Meaning change from an experimental perspective: two self-paced reading studies on the Spanish Imperfective domain

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Experiments in Linguistic Meaning (ELM) I

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Observation: The links between markers and meanings change systematically and cyclically, forming:

→ unidirectional grammaticalization paths (e.g., Lehmann 1985, Bybee et al. 1994, Haspelmath 1999).
Introduction.
The Progressive-to-Imperfective shift.

**Progressive-to-Imperfective** shift:

- *progressive* markers appear to express *event-in-progress* reading (**Progressive**).
- slowly become markers of *habitual* readings (**Imperfective**) (Comrie 1976, Bybee et al. 1994, Deo 2006).
Introduction.
The Progressive-to-Imperfective shift.

STAGES (Deo 2015):

1. Context Dependent: Marker X for both IMPF and PROG.
2. Partially Context Dependent: New marker Y optional for PROG.
3. Explicit Marking: Marker Y obligatory for PROG. X for habituals.
4. Context Dependent’: Marker Y for both IMPF and PROG.
Introduction.
The Progressive-to-Imperfective shift

1. Context Dependent
2. Partially Context Dep.
3. Explicit Marking
4. Context Dependent’

Recruitment
Categoricalization
Generalization
Introduction.

The questions

1. What are the **meanings** of the Progressive and the Imperfective? What is lexically encoded and what conceptual structure is being accessed and manipulated?

2. What are the **mechanisms** in speakers’ minds that take a language from one stage to the following?
Introduction.

Today’s talk

• Synchronic variation in Spanish between:
  • **Progressive**: Present Progressive marker (estar + V-ndo)
  • **Imperfective**: Simple Present marker (V-a)

• to express the *event-in-progress* and the *habitual* readings;
• in three dialectal varieties,
• through a real-time method that allows for the controlled manipulation of contextual information.
Introduction.

Road Map.

1. The distributional **puzzle** of Present Progressive and Simple Present in Spanish.
2. The **meanings** of the Progressive and the Imperfective.
3. The **proposals** for a mechanism for **categoricalization** and a mechanism for **generalization**.
4. Two **self-paced reading studies**.
5. **Conclusions**.
The Synchronic Puzzle.

**PROG** and **IMPF** in Spanish

(1) a. Ana **está fumando**.
   Ana, smoke.3.SG.PROG
   ‘Ana is smoking’
The Synchronic Puzzle.  
**PROG** and **IMPF** in Spanish

(1) a. Ana  **está fumando**.  
Ana   smoke.3.SG.PROG  
‘Ana is smoking’

(2) a. Ana  **fuma**  
Ana   smoke.3.SG.IMPF  
‘Ana smokes’
The Synchronic Puzzle. **PROG** and **IMPF** in Spanish

(1) a. Ana **está fumando**.
    Ana smoke.3.SG.PROG
    ‘Ana is smoking’

    b. Ana **fuma** ahora.
    Ana smoke.3.SG.IMPF now
    ‘Ana is smoking’

(2) a. Ana **fuma**
    Ana smoke.3.SG.IMPF
    ‘Ana smokes’
The Synchronic Puzzle. PROG and IMPF in Spanish

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<tr>
<td>a.</td>
<td>Ana está fumando.</td>
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<td>Ana smoke.3.SG.PROG</td>
<td>Ana smoke.3.SG.IMPF</td>
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<td>Ana está fumando mucho</td>
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<td>Ana smoke.3.SG.IMPF now</td>
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IMPF-marker (V_a) can express both PROG and IMPF. PROG-marker (estar + V_ndo) can express both PROG and IMPF.

What (contexts) can account for the distributional preferences?
The Diachronic Puzzle. Which stage is Spanish in?

