Generics as default?
Comparing the acquisition of universals and generics in Spanish

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What does it take for (1) to be true?

(1)

a. Cats have whiskers.

b. Los gatos tienen bigotes.

‘Los gatos tienen bigotes.’

What about (2)?

(2)

a. All cats have whiskers.

b. Todos los gatos tienen bigotes.

‘Todos los gatos tienen bigotes.’
Goals of this talk

- Investigate the differences in the interpretation of generic statements (GS) and universally quantified statements (UQS) with novel data from Spanish.
- Report an experimental study carried out with three age groups:
  - Young (4/5-year-olds)
  - Old (8/9-year-olds)
  - Adults
- Discuss the consequences of the collected results for the validity of the “Generics as Default” (GaD) hypothesis.
Highlights of the talk

- Taken together (abstracting away from age), the accuracy of GS is greater than the accuracy of UQS, (3). This seems to support the GaD, but …

(3) \( \text{Acc}(\text{GS}) > \text{Acc}(\text{UQS}) \)

- The old group and adults do not achieve at ceiling results for GS (and they perform equally well in UQS).

- The young group does not seem to behave adult-like in their interpretation of GS. They are better! (But careful, they fail with false generics.)

(4) \( \text{Acc}(\text{GS, young}) > \text{Acc}(\text{GS, old}), \text{Acc}(\text{GS, adults}) \).

- Despite the well-known command of restricted UQS in 4-year-olds, they are pretty inaccurate with unrestricted UQS.
Theoretical and experimental background

- Semantics: a quantificational / modal analysis
- Cognitive Psychology: Since GOG, GaD
- An alternative semantic analysis: QDR
- Generics in Spanish
Semantics as a starting point: UQS

(5) a. **All Fs are G**: \( F \subseteq G \)
    
    b. \[
    \llbracket \text{all} \rrbracket = \lambda P \lambda Q. \{ x : P(x) = 1 \} \subseteq \{ x : Q(x) = 1 \}
    \]

(6) a. The townspeople are asleep.
    
    b. All townspeople are asleep.
Semantics as a starting point: GS

\[ \rightarrow \text{GEN (Dahl, 1995; Krifka et al. 1995): a covert modal operator whose interpretation is similar to quantificational adverb} \text{ always} \text{ (in the sense of Lewis, 1975).} \]

\[(7) \quad \text{From Zamparelli (2002)} \]

a. Dogs bark at the moon.

b. \(\text{GEN}_{x,s}[\text{dog}(x) \text{ in } s][\text{bark-at-the-moon}(x) \text{ in } s] \)

c. For each appropriate situation \(s\), if \(x\) is a dog in \(s\), then \(x\) barks at the moon in \(s\).
Semantics as a starting point: GS

→ Types of GS:

(8)  
a. Quasi-definitional: Triangles have three sides.
b. Majority characteristic: Tigers have stripes.
c. Minority characteristic: Lions have manes.
d. Majority: Cars have radios.
e. Striking: Sharks attack people.
GS, as compared to UQS, . . .

- tolerate exceptions.
- are not associated with an overt dedicated quantifier.
Semantics as a starting point: UQS vs GS

Two a priori problems of the quantificational analysis

⊕ How does this theory account for minority and striking properties?
⊕ How does the learner acquire a quantificational structure that is not overt?
Predictions from cognitive psychology: GaD

The Generic Overgeneralization (GOG) Effect. An *error* consisting in . . .

- Interpreting UQS as GS (i.e., tolerating exceptions).
- Recalling UQS as GS.
Predictions from cognitive psychology: GaD

- GS are simpler and, hence, easier to acquire than UQS (Leslie 2007, 2008; Gelman 2008).
- Given the existence of two cognitive systems (Kahneman & Frederick 2002) . . .
  - System 1: fast, automatic, effortless.
  - System 2: slow, effortful, higher-level, and rule-governed.
- GaD postulates:
  - GS are part of System 1.
  - UQS are part of System 2.
Predictions from cognitive psychology: GaD

Unfolding the GaD hypothesis

- GS are verified by accessing a conceptual structure.
- Verifying a GS is easy and does not involve working memory (System 1).
- GS are held to be true even if we are aware that there are exceptions.
- GS are true of features that are characteristic, highly prevalent, or striking.
- UQS are difficult to verify properly (System 2).
- UQS are many times misinterpreted as generics.
QDR as an alternative

What if the GOG is the result of Quantifier Domain Restriction (QDR, von Fintel 1994)?

(9)    a. (Walking into the classroom.) Everyone is so quiet. What’s wrong?
        b. When I walked into my class today, everyone was really quiet. It made me suspicious.

(10)   a. All tigers have stripes.
        b. All [normal] tigers have stripes.

