Evolutionary stability in syntax: the case of information structure

Elena Maslova
Stanford University &
University of Bielefeld

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Themes

- Linguistic interpretation of cross-linguistic distributions
- Looking for ways to analyze language change in terms of a generalized evolutionary framework
- Typology of information-structure constructions: some very common properties which can be accounted for in terms of evolutionary stability
- A specific system of this sort, the Yukaghir focus, which has demonstrated a remarkable degree of stability in a rather aggressive environment

Terminology

- “Strategy” (of use): this term is intended to subsume both the meaning proper and all constraints (pragmatic, grammatical, etc.) that happen to be associated with a construction.
- “Dominant strategy”: the strategy used by (residing in the mental grammars of) the majority of speakers.
- “Mutation”: a novel strategy for the same construction, used by a minority of speakers.
- An evolutionary stable strategy is resistant to mutations if it is dominant.

Terms and assumptions

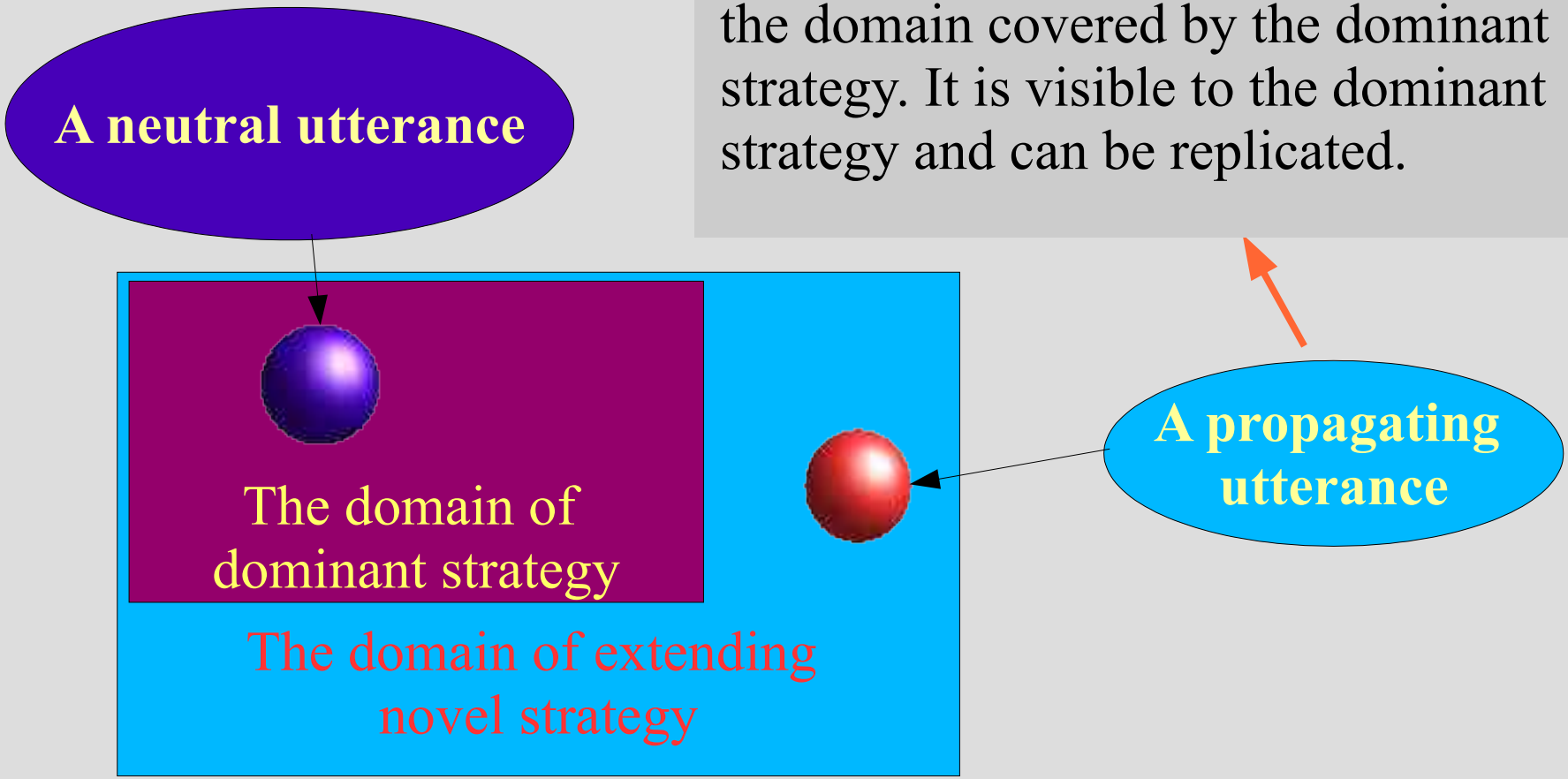
- **Language change:** a change from one dominant strategy to another
- **Propagation through acquisition**: a higher proportion of new speakers learn the novel (mutant) strategy (instead of the old one).
- **Propagation through communication**: (formerly) conservative adult speakers accept the novel strategy as a result of communication with the innovative speakers.
- This talk focuses on the second mechanism, more specifically, on its linguistic prereqisites.

Visibility ("actualization")

- A novel strategy can "jump" from one speaker to another only if it is *visible* to conservative speakers, i.e. if there are utterances which would "show" to conservative speakers that their interlocutors use a novel strategy; only a visible strategy can be imitated.
- This necessary (but not sufficient) condition is especially non-trivial in the case of semantic (functional) variation.
- This concept can be preliminarily illustrated with a very general and familiar phenomenon.