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<td>Ana</td>
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<td>fuma</td>
<td><strong>está fumando</strong></td>
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<tr>
<td>ahora.</td>
<td>mucho</td>
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<td>Ana</td>
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<td>smoke.3.SG.IMPF now</td>
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Main hypothesis

- **Meaning variation** (and **meaning change**) are rooted:
  
a. in the **structure** of the meanings that participate in the change, and
b. in properties of the **situational context** underpinned by **specific** communicative-cognitive pressures.
Main hypothesis

- **Meaning variation (and meaning change)** are rooted:
  
a. in the **structure** of the meanings that participate in the change, and

b. in properties of the **situational context** underpinned by **specific communicative-cognitive** pressures.
Question 1.
The Structural Component.

What are the meanings of the Progressive and the Imperfective?
Meanings
PROG / IMPF (Deo 2009, 2015)

• Are related in a subset relation,

• Both universally quantify over regular partitions of an interval, and

• the measure of the partition is a variable whose value is contextually determined.
**PROG** meaning:

“*estar + V-ndo*”: Ana **está fumando**

“*V-a (+ adverb)*”: Ana **fuma (ahora)**.

\[ PROG : \lambda P \chi \lambda w. \]
PROG meaning:

“estay + V-ndo”: Ana está fumando
“V-a (+ adverb)”: Ana fuma (ahora).

\[ PROG : \lambda P \lambda i \lambda w. \forall j[j \in \mathcal{R}_i] \]
**PROG** meaning:

“estar + V-ndo”: Ana *está fumando*

“V-a (+ adverb)”: Ana *fuma* (ahora).

\[ PROG : \lambda P \lambda i \lambda w. \forall j [j \in R_i \rightarrow COIN (P, j, w)] \]

\[ i \]

\[ j \quad j \quad j \quad j \quad j \quad j \quad j \quad j \quad j \quad j \]

\[ P \quad P \quad P \quad P \quad P \quad P \quad P \quad P \quad P \quad P \]

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\[ P = \text{smoke (Ana)} \]
**IMPF meaning:**

“V-a” : Ana fuma
“estar + V-ndo”: Ana *está* fumando (mucho)

\[ IMPF : \lambda P \chi \iota \lambda \omega. \]
IMPF meaning:

“V-a” : Ana fuma
“estar + V-ndo” : Ana está fumando (mucho)

\[
IMPF : \lambda P \lambda \iota \lambda w. \exists j [i \subseteq \text{ini } j]
\]
IMPF meaning:

“V-a” : Ana fuma
“estar + V-ndo” : Ana está fumando (mucho)

$\text{IMPF} : \lambda P \chi \lambda w. \exists j [ i \subseteq \text{ini} j \land \forall k [ k \in \mathcal{R}_j ]]$
**IMPF meaning**

“$V_a$” : Ana fuma

“estar + $V_{ndo}$”: Ana está fumando (mucho)

---

$IMPF : \lambda P \lambda i \lambda w. \exists j [i \subseteq ini j \land \forall k [k \in R_j^c \rightarrow COIN (P, k, w)]]$

---

$P = \text{smoke (Ana)}$
Conceptual Structure

PROG / IMPF (Fuchs et al. 2020a)

\[ \text{IMPF} : \lambda P \lambda i \lambda w. \exists j [i \subseteq_{\text{ini}} j \land \forall k [k \in \mathcal{R}_j^c \to \text{COIN} (P, k, w)]] \]

\[ \text{PROG} : \lambda P \lambda i \lambda w. \forall j [j \in \mathcal{R}_i^c \to \text{COIN} (P, j, w)] \]
Conceptual Structure

PROG / IMPF (Fuchs et al. 2020a)

$$IMPF : \lambda P \chi \lambda w. \exists j [ i \subseteq ini j \land \forall k [ k \in P \rightarrow COIN (P, k, w) ]]$$
Conceptual Structure

PROG / IMPF (Fuchs et al. 2020a)

\[ PROG : \lambda P \lambda i \lambda w. \forall j [j \in \mathcal{R}_i \rightarrow \text{COIN} (P, j, w)] \]
Conceptual Structure

PROG / IMPF (Fuchs et al. 2020a)

\[ \text{IMPF} : \lambda P \lambda i \lambda w . \exists j [i \subseteq_{ini} j \land \forall k [k \in \mathcal{R}_j^c \rightarrow \text{COIN} (P, k, w)]] \]

\[ \text{PROG} : \lambda P \lambda i \lambda w . \forall j [j \in \mathcal{R}_i^c \rightarrow \text{COIN} (P, j, w)] \]
Main hypothesis

- **Meaning variation** (and **meaning change**) are rooted:
  
  a. in the **structure** of the meanings that participate in the change, and
  
  b. in properties of the **situational context** underpinned by specific **communicative-cognitive** pressures.
Question 2.
The Dynamic Component.

