The Morphosemantics of the Slovenian Dual

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Outline

Recent semantic studies on [SG] vs. [PL]:

- Sauerland (2003), Sauerland, Anderssen, & Yatsushiro (2005), Sauerland (2008)
- Spector (2007)
- Farkas & De Swart (2010)

Against this backdrop, we will discuss **the Slovenian dual**.

1. Basic facts to be accounted for
2. Dvořák & Sauerland (2006) on the Slovenian dual
3. (Extending Spector's (2007) Theory of Number to Dual)
4. A morphosemantic theory of number
5. Towards a morphosemantic analysis of the dual

Properties of the Slovenian Dual

Slovenian Dual: Basics

Slovenian makes a three-way number distinction:

singular, **dual**, **plural**

'Town' (neuter)

	SG	DU	PL
NOM, ACC	mest**o**	mest**i**	mest**a**
DAT	mest**u**	mest**oma**	mest**om**
INSTR	mest**om**	mest**oma**	mest**i**
GEN	mest**a**	mest	mest

Masc. pronouns

NOM	SG	DU	PL
1	**ja**	**midva**	**mi**
2	**ti**	**vidva**	**vi**
3	**on**	**onadva**	**oni**

ACC	SG	DU	PL
1	**mene**	**naju**	**nas**
2	**tebe**	**vaju**	**vas**
3	**njega**	**njiju**	**njih**

Slovenian Dual: Basics (cont.)

Determiners, adjectives, and verbs show dual agreement.

(1)

T**a**	dv**a**	stol**a**
these.DU.M.NOM	two.DU.M.NOM	chair.DU.M.NOM

st**a**	polomljen**a**
be.3.DU.PRES	broken.DU.M.NOM

‘These two chairs are broken.’ (Derganic 2003: 168)

Unmodified dual nouns tend to receive definite interpretations (Jakopin 1966; see also Dvořák & Sauerland 2006).

(2)

Otroka	hodita	še	v	šolo.
children.DU.M.NOM	go.3.DU.PERS	still	to	school

‘The two children still go to school.’ (Derganic 2003: 168)

Dva, Oba + DU

Modifiers like **dva** ‘two’ and **oba** ‘both’ require dual nouns (Derganic 2003, Dvořák & Sauerland 2006).

(3) **Dva** **otroka** hodita še v
two.DU.M.NOM child.DU.M.NOM go.3.DU.PRES still to
šolo.
school
‘Two children still go to school.’ (Derganic 2003: 168)

(4) **Obe** **nogi** me bolita.
both foot.DU me hurt.3.DU.PRES
‘Both my feet hurt’ (Derganic 2003: 172)

Paired Nouns

What's peculiar about the Slovenian dual is that [PL] is used for entities that naturally come in pairs (**paired nouns**) (Derganic 2003, Dvořák & Sauerland 2006, Sauerland 2008).

roke	'hands'	*noge*	'feet'	*oči*	'eyes'
čevlji	'shoes'	*rokavice*	'gloves'	*starši*	'parents'

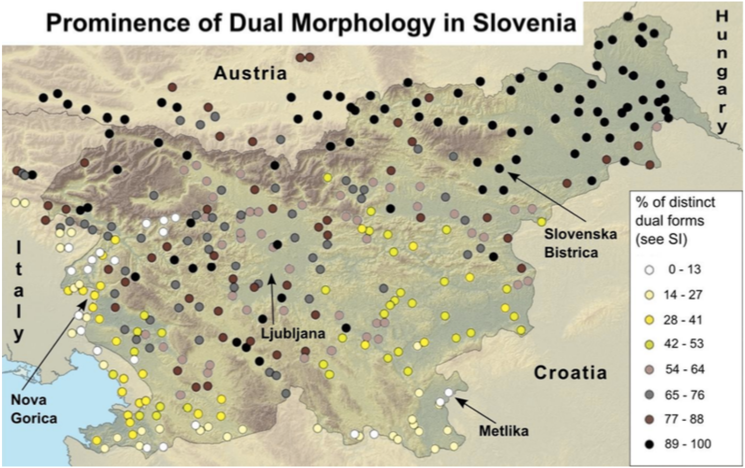
(5) a. **Noge** me bolijo.
foot.PL me hurt.3.PL.PRES
'My feet hurt.'

b. ***Nogi** me bolita.
foot.DU me hurt.3.DU.PRES

Their dual forms are used when preceded by *dva* or *oba*, as in (4).