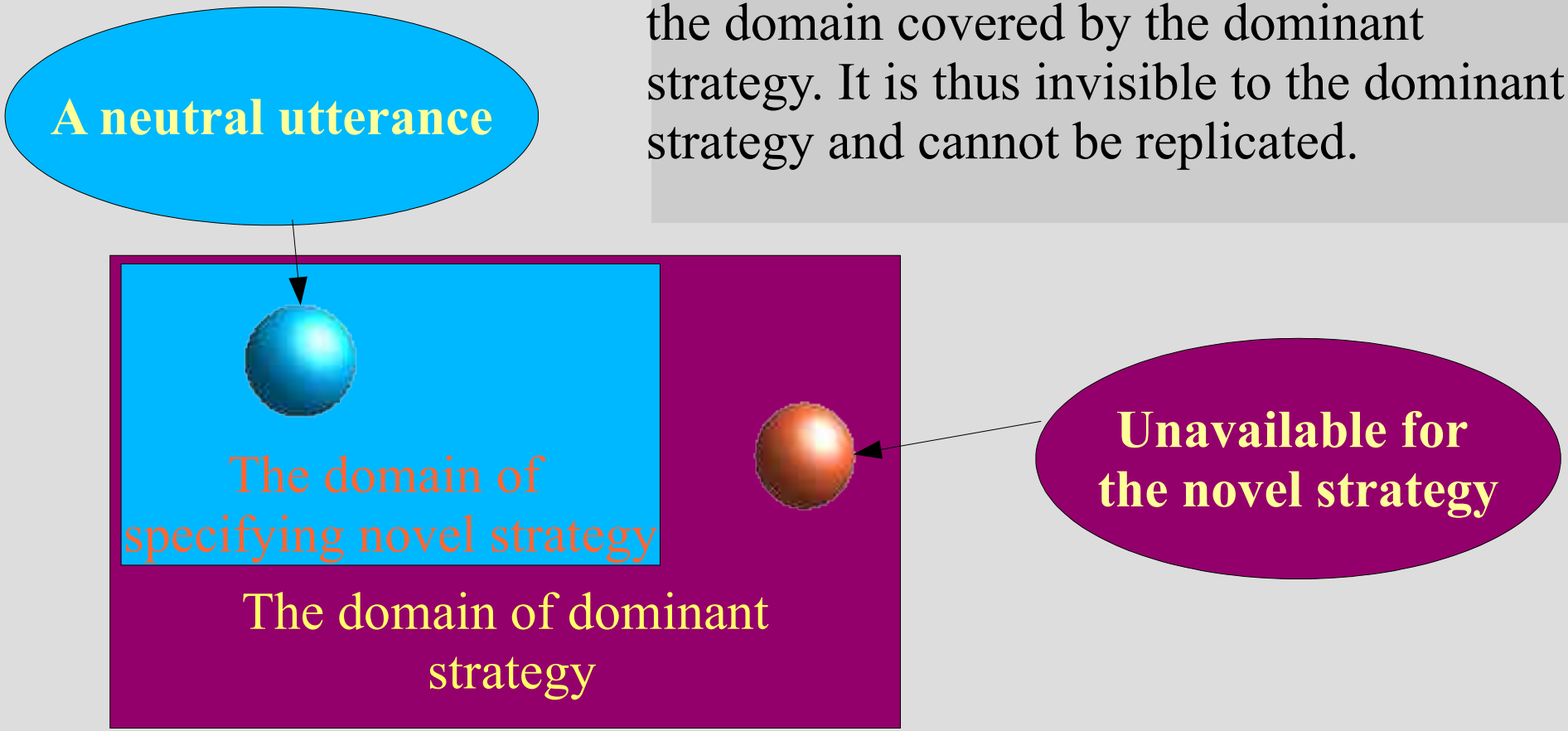
Extending vs. specifying mutations

An extending mutation produces propagating utterances, which lie outside the domain covered by the dominant strategy. It is visible to the dominant strategy and can be replicated.



Extending vs. specifying mutations

A specifying mutation cannot produce utterances which would lie outside the domain covered by the dominant strategy. It is thus invisible to the dominant strategy and cannot be replicated.