Proposal to find out whether QDR – instead of an ad hoc mechanism – is playing a role in the GOG effect (Lazaridou-Chatzigoga et al. 2013, 2019).
QDR as an alternative

- An experiment with context manipulation, on English and Greek.
- Prediction: UQS will be affected by context, which will supply QDR, but GS will be immune to it.

(11) Neutral: Linton Zoo is home to three tigers, Tibor, Baginda and Kaytlin, whose playful games visitors love to watch and photograph.

(12) Contradictory: Linton Zoo is home to three tigers, Tibor, Baginda and Kaytlin, whose fur is all white due to a recessive gene that controls coat color.

(13) Supportive: Linton Zoo is home to three tigers, Tibor, Baginda and Kaytlin, whose black and orange coats visitors love to photograph.

→ Main effect of context type and determiner type.
Generalizations in Spanish

- UQS in Spanish acquired already by 4-year-olds (Katsos et al. 2011, 2016; Barberán-Recalde 2019).

(14) Todas las pelotas están dentro de las cajas.

‘All the balls are inside the boxes.’
Generalizations in Spanish

○ (Leaving aside the large body of literature on indefinite and bare nominals, and kind terms . . . .)
○ A recall study by Gelman & Sánchez Tapia (2016).
  ⊕ NP type does not involve a difference in markedness: DET.PL vs many.

(15) a. Los osos trepan árboles.
    DET.PL bears climb 3PL trees
    ‘Bears climb trees.’

  b. Muchos osos trepan árboles.
    many bears climb 3PL trees
    ‘Many bears climb trees.’

⊕ RQ1: GOG in Spanish?, RQ2: Is there an effect of “complexity”?
⊕ Results: Irrespective of the complexity of NP, participants tend to interpret the quantified statements as GS more often than the other way around.
Our study

- Research questions and hypotheses
- Method
- Results and discussion
Generalizations in linguistics and cognition

- Semantics proposes GEN, a covert modal operator with quasi-universal force. It does not explain minority and striking properties or acquisition.

- Cognitive Psychology observes a GOG effect, which is explained by claiming that GS are (not quantifiers) but defaults, part of System 1 (automatic). UQS are part of System 2 (rule-based).

- The mechanism of QDR may have an effect on the GOG. Pending further research.

- In Spanish there is only 1 experimental study comparing GS vs. quantified statements, but it is a recall study.
Research questions and hypotheses

RQ1) Are children sensitive to the reported differences between GS and UQS?
   - $H_0$: Accuracy of GS = Accuracy of UQS in the two groups.
   - $H_1$: Accuracy of GS > Accuracy of UQS in the two groups.

RQ2) Is there an interaction between NP type and age? Is the joint effect of NP type and age on accuracy predictable from the effect of the two factors individually?
   - $H_0$: There is no interaction.
   - $H_1$: There is an interaction.
Participants

Three age groups (all from Vitoria-Gasteiz):

1. **Young**: 4/5-year-olds (N = 31) → Command of UQS.
2. **Old**: 8/9-year-olds (N = 24) → Controls for a study with ASC participants with matching developmental age.
3. **Adults** (N = 26) → Controls for adult-like behavior.
Design

→ All contexts are *contradictory*. Importance of exceptions. (Lazaridou-Chatzigoga et al. 2019).

○ Critical items (x 16)
  ⊕ A within-individual variable: NP type (GS vs UQS)

○ Fillers (x 32)
  ⊕ Fillergen (false generics → controls) (x 16)
  ⊕ Name (pure fillers) (x 16)

○ A between-individual variable: age (Young, Old, Adults)
○ Critical items: majority characteristic (GS true, UQS false)

(16) ¿Dirías que (todos) los gatos tienen bigotes?
‘Would you say (all) cats have whiskers?’

<table>
<thead>
<tr>
<th>Cond</th>
<th>Answer</th>
<th>Accuracy</th>
<th>Answer</th>
<th>Accuracy</th>
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<tbody>
<tr>
<td>UQS</td>
<td>Yes</td>
<td>0</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>GS</td>
<td>Yes</td>
<td>1</td>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>

Table: Table 1. Accuracy in critical items
Materials

- **Fillergen**: not in the list of generics (false)

  (17) ¿Dirías que las pizzas son cuadradas?
  ‘Would you say pizzas are square-shaped?’

- **Name**: a proper name as a referent (true and false)

  (18) ¿Dirías que Celedón lleva corbata?
  ‘Would you say Celedón wears a tie?’