Note: Dialectal Variation

There is considerable dialectal variation (Marušič, Žaucer, Plesničar, Rzboršek, Sullivan & Barner 2016; see also Jakop 2008).



Data Summary

1. Slovenian dual nouns are used to describe exactly two entities.

2. *Dva* ‘two’ and *oba* ‘both’ select for dual nouns.

3. Unmodified dual nouns tend to receive definite readings.

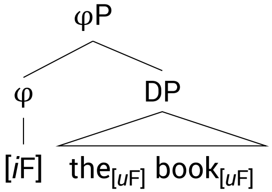
4. Paired nouns appear in plural, except when modified by *dva* or *oba*.

Dvořák & Sauerland (2006) on the Slovenian Dual

Sauerland's Theory of Number

Dvořák & Sauerland's (2006) analysis is built on Sauerland's theory of number (Sauerland 2003, Sauerland, Anderssen & Yatsushiro 2005, Sauerland 2008).

Sauerland claims that φ-features are situated above D.



The only instances of interpretable φ-features are on φ, and all others are uninterpreted agreement reflexes.

We will only represent number features in this talk.

Sauerland's Semantics for Number

Number features denote identity functions over entities.

$$
\begin{array}{lclll}
[\![\text{[SG]}]\!] & = & \lambda x: & |x| = 1 & . \quad x \\
[\![\text{[PL]}]\!] & = & \lambda x: & \top & . \quad x
\end{array}
$$

The presupposition of [PL] is always satisfied, but the pragmatics requires [SG] to be used whenever possible.

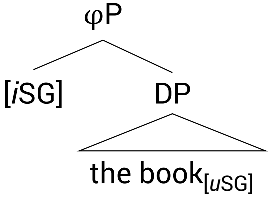
Maximize Presupposition (MP)

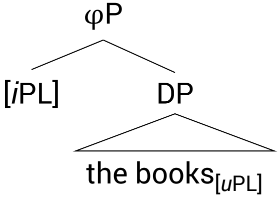
φ is infelicitous in context *c* if there is an alternative ψ that is contextually equivalent to φ and has a stronger presupposition that is satisfied in *c*.

Everything else (i.e. assertion) being equal, the pragmatics prefers expressions with more presuppositions.

Examples: Definites

⟦book(s)⟧ is always number-neutral and ⟦the⟧(P) is the unique maximal individual in P.





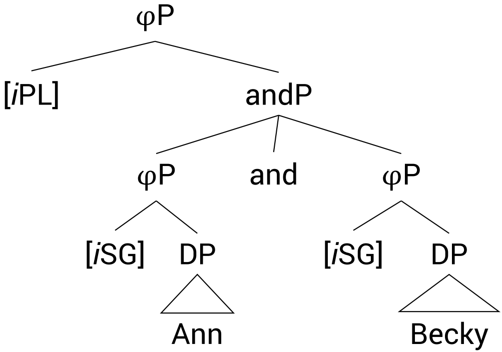
In situations with only one book, both are semantically coherent, but [PL] is ruled out by MP.

If there are multiple books, [SG] triggers a presupposition failure and cannot be used, so only [PL] is felicitous.

(See Mayr 2015 for more discussion)

Coordination

The theory captures why conjoined singular proper names trigger plural agreement.

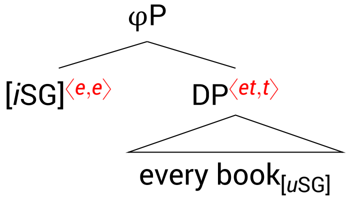


Other combinations of number features are ruled out semantically or by MP.

Generalized Quantifiers

Sauerland's theory gets complicated with quantifiers.

Number features denote identity functions over entities, so when DP is a quantifier, there will be a type-mismatch.