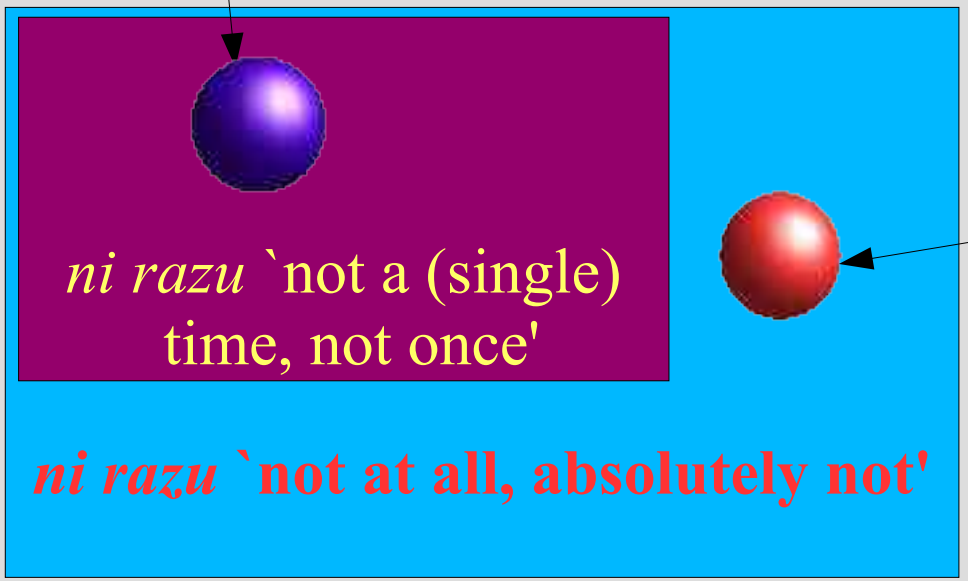
Grammaticalization

Semantic extension is an inherent aspect of grammaticalization; the well-known strong tendency towards unidirectionality of this process doesn't mean there is any preference for extending mutations (i.e. that they are more probable, at the level of individual speaker, than specifying mutations): even if these types of mutations are equiprobable, the asymmetry of "visibility" would fully account for the unidirectionalty, insofar as specifying mutations remain invisible and are not propagated.

An example of extending mutation: Russian *ni razu*

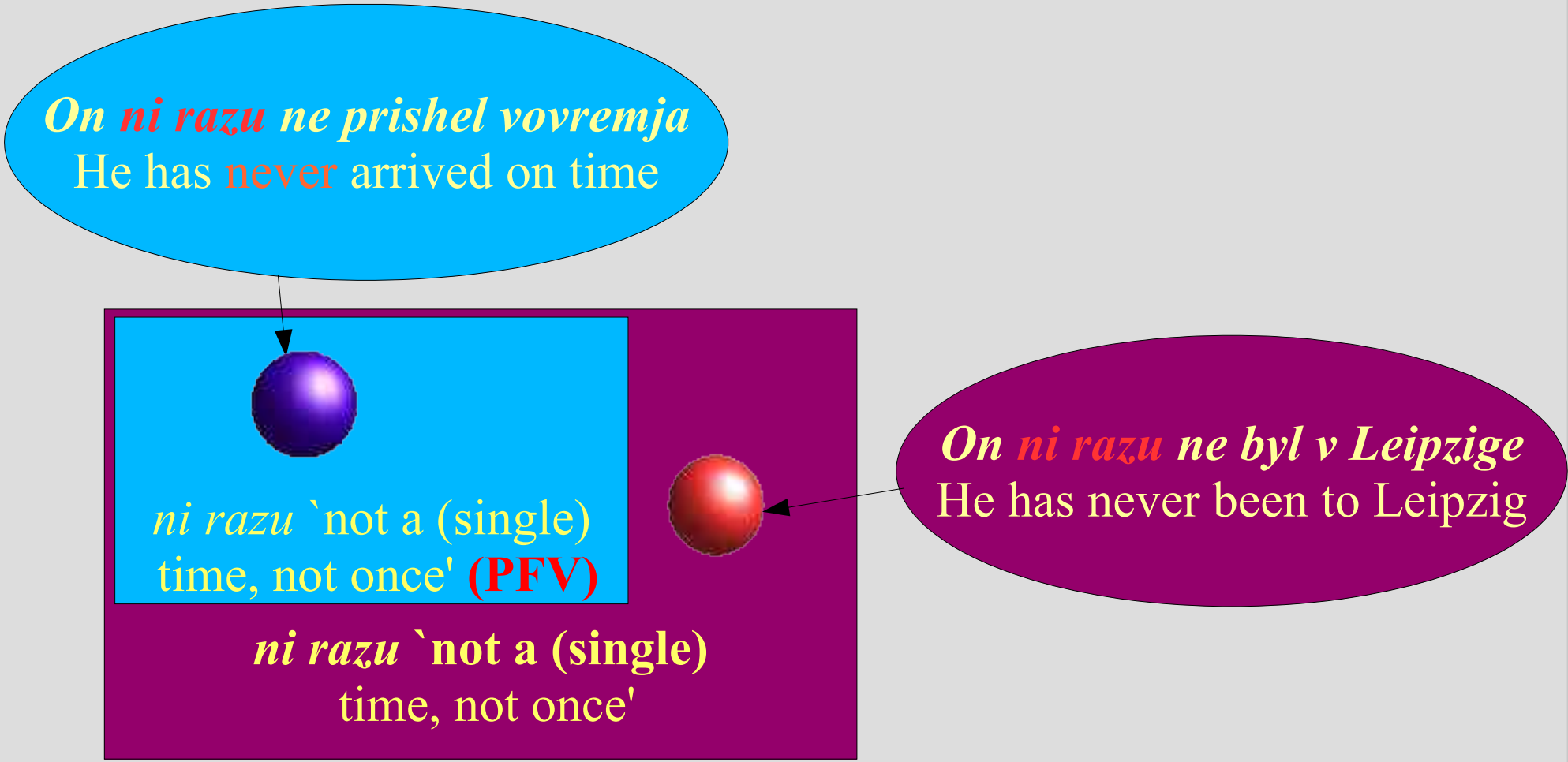
On ni razu ne byl v Leipzige
He has never been in Leipzig

ni	*raz-u*
NEG	time-GEN
odin	*raz*
one	time
sem'	*raz*
seven	times[C]