<table>
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<tr>
<th>Cond</th>
<th>Answer</th>
<th>Accuracy</th>
<th>Answer</th>
<th>Accuracy</th>
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<tr>
<td>Name (True)</td>
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<td>1</td>
<td>No</td>
<td>0</td>
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<tr>
<td>Name (False)</td>
<td>Yes</td>
<td>0</td>
<td>No</td>
<td>1</td>
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<tr>
<td>Fillergen</td>
<td>Yes</td>
<td>0</td>
<td>No</td>
<td>1</td>
</tr>
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</table>

**Table**: Table 2. Accuracy in filler items
Procedure

SCREEN 1: un gato sin bigotes ‘a cat without whiskers’

SCREEN 2: ¿Dirías que \{los, todos los\} gatos tienen bigotes? ‘Would you say \{∅, all\} cats have whiskers?’
Coding and analysis

- Analysis of variance (ANOVA) of accuracy means using IBM SPSS 26.
- By item analysis (difference in N of participants in each group prevents the by-participant analysis).
- Repeated measures with one within-participant factor (NP type) and one between-participant factor (age).
Results: critical items

![Accuracy means](image)

**Table:** Descriptive statistics (Critical)
Results: critical items

Fig. 2 Interaction plot for NP Type x Age
1 = GS; 2 = UQS
Results: fillers

Fig. 3 Accuracy means in fillers

<table>
<thead>
<tr>
<th>NP type</th>
<th>Fillergen</th>
<th>Name</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>young</td>
</tr>
<tr>
<td>age group</td>
<td></td>
<td>0.49 [SD 0.20]</td>
</tr>
<tr>
<td>young</td>
<td>0.81</td>
<td>0.92</td>
</tr>
<tr>
<td>old</td>
<td></td>
<td></td>
</tr>
<tr>
<td>adults</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table: Descriptive statistics (Fillers)
Results: a study on Gen type

Fig. 4 Interaction plot for Gen Type x Age
1 = Fillergen; 2 = GS
Discussion: back to our hypotheses

RQ1) Are children sensitive to the reported differences between GS and UQS?

 Mandal H₀: Accuracy of GS = Accuracy of UQS in the two groups.

✓ H₁: Accuracy of GS > Accuracy of UQS in the two groups.

RQ2) Is there an interaction between NP type and age? Is the joint effect of NP type and age on accuracy predictable from the effect of the two factors individually?

 Mandal H₀: There is no interaction.

✓ H₁: There is an interaction.
Discussion: developmental overview

1. **Young:**
   - Very high acceptance rate for GS, but very low rejection rate for UQS.
   - Failed at rejecting Fillergen.

2. **Old:**
   - They perform worse in GS than **Young** (≈ **Adults**).
   - No difference between GS and UQS (≈ **Adults**).
   - They pattern with **Young** in failing to reject Fillergen.

3. **Adults:**
   - GS are not at ceiling.
   - An interesting difference according to item type (sub-kind vs accidental, the former yielding the rejection of GS).
Discussion: Support for the GaD?

- **In favor:**
  - \( \text{Acc}(\text{GS}) > \text{Acc}(\text{UQS}) \)
  - \( \text{Acc}(\text{Young,GS}) > \text{Acc}(\text{Young, UQS}) \)

- **But important data points against it:**
  - \( \text{Acc}(\text{Adults, GS}) \) is not at ceiling.
  - \( \text{Acc}(\text{Young/Old, Fillergen}) < \text{Acc}(\text{Young/Old, UQS}) \)
  - GaD does not predict a decline in acceptability across development.
Discussion: GOG?

- Acc(Young, UQS) is an instance of GOG effect, attenuated in **Old** and **Adult**.

- **Young**
  - don’t pay attention to exceptions (do not update background knowledge), OR
  - do not master unrestricted UQS.

- **Old, Adults**
  - Acceptance of UQS can be an instance of loose talk (*all* vs *absolutely all*).
  - However this does not hold across the board: only with certain items (remember the sub-kind vs accidental distinction).
    → Could there be different types of generalizations as expressed by UQS?
Discussion: generics not so easy after all?

False generics are difficult to reject in \textit{Young, Old}.

Could it be that System 1 is good at verifying GS, but falsifying them is not as fast/easy? (GaD)

Could it be that negating a UQS ($\neg \forall$) vs a GS ($\neg P$) evokes different alternatives, thus affecting the possibility of an easy direct rejection?
Conclusions
Conclusions

1. We have reported new data regarding interpretive and cognitive differences in generalizations as realized by GS and UQS in Spanish.

2. Our data does not talk in favor of the GaD view. In fact, it opens new interesting lines of research.
   - The processing and interpretation of true vs false generics.
   - The acquisition of restricted vs unrestricted UQS.
   - Potential differences in generalizations as expressed by UQS.
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Thanks for your attention and feedback!

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