Sauerland assumes DP undergoes QR in such cases.

(To ensure [SG] with 'every', Sauerland assumes that'every book' is quantifies over atomic books, and universally projects the presupposition of the nuclear scope)

Sauerland's Generalization

Further complications arise when DP is an indefinite, which Sauerland assumes is a GQ.

Sauerland's generalization

Indefinite plurals (including bare plurals) receive number-neutral interpretations in negative contexts.

(6) I have **coins** in my pocket.
= I have $\gneq$ 1 coins (**Multiplicity Inference**)

(7) I don't have **coins** in my pocket.
$\neq \neg$**(I have $\gneq$ 1 coins)**

(8) If you have **coins** in your pocket, put them in a tray.
$\neq$ **If you have $\gneq$ 1 coins, ...**

Indefinites

Sauerland (2003) assumes that $\exists(R)(S)$ has an existential presupposition that $\exists x : R(x) \wedge x \in \mathrm{dom}(S)$.

(9) I saw unicorns.
  a. LF: [$\exists$ unicorns] [λx I saw [PL] x]
  b. Presupposition: there is at least one unicorn.

But as Sauerland, Anderssen & Yatsushiro (2005) point out, this is problematic for cases like (10).

(10) I didn't see unicorns.
  a. LF: [$\exists$ unicorns] [λx I didn't see [PL] x]
  b. Presupposition: there is at least one unicorn. !!!

Sauerland et al. (2005)

Sauerland et al. (2005) assume instead that existentially quantified sentences $\exists(R)(S)$ do not have presuppositions, and simply assert $\exists x\colon\ P(x) \wedge Q(x)$.

This is fine for sentences like (11). The predicted truth-conditions for them are identical.

(11) a. I didn't read a book. b. I didn't read $\exists$ books.

But it does not explain the **multiplicity inference** in positive contexts like (12b).

(12) a. I read a book. b. I read books.

Sauerland et al. (2005) (cont.)

To fix this, Sauerland et al. (2005) propose:

(13) MP applies to the scope of an existential quantifier if it strengthens the meaning of the entire sentence.

But they do not define MP for such non-global cases. As Spector (2007) discusses, it is not trivial to formulate it.

(14) a. [λx I read [SG] x] b. [λx I read [PL] x]

(14a) is only defined for atomic entities. If we negate this presupposition, what we get for (14b) is that it is defined not only for atomic entities, which is too weak (we want (14b) is not defined for atomic entities).

Spector (2007) raises more problems against Sauerland et al.

Dvořák & Sauerland on Slovenian Dual

So Sauerland's theory of number has problems with number marking on indefinites.

Assuming Sauerland's theory of number, Dvořák & Sauerland (2006) claim: **the Slovenian dual is semantically less marked than the singular and more marked than the plural** (see also Sauerland 2008):

(15)
$$\begin{array}{llllll} [\![\text{[PL]}]\!] & = & \lambda x: & \top & . & x \\ [\![\text{[DU]}]\!] & = & \lambda x: & |x| = 1 \vee |x| = 2 & . & x \\ [\![\text{[SG]}]\!] & = & \lambda x: & |x| = 1 & . & x \end{array}$$

Why does [DU] presuppose **at most two** rather than **exactly two** or **at least two**?

Sauerland's (2008) examples: Ignorance

Sauerland (2008: 85) presents (16) to support the analysis:

(16) Context: *I want to have someone over for dinner but I only have enough food to invite either* **Bill and his brother** *or* **only John***.*

Naj pride-ta točno ob osmih.
PRT come.3.DU exactly at 8.LOC

'They.DU should come at 8 o'clock.'

Three native speakers we consulted do not agree with the reported judgments here: For them, the dual here is either plainly infelicitous, or suggests that the speaker is talking about Bill and his brother, but not John.

Sauerland's (2008) examples: Quantification

Sauerland (2008) gives another relevant example:

(17) Context: *Every student brought one or two books.*

Vsak študent je prinesel s seboj
- a. svoj-o knjig-o (SG)
- b. svoj-i knjig-i (DU)
- c. svoj-e knjig-e (PL)

every student be brought with self self's book(s)
'Every student brought his book(s)'

According to Dvořák & Sauerland:

- (17a) presupposes that every student has one book.
- (17b) presupposes that every student has one or two books.
- (17c) presupposes that every student has at least one book.