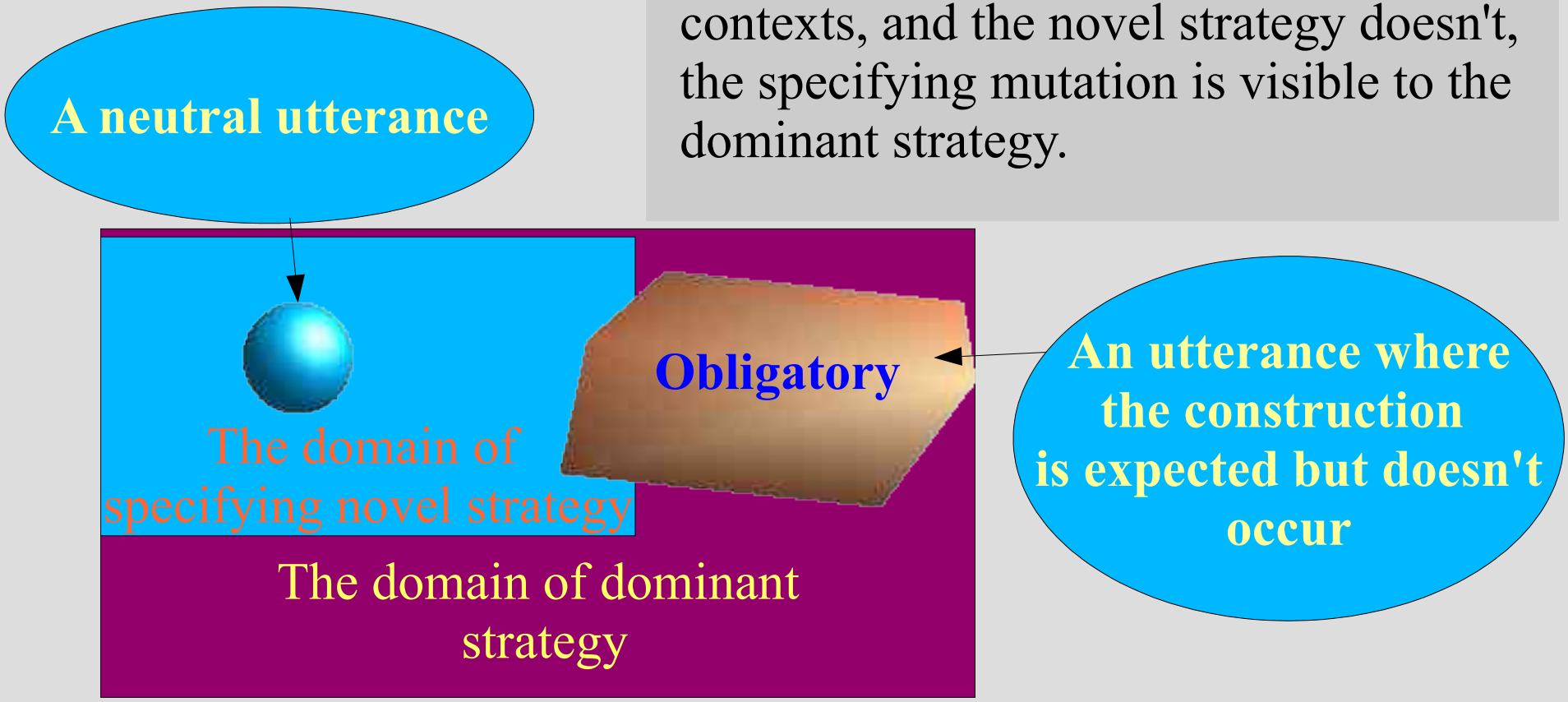
Ona ni razu ne krasivaja
She is not beautiful at all

A specifying mutation: invisible “perfective constraint”