What are the mechanisms in speakers’ minds that take the language from one stage to the following?
The mechanisms.
Categoricalization.

1. Context Dependent
2. Partially Context Dep.
3. Explicit Marking
4. Context Dependent’

Recruitment
Categoricalization
Generalization
The Diachronic Puzzle.
Which stage is Spanish in?

(1) a. Ana está fumando.
Ana smoke.3.SG.PROG
‘Ana is smoking’

b. Ana fuma ahora.
Ana smoke.3.SG.IMPF now
‘Ana is smoking’

(2) a. Ana fuma
Ana smoke.3.SG.IMPF
‘Ana smokes’

b. Ana está fumando mucho
Ana smoke.3.SG.PROG a-lot
‘Ana is smoking a lot’
The Diachronic Puzzle.

**Event-in-progress** (categoricalization)

(1) a. Ana **está fumando**.
    Ana smoke.3.SG.PROG
    ‘Ana is smoking’

    b. Ana **fuma ahora**.
    Ana smoke.3.SG.IMPF now
    ‘Ana is smoking’
The context for **event-in-progress**. Shared Perceptual Access Hypothesis

“The distribution of the Simple Present and the Present Progressive to convey **event-in-progress** is constrained

- by whether speaker and hearer *share perceptual access* to the event described by the predicate”

But...

Why does *shared perceptual access* between speaker and hearer to the event enable speakers to convey an *event-in-progress* reading?
Main hypothesis

- **Meaning variation** is rooted:
  
  a. in the **structure** of the meanings that participate in the change, and
  
  b. in properties of **situational context**...

  underpinned by **specific communicative-cognitive pressures**.
A cognitively grounded approach  
(Fuchs et al., 2020b)

**Perspective:**
- “The information that is perceptually available for a given individual from a particular point of view in space”. (Roberts 2015: 3)
- >> the set of worlds compatible with an individual’s knowledge and beliefs at that time in that world.

**Grammatical aspect manipulates perspective.**

**Perspective alignment:**
- The process by which the speaker intends to align the hearer’s perspective to her own.
A cognitively grounded approach
(Fuchs et al., 2020b)

*Perspective alignment* optimizes two communicative constraints that are always in tension:

- **Economy:**
  - recognition of *Common Ground* (e.g., Stalnaker 1978, 2002; Roberts 1996/2012).

- **Expressivity:**
  - recognition of *Common Ground Complement*.

- Calibrating their relative content is a process dependent on *Theory of Mind* abilities (e.g., Wellman 1990, Gopnik 1993, de Villiers 2007, Phillips & Norby 2019).
A cognitively grounded approach (Fuchs et al., 2020b)

Perspective alignment can be achieved by linguistic means, such as the event-in-progress reading, which makes salient the reference interval:

1. Use the Present Progressive marker, or

2. Use the Simple Present marker + a context in which perspective alignment is independently satisfied (e.g., by Shared Perceptual Access)
The mechanism. Categoricalization.

Synchronic prediction:

  When this contextual requirement is not met, context construal must take place for the Simple Present
  >> increased processing cost.

Diachronic prediction:

  Increased processing cost for Simple Present leads to preference for Present Progressive >> categoricalization.
The mechanisms.
Generalization.