He reports that PL is not possible, while SG and DU are acceptable (the former is problematic for Dvořák & Sauerland).

Sauerland's (2008) examples: Quantification (cont.)

We tested the same example with 30 speakers. The results show that the dual is unavailable.

- SG: 48% acceptance
- DU: **0% acceptance**
- PL: 62% acceptance

If anything, this suggests that [DU] does *not* mean 'one or two', but either 'exactly two' or 'at least two'.

- The acceptability of SG is unexpected under any account. (Could be due to accommodation?)
- The acceptability of PL is also unexpected for Dvořák & Sauerland. It should be ruled out by MP.

Advantage

There is no convincing evidence that DU means ‘at most two’, rather than ‘exactly two’ or ‘at least two’.

But regardless of this question, their analysis accounts for the distribution of [DU] with referring DPs.

(18)	**Tone in**	**jaz** sva		šla	h	kovaču.
	Tone and I		be.1DU.PRES	went	to	blacksmith

‘Tone and I went to the blacksmith.’ (Derganic 2003: 169)

Here, [DU] wins over [PL]. [SG] is semantically ruled out.

(19)	**ta**	**dva**	**stola**
	these.DU.NOM	two.DU.M.NOM	chair.DU.NOM

‘these two chairs’

If there is only one chair, [SG] is the best option. So (19) can only be used to refer to exactly two chairs.

Problems

But Dvořák & Sauerland's analysis is incomplete in several respects.

- They assume Sauerland's theory of number, which is problematic for existentially quantified sentences.

- Relatedly, they don't account for the definite interpretation of bare dual nouns.

  (20)

Otroka	hodita	še	v	šolo.
children.DU.M.NOM	go.3.DU.PERS	still	to	school

  'The two children still go to school.' (Derganic 2003: 168)

- They also do not explain the behavior of paired nouns.

Spector (2007) on Plural Indefinites

Spector's (2007) Analysis of Multiplicity

Spector (2007) proposes a better analysis of the multiplicity inferences of plural indefinites as **higher-order scalar implicatures**.

With Sauerland, Spector assumes that [PL] is semantically trivial. He also assumes that a singular indefinite asserts (rather than presupposes) atomicity (see also Mayr 2015).

(21) a. $[\![$Chris read a book$]\!] = 1$ iff there is one book that Chris read.

b. $[\![$Chris read books$]\!] = 1$ iff there is at least one book that Chris read.

Spector's (2007) Analysis of Multiplicity (cont.)

So (22) are truth-conditionally equivalent under this account.

(22) a. Chris read a book. b. Chris read books.

Spector derives the multiplicity inference of (22b) as a higher-order scalar implicature as follows:

- *a* competes with *several*, so (22a) has a scalar implicature that $\neg$(Chris read multiple books). With this SI, (22a) means 'Chris read exactly one book'.
- (22b) competes with (22a) with the scalar implicature. Consequently, its scalar implicature is $\neg$(Chris read exactly one book), which is the multiplicity inference we want.

Spector's theory accounts for various examples involving plural indefinites.

Extending Spector to Slovenian Dual

But it is not obvious how to extend it to the Slovenian dual.

To be concrete, let's assume:

(23) a. $[\![\text{book.SG}]\!](x) = 1$ iff x is an atomic book.
b. $[\![\text{book.PL}]\!](x) = 1$ iff all atomic parts of x are books.
c. $[\![\text{book.DU}]\!](x) = 1$ iff $x = y \oplus z$ and y and z are both atomic books.

- This alone does not explain why bare dual nouns tend to have definite readings.
- It also does not explain the behavior of paired nouns.
- (Unlike Dvořák $\pm$ Sauerland, Spector only talks about indefinites. His theory is not meant to account for [DU] on definite DPs.)

A Morphosemantic Theory of Number

Morphological Markedness

Sauerland and Spector do not say much about the morphology of number.