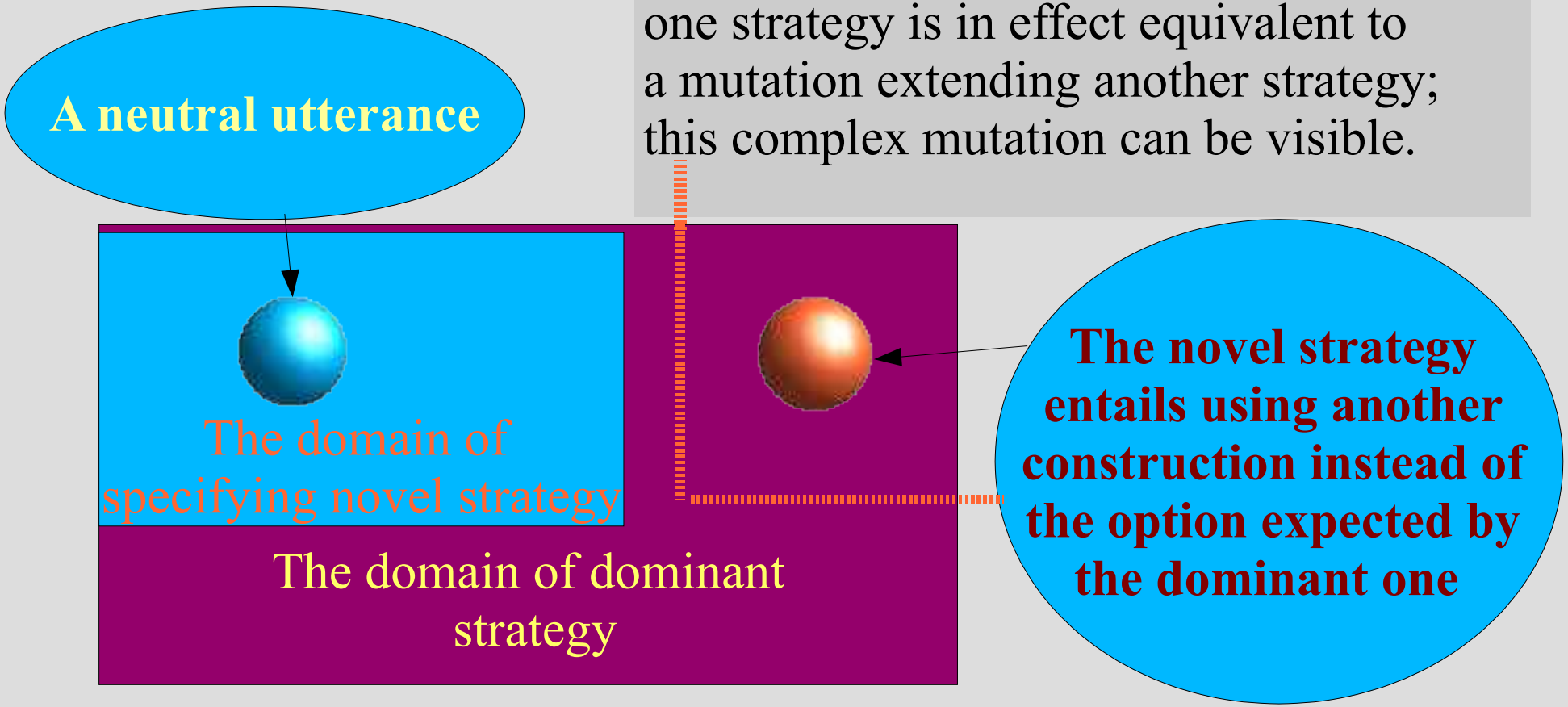
Visible specifying mutations

If the dominant strategy requires the construction in certain identifiable contexts, and the novel strategy doesn't, the specifying mutation is visible to the dominant strategy.



Visible specifying mutations

If two (or more) constructions belong to the same paradigm, a mutation specifying one strategy is in effect equivalent to a mutation extending another strategy; this complex mutation can be visible.



Yukaghir focus construction

X_i-PREDICATIVE + (__$_i$ clause)-RELATIVE

→ (X-PRED(FOC) ... V-REL(X=FOC))

Tundra Yukaghir, S-Focus construction

(1) … *qahime-**leŋ*** *kelu-**l***
raven-PRED came-SF
'… A RAVEN came.'

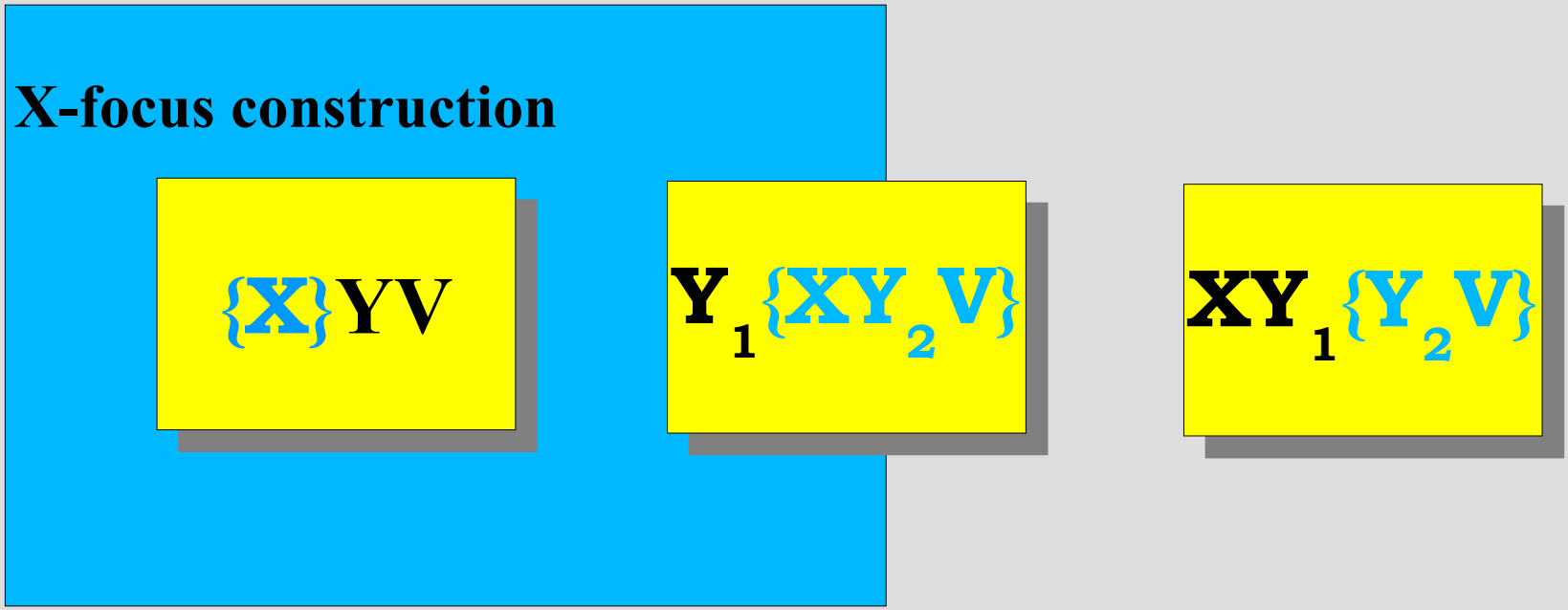
(2) *qahime-**leŋ***
raven-PRED
'It is A RAVEN.'