1. Context Dependent
2. Partially Context Dep.
3. Explicit Marking
4. Context Dependent’

Recruitment

Categoricalization

Generalization
The Diachronic Puzzle

**Habitual (generalization)**

(2) a. Ana fuma
    Ana smoke.3.SG.IMPF
    ‘Ana smokes’

b. Ana **está fumando mucho**
    Ana smoke.3.SG.PROG a-lot
    ‘Ana is smoking a lot’
The context for habitual. 
Alternative Indices of Evaluation Hypothesis

“The distribution of the Simple Present and the Present Progressive to convey a habitual reading is: constrained by whether the context satisfies the presuppositional requirement of estar”

(Fuchs & Piñango 2019).
The context for habitual. Alternative Indices of Evaluation Hypothesis

Estar’s presupposition (e.g., Maienborn 2005, Sánchez Alonso 2018): alternative situations at which the proposition does not hold.

\[
[[\text{estar}]] = \lambda P \lambda x \lambda i : \exists i' [R_p(i, i') \land [[P(x)]]^{i'} = 0].[[P(x)]]^i = 1
\]

(1) Patricia es alta ‘Patricia is (ser) tall’ (she’s 5’ 10”).
(2) Patricia está alta ‘Patricia is (estar) tall’ (she’s wearing heels)
The context for habitual.

Alternative Indices of Evaluation Hypothesis

**Habitual** readings can be achieved:

1. Use the Simple Present marker, or
2. Use the Present Progressive marker (in contexts that satisfy *estar’s* presupposition).
The mechanism. Generalization.

• *Estar* + V-*ndo* conveys a *habitual* reading and implicates the possibility of an alternative.

• This dual role *endows the marker with greater informativity*.

• Greater informativity leads to an *increase in frequency of use* and a proportional *decrease in context dependence*.

• Decrease in context-dependence leads to *generalization*. 
The studies. How can we test the hypotheses?

• (Diachronic) corpus studies.
• Acceptability judgments.
• Real-time comprehension: e.g., Self-Paced Reading.
Study 1. Categoricalization.

• Situations that expressed an event-in-progress reading.

Two Contexts:
• a) Rich Contexts [ + Shared Perceptual Access ]
• b) Poor Contexts [ - Shared Perceptual Access ]

Three Markers:
• a) Simple PRES-marked sentences,
• b) PROG-marked sentences, and
• c) PRÉTERITO–marked (as a baseline condition) sentences.
### Sample stimulus (Categoricalization)

<table>
<thead>
<tr>
<th><strong>Context</strong></th>
<th><strong>Test Sentence</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POOR</strong>: John is in the kitchen and Ana just got home, but John does not hear her arrive. John hears that the TV is on in the living room, <strong>and calls her to check if it is her who arrived</strong>. After hearing her name a couple of times, Ana answers:</td>
<td><strong>PROG</strong>: Estoy mirando un documental en la tele. ‘I am watching a documentary on the TV’</td>
</tr>
<tr>
<td><strong>RICH</strong>: John is in the kitchen and Ana just got home, but John does not hear her arrive. John hears that the TV is on in the living room, <strong>and goes over there while calling Ana, to check that it is her who arrived</strong>. Ana is sitting in the couch, sees John, and tells him:</td>
<td><strong>PRES</strong>: Miro un documental en la tele. ‘I watch a documentary on the TV’</td>
</tr>
<tr>
<td></td>
<td><strong>PRET</strong>: Miré un documental en la tele. ‘I watched a documentary on the TV’.</td>
</tr>
</tbody>
</table>
Study 1.
Participants

• **60 Rioplatense Spanish (30 female):** Ciudad de Buenos Aires, Argentina.

• **56 Mexican Altiplano Spanish (33 female):** Mexico City or surroundings states, Mexico.

• **60 Castilian Spanish (30 female):** Madrid and surrounding states (Castilla-La Mancha, Castilla y León).

  • Age: 18 to 37 (mean = 27.5 years).
  
  • 12 years of formal education (completed high school).

  • Items were adapted to each variety and normalized by native speakers.
Study 1.
Predictions.
Study 1.
Results (Castilian Spanish)
Study 1.
Results (Rioplatense Spanish)
Study 1.
Results (Mexican Altiplano Spanish)
Study 1.
Discussion

- Present Progressive is the preferred marker across all dialects regardless of context type.