Farkas & De Swart's (2010) insight: morphological markedness and semantic markedness are closely related.

- [PL] is morphologically more marked than [SG].
- Correspondingly, [PL] expresses a more marked meaning than [SG], i.e. it has a multiplicity inference.

Since Farkas & De Swart's theory has some unattractive features, we will not follow it faithfully here.

Also, we will extend the idea to [DU] on the assumption that [DU] is morphologically more marked than [PL] (Nevins 2011).

[SG] vs. [PL]

It is uncontroversial that [PL] is morphologically more marked than [SG] (Greenberg 1963, Corbett 2000, Farkas & De Swart 2010)

- When a language has plural, it also has singular.
- There are many cases of singular-plural pairs crosslinguistically where the singular is morphologically zero-marked or at least simpler than the plural.
- There tends to be more syncretism in the plural.

Following Farkas & De Swart, we assume that morphological and semantic markedness align:

- [SG] receives an unmarked meaning.
- [PL] receives a marked meaning.

Semantic Hierarchy

What is a marked meaning?

Again following Farkas & De Swart (2010), we assume reference to plural entities is semantically marked (see Farkas & De Swart for psycholinguistic support). The most unmarked meaning is atomic entities only.

Markedness hierarchies:

Morphological:	[SG]	$\ll$	[PL]
Semantic:	atomic only	$\ll$	not only atomic

We assume no semantics for [SG] and [PL], except that they are somehow associated with the number semantic hierarchy (Here we depart from Farkas & De Swart).

They get number inferences via ‘pragmatic reasoning’.

Number Inference: Singular

Basic Idea:

- You encounter a singular noun; you ask yourself “Whey didn’t the speaker use the plural form?’
- The singular and plural have the same semantics, so the literal meaning is not the reason.
- One plausible reason is because the speaker wants to mean the unmarked number meaning, i.e. atomic reference.

E.g.

- ‘There is a book’ is semantically number-neutral.
- The speaker must mean the unmarked meaning. The sentence is only about atomic entities. (in the sense to be made precise below)

Operator $\mathfrak{M}$

To be more explicit, we implement this pragmatic reasoning as an operator $\mathfrak{M}$ (Here, too, we depart from Farkas & De Swart; they explicitly deny such a possibility).

$\mathfrak{M}$ (ver. 1)

Let $\varphi[N]$ be a sentence that contains an occurrence of a singular noun N. If a plural form of N would be grammatical in place of N,

$$[\![\mathfrak{M}(\varphi[N])]\!] = [\![\varphi[N]]\!] \wedge \neg[\![\varphi[N^+]]\!]$$

where $[\![N^+]\!] = [\lambda x.\ [\![N]\!](x) \wedge |x| > 1]$

Example

$[\![\mathfrak{M}(\text{there is a book})]\!]$
$= [\![\text{there is a book}]\!] \wedge \neg[\![\text{there is a book}^{+}]\!] = 1$
iff $\exists x[{}^{*}\text{BOOK}(x)] \wedge \neg\exists x[{}^{*}\text{BOOK}(x) \wedge |x| > 1]$
iff there is exactly one book.

You might think that this inference is too strong. We believe this is a possible interpretation (cf. Spector 2007), but the sentence also has a reading that is compatible with multiple books.

We allow $\mathfrak{M}$ to take scope at the NP level by type-generalizing it (cf. Sudo 2014, Mayr 2015 for Exh):

$[\![\text{There is a } \mathfrak{M}(\text{book})]\!] = 1$
iff $\exists x[{}^{*}\text{BOOK}(x) \wedge \neg({}^{*}\text{BOOK}(x) \wedge |x| > 1)]$
iff there is an atomic book.

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iff there is an atomic book.

Consistency

For negative sentences, the wide scope $\mathfrak{M}$ is contradictory.

$[\![\mathfrak{M}(\text{there isn't a book})]\!] = 1$
iff $\neg\exists x[{}^*\text{BOOK}(x)] \wedge \neg(\neg\exists x[{}^*\text{BOOK}(x) \wedge |x| > 1)])$
iff $\bot$

Assuming that pragmatic reasoning is contradiction-free, the options here are the intermediate and local readings (**Open issue**: Why is the latter preferred?).