(3) … *kelu-**l*** *qahime*
come-REL raven
'… a raven that is coming/has come.'

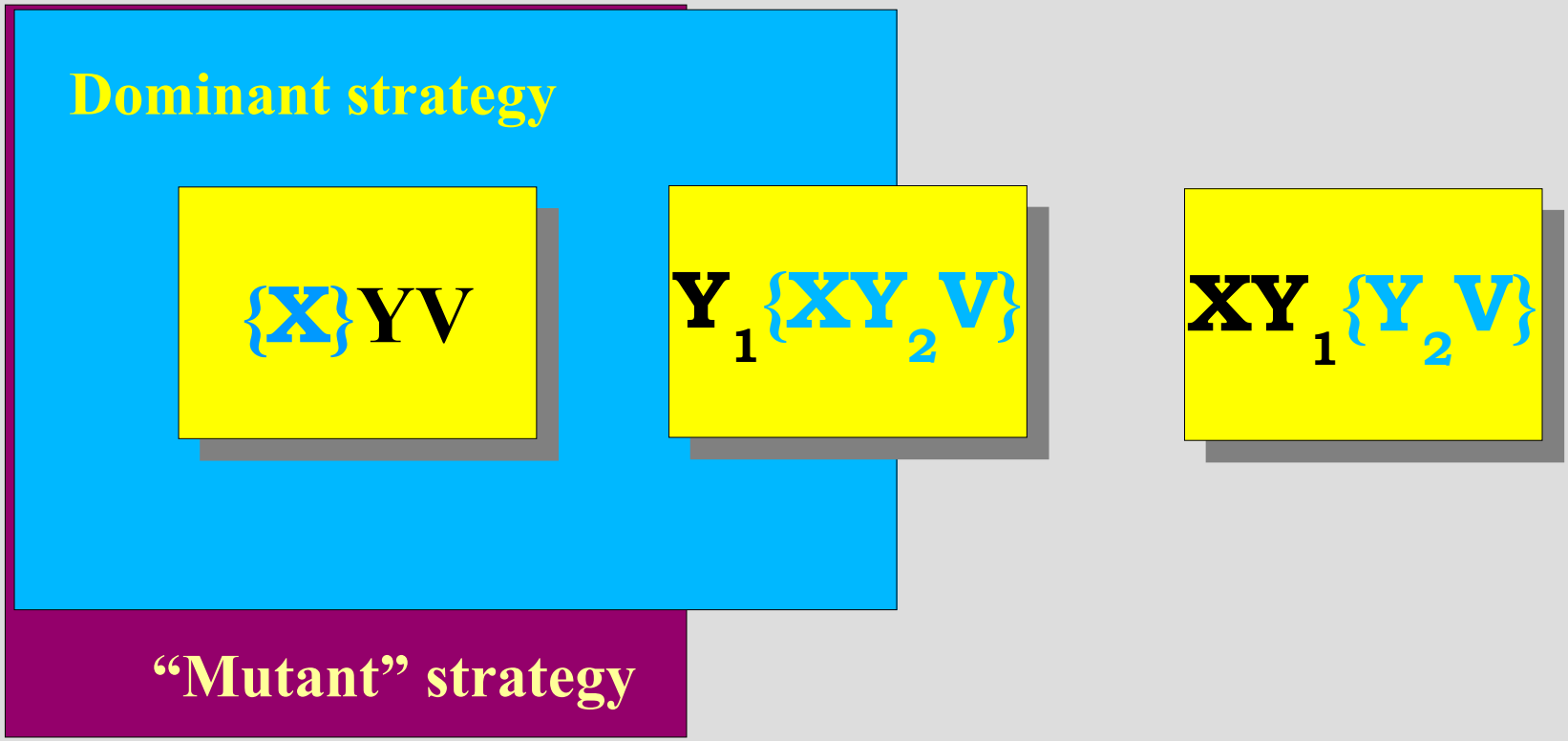
Information-structure range

- ***"Narrow-focus" structures: obligatory***
  - e.g. both components of a *wh*-question-answer pair must be encoded by means of the focus construction.
- ***"Broad-focus" structures: optional***
  - If a NP belongs to the scope of assertion along with the verb and, possibly, other sentence components, it can but need not be marked as the grammatical focus.
- There can be two quite different motivations for chosing the focus construction (as opposed to the neutral option):
  - It can be triggered by strong contextual factors.
  - It can be used when the information structure is not clear from the context, and so has to be marked.