- Simple Present processing is facilitated in Rioplatense and Castilian Spanish only when *shared perceptual access* is guaranteed by the context.

- In Mexican Spanish, *shared perceptual access* no longer plays a role in improving Simple Present comprehension. This dialect is further along the diachronic path.
Study 2. Generalization.

• Situations that expressed a **habitual** reading.

Two **Contexts**:
  • a) **Supporting Contexts** [ + Alternative Indices of Evaluation]
  • b) **Neutral Contexts** [ - Alternative Indices of Evaluation]

Three **Markers**:
  • a) Simple PRES-marked sentences,
  • b) PROG-marked sentences, and
  • c) PRÉTERITO–marked (as a baseline condition) sentences.
Sample stimulus (Generalization)

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<tr>
<td><strong>Supporting</strong>: Anna and John go to high school together. <strong>Both of them are always late because there is a lot of traffic, but lately John makes it on time.</strong> When Anna asks him later how he manages to get there on time, <strong>he tells her:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Neutral</strong>: Anna and John go to high school together. <strong>Anna is always late because there is a lot of traffic, but John always makes it on time.</strong> When Anna asks him later how he manages to get there on time, <strong>he tells her:</strong></td>
<td></td>
</tr>
</tbody>
</table>
| **PRES**: Vengo en bicicleta.  
‘I come here by bike’ |
| **PROG**: Estoy viniendo en bicicleta.  
‘I am coming here by bike’ |
| **PRET**: Vine en bicicleta.  
‘I came here by bike’ |
Study 2.

Participants

• **40 Rioplatense Spanish (20 female):** Ciudad de Buenos Aires, Argentina.

• **40 Mexican Altiplano Spanish (19 female):** Mexico City or surroundings states, Mexico.

• **40 Castilian Spanish (19 female):** Madrid and surrounding states (Castilla-La Mancha, Castilla y León).

• Age: 19 to 36 (mean = 27.5 years).

• 12 years of formal education (completed high school).

• Items were adapted to each variety and normalized by native speakers.
Study 2. Predictions.
Study 2. Results (Castilian Spanish)
Study 2.
Results (Rioplatense Spanish)
Study 2.
Results (Mexican Altiplano Spanish)
Study 2. Discussion.

- Present Progressive comprehension is facilitated in Rioplatense and Castilian Spanish when contextual information satisfies the presuppositional demands of estar.

- Mexican Spanish does not show this facilitating effect, but indicates that in this variety Present Progressive is no longer dependent on context support.

- Generalization is underway in the three varieties, but Mexican Spanish appears a step further in the grammaticalization path.
Conclusions

• Convergence of synchronic and diachronic questions:
  • Use of the Simple Present with a event-in-progress reading >> Categoricalization.
  • Use of the Present Progressive with a habitual reading >> Generalization.

• The proposal is based on:
  • A communicative goal that is at play during linguistic communication and that guides language use, but is not linguistic in nature:
    • Perspective Alignment ➔ Expressivity (CG Complement)
      ➔ Economy (Common Ground)
  • The informativity strength of the combined lexico-semantic properties associated with the progressive marker.

Theory of Mind
Conclusions.

The questions

1. What are the meanings of the Progressive and the Imperfective?

2. What are the mechanisms in speakers’ minds that take the language from one stage to the following?
Conclusions.
The answers.

1. What are the **meanings** of the Progressive and the Imperfective? – one meaning with different contextual interactions.
Conclusions.
The answers

2. What are the mechanisms in speakers’ minds that take the language from one stage to the following?

• Categoricalization (events-in-progress reading)
  • Perspective Alignment

• Generalization (habitual reading)
  • Informativity strength of the Present Progressive marker
General Conclusion

The patterns across dialects are consistent with a model of semantic variation and change that is embedded in a communicative system, visible during real-time comprehension, and subject to isolable contextual factors.
Thank you!

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