$\mathfrak{M}$ (ver. 2)

Let $\varphi[N]$ be a sentence that contains an occurrence of a singular noun N. If a plural form of N would be grammatical in place of N and $[\![\varphi[N]]\!] \wedge \neg[\![\varphi[N^+]]\!]$ is consistent:

$$[\![\mathfrak{M}(\varphi[N])]\!] = [\![\varphi[N]]\!] \wedge \neg[\![\varphi[N^+]]\!]$$

Example: Non-monotonic Environment

We derive the correct inference for (24).

(24) Exactly one student read a book.

$[\![\mathfrak{M}(\text{Exactly one student read a book})]\!] = 1$
iff exactly one student read at least one book,
and $\neg$(exactly one student read multiple books)
iff one student read exactly one book,
and no other students read any books.

The local reading would be ‘Exactly one student read at least one book’, which might also be attested.

Open issue: The intermediate reading is hard (‘Exactly one student read exactly one book’).

Semantically Unmarked [SG]

What's nice about this account is that [SG] only gets a number inference when [PL] is a grammatical alternative.

Conversely, if [PL] is unavailable, [SG] would get a number-neutral reading (cf. Farkas & De Swart 2010).

- Hungarian cardinal expressions are incompatible with [PL].

  (25) **Sok gyerek** gyűlt össze a téren.
  many child.SG gathered.SG PRT the square.on
  'Many children gathered in the square.' (Farkas & De Swart 2010)

- In languages with no obligatory number marking (e.g. Mandarin Chinese, Japanese), unmarked forms are always number-neutral.
- Mass nouns are morphosyntactically [SG], but have no number inferences.

Number Inference: Plural

Why about plural nouns?

- When you encounter a plural noun, then you reason why the speaker didn’t use the singular.
- Again, the literal meaning would be the same.
- It must be because the speaker doesn’t want to mean the unmarked meaning ‘atomic only’.

E.g.

- ‘There are books’ is semantically number-neutral.
- The speaker doesn’t mean the unmarked meaning, which is atomic only.
- So the speaker must mean ‘not only atomic’.

What does ‘not only atomic’ mean?

'Not Only Atomic' (Formal Details)

The idea is to allow the possibility for *books* to be describing multiple books.

One way to formalize 'not only atomic' is to use Veltman's (1996) test modal. So let's dynamicize the language.

- $c[{}^*\mathrm{BOOK}(x)] = \{\, \langle f, w\rangle \in c \mid \langle f, w\rangle \models {}^*\mathrm{BOOK}(x) \,\}$
- $c[\exists^x] = \{\, \langle f[x \mapsto d], w\rangle \mid \langle f, w\rangle \in c \wedge d \in D \,\}$
- $c[\Diamond(\varphi)] = \begin{cases} c & \text{if there is } \langle f, w\rangle \in c \text{ s.t. } \langle f, w\rangle \models \varphi \\ \varnothing & \text{otherwise} \end{cases}$
- $c[\varphi \wedge \psi] = c[\varphi][\psi]$

The literal meaning of 'there are books' translates into:

$$c[\exists^x \wedge {}^*\mathrm{BOOK}(x)] = \left\{ \langle f[x \mapsto d], w\rangle \;\middle|\; \begin{array}{l} \langle f, w\rangle \in c \wedge d \in D \\ \wedge \langle f[x \mapsto d], w\rangle \models {}^*\mathrm{BOOK}(x) \end{array} \right\}$$

'Not Only Atomic' (Formal Details) (cont.)

$\mathfrak{M}$ adds a statement that there might be multiple books.

$$c[\exists^x \wedge {}^*\text{BOOK}(x)][\Diamond(\exists^x \wedge {}^*\text{BOOK}(x) \wedge |x| > 1)]$$

In words, you have to make sure that there is at least one possibility where there are multiple books.

A nice consequence of this is that we can rule out examples like (26) (Spector 2007, Farkas & De Swart 2010).

(26) #Chris doesn't have Roman noses.