The dominant strategy



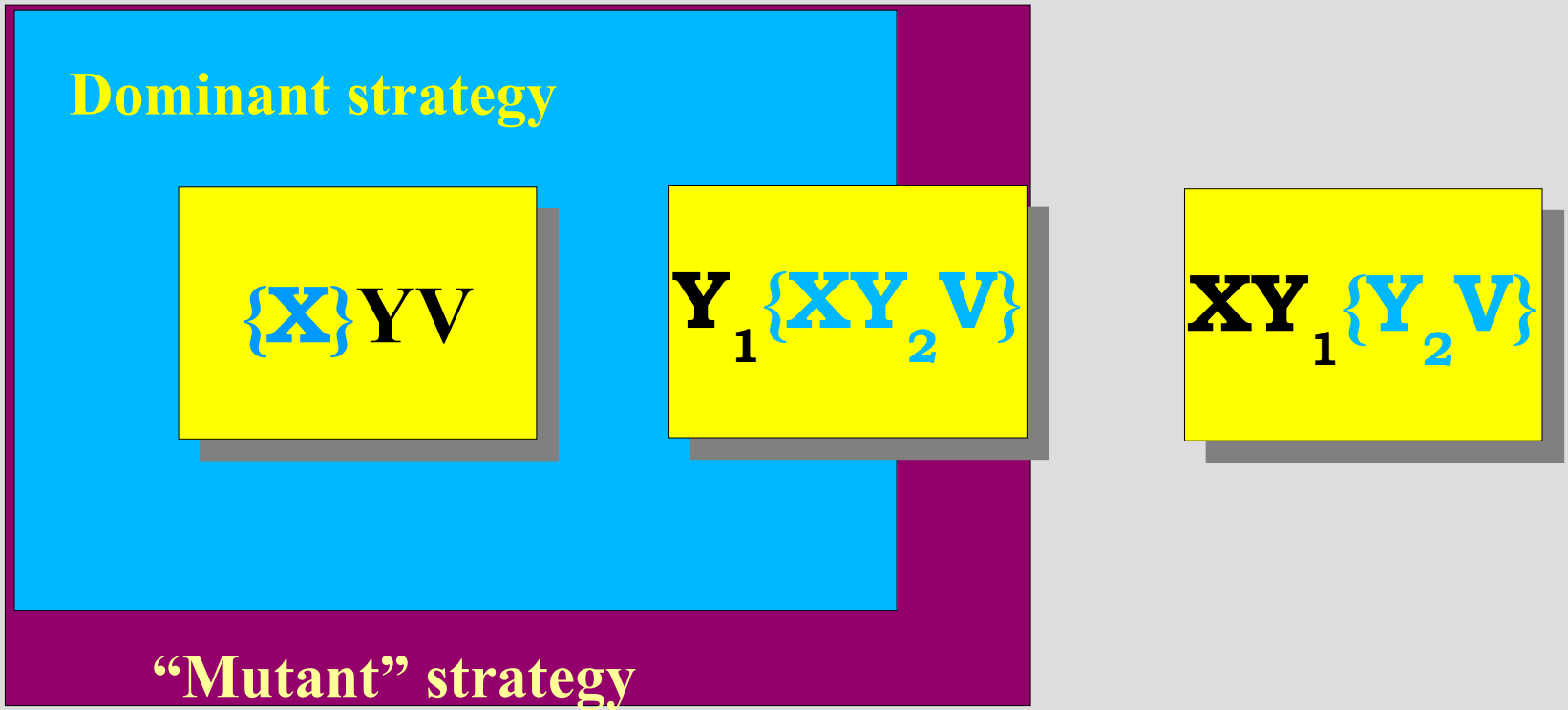
Minor specifying mutations



Propagating utterances?

- **Innovative speaker:**
  - **Broad-focus structure + Neutral construction**
- **Conservative listener:**
  - Correctly identifies the information structure:
    - Since the information structure is identifiable without focus marking, the neutral construction is acceptable for the dominant strategy. The mutation remains invisible, since the listener might have used the neutral construction in a similar situation, although for different reasons.

“Minor” extending mutations



Propagating utterances?

- **Innovative speaker:**
  - **Broad-focus structure**
    + **Focus construction**
- **Conservative listener:**
  - Correctly identifies the information structure:
    - Focus-marking in broad-focus utterances is acceptable for the dominant strategy. The mutation remains invisible. If the listener has expected the neutral construction, he is likely to “receive” a somewhat richer information-structure meaning than intended by the speaker, but this difference is invisible to either interlocutor.

Stabilizing factors

- There is only one type of contexts in which a minor mutation in the focus-marking strategy might show itself to a conservative listener and thus give him a chance to adopt it as his own: these are contexts where the listener would (correctly) reconstruct a broad-focus structure, independently of the actual encoding.
- But these are exactly the contexts where the dominant strategy gives the speakers a considerable amount of freedom ("context-independence") in their choice of encoding option, and this is what makes this strategy resistant to minor mutations.
- In some cases, the difference between two strategies might lead to minor misinterpretations, which would remain unnoticed by the interlocutors because of the very nature of information-structure semantics.

A generalization

- Strategies of this sort would present themselves to descriptive linguists as combinations of (some degree of) context-sensitivity and (some degree) randomness: context-based factors might determine the choice of coding option for some types of contexts, but their influence would be at best probabilistic in other contexts.
- This situation is attested again and again, for multiple language-specific context-sensitive constructions.
- Many linguists would construe this randomness as a sign of our ignorance, yet it might be the case that a certain degree of randomness is necessary for evolutionary stability; the information-structure encoding is to some extent random just because it is evolutionary stable to be to some extent random.

A-focus construction

The predicative focus construction is compatible only with the sole (S) participant of intransitive clause and with the object (O) participant of transitive clause.

Tundra Yukaghir, S-Focus construction

(1) … *qahime-**leŋ*** *kelu-**l***
raven-PRED came-SF
'… A RAVEN came.'

Tundra Yukaghir, O-focus construction:

(4) *met ten'i n'awn'iklie-**leŋ*** *toŋore-**meŋ***
I here polar.fox-PRED chase-OF.1|2SG
'I have been chasing A POLAR FOX here.'

