the set denoted by the bare noun and its similarity set need to be excluded, leaving only the set of sums of book and book-like objects. While the former is in principle derivable via a structural approach to alternatives (Katzir 2007), either by deletion of the reduplicative morpheme in the syntax, or by replacement of the reduplicative morpheme with the cumulative closure operator, the latter is an *abstract alternative* (Buccola et al. 2018; Charlow 2016), and does not correspond to any particular lexical item in the language. It is therefore not derivable via a sequence of deletions and replacements applying to the structural representation of the sentence.

The required alternatives  $*P$  and  $*P^\sim$  may be derived in two ways: they can be either lexically stipulated as part of a Horn scale (Horn 1972) or via operations on the conceptual representation of the expression in a language of thought (Buccola et al. 2018). However the alternatives are derived, they need to be pragmatically excluded. I formalize this with the notion of exhaustification (Fox 2007), defined in (13).

$$13) \llbracket \text{Exh}(p)(A) \rrbracket = p \ \& \ \forall q: q \in \text{IE}(A) \rightarrow \neg q$$

Both  $*P$  and  $*P^\sim$  are innocently excludable, as their negation does not lead to contradiction of the main assertion, so applying exhaustification to (9b) will lead to the following representation in (14).

$$14) \llbracket \text{Exh}(9b)(A) \rrbracket = \exists X[\text{Mix}(\text{Book}, \text{Book}^\sim)(X) \ \& \ * \text{Read}(X)(a)] \\ \& \ \neg \exists X[\text{Book}(X) \ \& \ * \text{Read}(X)(a)] \ \& \ \neg \exists X[\text{Book}^\sim(X) \ \& \ * \text{Read}(X)(a)]$$

(14) means that Mohsen read at least one thing in the mixture of books and book-like objects, he did not read something in the set of books, nor did he read something in the set of book-like things. This means that Mohsen must have read one of the book/book-like sums, deriving the non-homogeneous plural interpretation.

Although on this approach m-reduplication does not entail a non-homogeneous plurality, it is still possible to explain the compatibility of m-reduplication with collective predicates (2) and their unacceptability with *-râ* (3). For (2), we can simply assume the presence of a group forming operator that takes a number-neutral predicate and returns a group, to which a collective predicate may then apply. In the case of (3), following Jasbi (2014), bare NPs to which *-râ* attaches are operated on by an iota type-shifter, which is only defined if the domain to which it applies is a singleton set. Because of the mixture semantics of m-reduplication, unless *-hâ* is attached to an m-reduplicated noun to return the maximal element of the expression (Jasbi 2014), m-reduplicated nominals necessarily denote non-singleton sets: they will always contain at least the elements of the two sets in the mixture and their sum, so even the mixture of two singleton sets will result in a set with three elements. As such, the iota type-shifter will not be able to apply to an m-reduplicated nominal, explaining the unacceptability of (3) without *-hâ*.

**Selected References:** Buccola, B., Križ, M., & Chemla, E. (2018). Conceptual alternatives: Competition in language and beyond; Fox, D. (2007). Free choice and the theory of scalar implicatures. In *Presupposition and implicature in compositional semantics*, 71-120, Palgrave Macmillan, London; Jasbi (2014). The semantics of differential object marking in Persian. Qualifying Paper, Stanford University; Katzir, R. (2007). Structurally-defined alternatives. *Linguistics and Philosophy*, 30(6), 669-690; Krifka, M. (2004). Kinds of Kind Reference: Bare Plurals-Ambiguous or Not? In *Proceedings of Semantics and Linguistic Theory (SALT)*; Zweig, E. (2009). Number-neutral bare plurals and the multiplicity implicature. *Linguistics and philosophy*, 32(4), 353-407.