$\mathfrak{M}$ adds the following test:

$$\Diamond(\neg(\exists^x \wedge {}^*\text{ROMAN.NOSE}(x) \wedge {}^{**}\text{HAVE}(\text{chris}, x) \wedge |x| > 1))$$

We assume the standard update for negation $c[\neg\varphi] = c - c[\varphi]$. So we have to make sure that c updating with 'Chris has multiple Roman noses' is not null. But given the common ground, it will be null!

Contextual Blindness

So the number inference could trigger infelicity.

If it is a purely pragmatic inference, like Gricean reasoning, then it would be able to do so (Of course, the speaker is not trying to be infelicitous!).

We assume that the number inference is similar in nature to the **Magrian scalar implicature** (Magri 2009, 2011).

(27) #Some Italians are from a beautiful country.

Multiplicity as Scalar Implicature

But the ‘not only atomic’ meaning doesn’t give you the multiplicity inference. ‘$\mathfrak{M}$(There are books)’ would only mean, there might be multiple books.

To derive it, we adopt Spector’s (2007) idea: The multiplicity inference is a scalar/quantity implicature:

- You hear ‘$\mathfrak{M}$(There are books)’.
- ‘$\mathfrak{M}$(there is a book)’ means ‘There is exactly one book’, which is stronger. Why didn’t the speaker say so?
- The speaker doesn’t believe that this is true (Quantity Implicature).
- (With an Epistemic Step) we conclude that there is at least one book and $\neg($there is exactly one book$)$.

Furthermore, all the nice things about Spector’s analysis will carry over to our analysis.

Examples

$[\![\mathfrak{M}(\text{There are books})]\!] = 1$ iff there is at least one book (and possibly multiple books).

This competes with $[\![\mathfrak{M}(\text{There is a book})]\!]$, which means 'There is exactly one book', and generates a scalar implicature that $\neg($there is exactly one book$)$, which is the multiplicity inference.

$[\![\mathfrak{M}(\text{There aren't books})]\!] = 1$ iff there is no books (and possibly, there is no multiple books).

Here, $[\![\mathfrak{M}(\text{There isn't a book})]\!]$ is contradictory. So no scalar implicatures.

We can deal with non-monotonic contexts, just like Spector does (which are problematic for Farkas & De Swart 2010).

Summary: Morphosemantic Theory of Number

- [SG] and [PL] get their meanings only via competition. When no competition, [SG] is number-neutral.

- The 'pragmatics' demands that the morphologically less marked form express the semantically less marked meaning.

- Markedness hierarchies:

Morphological:	[SG]	$\ll$	[PL]
Semantic:	atomic only	$\ll$	not only atomic

- Multiplicity inference of the plural is a scalar implicature (Spector 2007).

A Morphosemantic Analysis of the Slovenian Dual

The Morphological Markedness of Dual

Dual is morphologically more marked than plural (see Nevins 2011 for more discussion):

- When a language has dual, it also has plural (Greenberg 1963).
- Dual is the first one to be lost (Corbett 2000).
- Dual is rarer than plural (Corbett 2000).
- Dual is acquired later than plural (Ravid & Hayek 2003).
- Dual exhibits more syncretism (Greenberg 1966, Nevins 2011).

So the dual should express a more marked meaning than plural.

Semantic Hierarchy with Dual

Stipulation: Pair reference is semantically most marked.

(Default) markedness hierarchies:

Morphological:	[SG]	$\ll$	[PL]	$\ll$	[DU]
Semantic:	atomic	$\ll$	non-atomic, non-pair	$\ll$	pair

When you encounter [DU] you ask yourself: 'Why did the speaker use the most marked form?' One plausible reason is that the speaker wants to mean the most marked meaning, reference to pairs.

So [DU] ends up meaning 'exactly two'!

Paired Nouns

But recall that paired nouns usually plural, rather than dual.

(28) a. **Noge** me bolijo.
foot.PL me hurt.3.PL.PRES
'My feet hurt.'
b. ***Nogi** me bolita.
foot.DU me hurt.3.DU.PRES

Proposal: The semantic markedness hierarchy is context-dependent. When talking about feet, reference to pairs is *less* marked than reference to non-pair plural entities.