The grammatical constraints on the original cleft-like construction could have been motivated only by the constraints on relativization, which suggests that it used to be compatible with the transitive subject (A) as well.

Loss of the predicative A-focus construction

- Functional extension from “narrow” to “broad” focus
- → A considerable increase in the frequency of O-focus sentences, most importantly, in their relative frequency among transitive clauses with explicitly marked nominal focus:
  - ✔ At the present time, ca. 97% of transitive clauses with nominal focus are O-focus clauses.
- → Avoidance of predicative marking of A-focus (which would trigger the wrong case-role interpretation).
- → Reanalysis of predicative focus markers as “focus/O” markers.

A-focus construction

The major formal feature of the A-focus construction is absence of any morphological markers: it is opposed both to the O-focus sentence structure and to the neutral structure as the "zero-marked" structure. This is a really unusual type of focus construction, especially because it is functionally most marked and least frequent sentence structure in the language.

Tundra Yukaghir, A-focus construction

(5) a. *nime-**le*** *aq* *pajp* *wie-nun*
dwelling-ACC only woman make-HAB(AF)
'Only WOMEN install dwellings.' (Krejnovič 1982: 210)

Tundra Yukaghir, neutral transitive construction

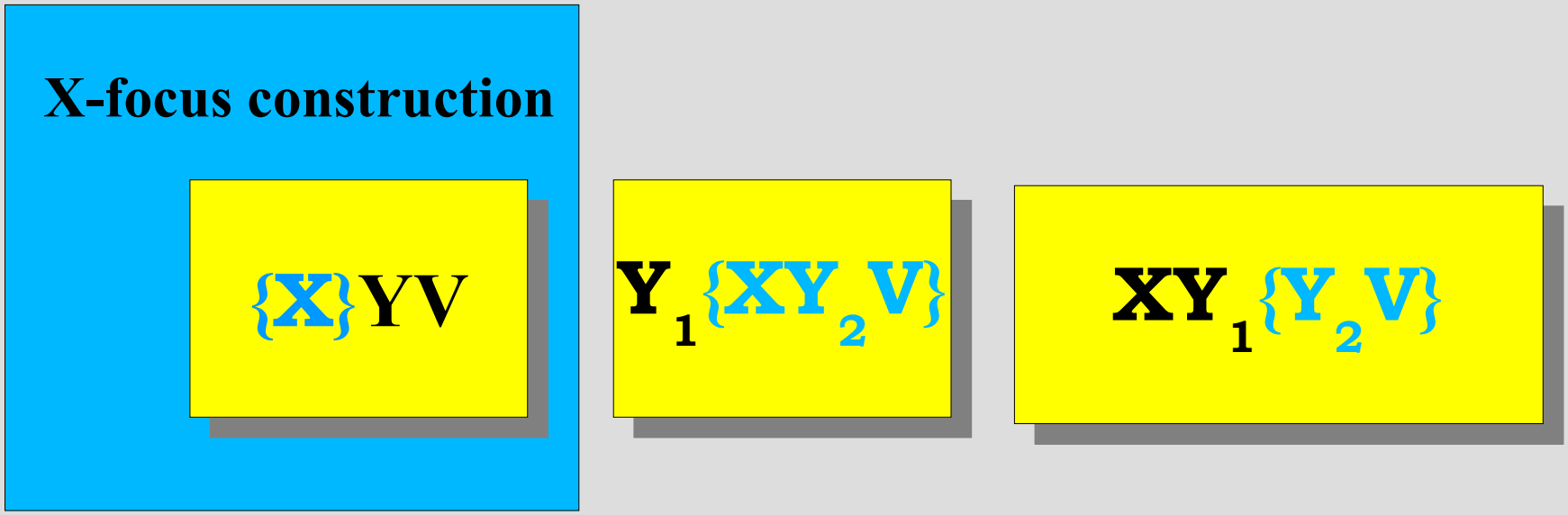
b. *pajp* *nime-**le*** *me-wie-nunnu-**m***
woman dwelling-ACC AFF-make-HAB-TR:3SG
'Women install dwellings.'

An unusual result of a usual develpment path

- **Stage I:**
  - **Neutral** (unmarked) → A-focus (*specification under the pressure of new expanding constructions*)
  - **Topic-comment with A/S-topic** (cross-reference) → Neutral (*topic-to-subject: extension & grammaticalization*)
  - **Presupposition-focus with S/O-focus** (predicative NP) → S/O-focus (*extension & grammaticalization in the narrow-focus contexts*)

- **Stage II:**

The A-focus strategy



This strategy is not evolutionary stable, because it is linked to the context in a deterministic way. Indeed, this construction disappeared in Kolyma Yukaghir; more generally, such constructions appear to be uncommon cross-linguistically, even though they seem to constitute a likely stage of a quite common development path.

Why do unstable strategies sometimes survive?

- If this strategy is unstable, why does it survive in Tundra Yukaghir?
- If we assume that the process of language change has the so-called “no-memory” property (if a strategy has survived for some period of time, the likelihood of change doesn't depend on the length of this period), the distribution of life times of such constructions can only be exponential.
- This means that whereas the expected (mean) life time of the construction type is very short, so that the majority of them disappear almost immediately (and so they are cross-linguistically rare), there must be some (very rare) cases of long life times.
- This observation applies to other rare phenomena as well: few instances of long life times cannot falsify a hypothesis of instablility.