Markedness hierarchies for paired nouns:

Morphological:	[SG]	≪	[PL]	≪	[DU]
Semantic:	atomic	≪	pair	≪	non-atomic non-pair

Paired Nouns (cont.)

Recall also that dual paired nouns are acceptable with **dva** 'two' and **oba** 'both'.

(29) **Obe nogi** me bolita.
both foot.DU me hurt.3.DU.PRES
'Both my feet hurt' (Derganic 2003: 172)

We claim that this is due to the same reason why [SG] is acceptable with cardinal expressions in Hungarian.

That is, in these contexts, [DU] does not compete with [PL], because [PL] would be ungrammatical for syntactic reasons (similarly for [SG]). So [DU] is simply the only possibility here.

Open question: How do we know that this is a syntactic phenomenon, and not semantic??

Why Only Definite?

Lastly, recall that bare dual nouns tend to be definite.

Our theory offers an analytical possibility here: The number inference that the Slovenian dual triggers is ‘necessarily two’, where ‘necessarily’ is Veltman’s $\Box$.

$$c[\Box(\varphi)] = \begin{cases} c & \text{if for each } \langle f, w\rangle \in c, \langle f, w\rangle \vDash \varphi \\ \varnothing & \text{otherwise} \end{cases}$$

$$\begin{aligned} & c[\mathfrak{M}(\exists^x \text{ book.DU})] \\ & = c[\text{There are } \exists^x \text{ book.DU}][\Box(\text{There are } \exists^x \text{ book.DU and } |x| = 2)] \end{aligned}$$

This would always fail with an indefinite, because $\exists$ is assumed to be random assignment.

On the other hand, if ‘the book.DU’ would always succeed, insofar as it is referring to exactly two books.

Unresolved question: Why is it that [SG] simply asserts atomicity, while the inference of [DU] is modalized?

Conclusion: Towards a Morphosemantic Theory of Meaning

A morphosemantic theory of number:

- Number features have no lexically determined meanings. They trigger interpretive effects via compeition with other number features.
- Morphological and semantic markedness must align.

(Default) markedness hierarchies:

Morphological:	[SG]	$\ll$	[PL]	$\ll$	[DU]
Semantic:	atomic	$\ll$	non-atomic, non-pair	$\ll$	pair

This is very different from the traditional approach that assigns meanings in the lexicon.

Further directions: other φ-features (person, gender, politeness, etc.), tense/aspect.

Thanks!

References

- Derganc (2003) The dual in Slovenian. *Sprachtypologie und Universalienforschung*, 56.
- Dvořák & Sauerland (2006) The semantics of the Slovenian dual. In FASL 14.
- Farkas & De Swart (2010) The semantics and pragmatics of plurals. In *Semantics & Pragmatics*, 3.
- Greenberg (1963) Some universals of grammar with particular reference to the order of meaningful elements. In *Universals of Language*.
- Jakop (2008) *The Dual in Slovene Dialects*.
- Jakopin (1966) Slovenska dvojina in jezikovne plasti. *Jezik in slovstvo*, 11.
- Nevins (2011) Marked targets versus marked triggers and impoverishment of the dual. *Linguistic Inquiry*, 42.
- Marušič, Žaucer, Plesničar, Razboršek, Sullivan, & Barner (2016) Does grammatical structure accelerate number word learning? Evidence from learners of dual and non-dual dialects of Slovenian. *Plos One*.
- Mayr (2015) Plural definite NPs presuppose multiplicity via embedded exhaustification. *SALT 25*.
- Sauerland (2003) A new semantics for number. In *SALT 13*.
- Sauerland (2008) On the semantic markedness of phi-features. In *Phi Theory*.
- Sauerland, Anderssen & Yatsushiro (2005) The plural is semantically unmarked. In *Linguistic Evidence*.
- Spector (2007) Aspects of the pragmatics of plural morphology: On higher-order implicatures. In *Presuppositions and Implicatures in Compositional Semantics*.
- Veltman (1996) Defaults in update semantics. *Journal of Philosophical Logic*, 25.