# Acquisition of Irregular Patterns in Spanish Verbal Morphology

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## 1. Introduction

English past tense acquisition has been the subject of a long controversy between connectionism and generative linguistics. However, English past tense has simple morphology and phonology. Thus, the debate can benefit from looking at a morphologically more complex language.

Goals of this paper:

1. Analyze data from acquisition of irregular patterns in Spanish verbs.
2. Is the data compatible with all models of morphology acquisition?

## 2. Background

### 2.1 Irregular patterns

•Analysis of **lexically arbitrary** verbal alternations.
•They are a minority pattern in the 1st conjugation and more common in the 2nd and 3rd [AAH, 2000]
•All the verbs in the **3rd conjugation** undergo some alternation.

A. Diphthongization in stressed syllables:
[e] → [ie] comenzár vs. com**ié**nzo
[o] → [ue] c**o**ntár vs. c**ué**nto
B. Raising in stressed syllables (only 3rd conj):
[e] → [i] pedír vs. pído
C. Velar insertion:
∅ → [g | k] poner vs. pon**g**o

### 2.2 Morphology acquisition

**Words and Rules** (WR, [PU, 2002]): all regulars are derived by a rule, while irregular forms are individually stored in the lexicon.

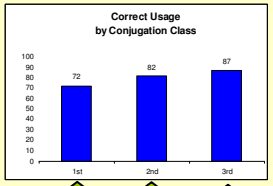
**Rules and Competition** (RC, [YANG, 2003]): there are rules both for the regular forms and for the irregular forms and these rules compete against each other. Acquisition task consists of:

1. Learning whether an irregular rule R applies to a certain subclass of verbs.
2. Learning whether a verb x belongs to a certain irregular class of verbs S

## 3. Data and Results

•Data: transcriptions of six Spanish-speaking children from the CHILDES database [MS, 1985].
• Extraction of:
1. Correct verbs containing one of the irregular patterns: 'quiero'
2. Overregularized verbs: 'quero'
3. Overirregularized verbs: 'cuemo'

•Results: 345 overregularizations found
0 irregularizations found




-1st conj. lower CUR

-2nd conj. larger input

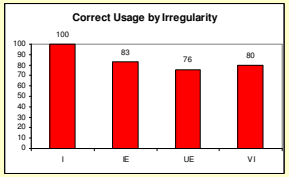
-3rd conj. higher CUR → all 3rd conj. verbs undergo some alternation

| | | | |
|---|---|---|---|
| Child # | 214 | 1456 | 152 |
| Adult # | 740 | 4711 | 213 |

**Figure 1.** Correct Usage Rate (# correct verbs / # total verbs) for each conjugation. Tokens used by children and adults.

- Raising verbs 100% CUR.

-Other three types: the more input from adults the higher the CUR




| | | | | |
|---|---|---|---|---|
| Child tokens | 13 | 1090 | 357 | 362 |
| Adult tokens | 39 | 2373 | 1508 | 1744 |

**Figure 2.** Correct Usage Rate (# correct / # total verbs) for each irregularity. Tokens used by children and adults.

The differences in Correct Usage Rate are statistically significant both for conjugation class and type of irregularity: $p<0.05$ in a $\chi 2$ test for both distributions.

## 4. Analysis

### 4.1 Statistics

- Out of our variables (conjugation class, type of irregularity, adult input), which one gives us the best statistical model?
- Best regression contains 2 variables: (1) input from adults and (2) whether a verb belongs to the 1st conj.
- This model achieves significant results: $F = 6.1$, $p < 0.02$

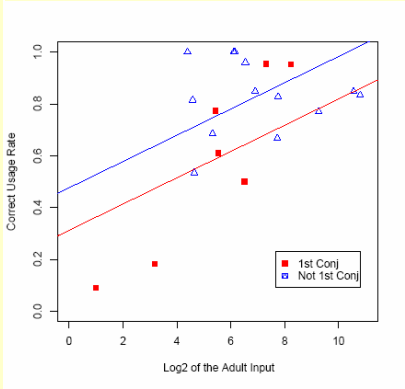



**Figure 3.** Plot of the irregular verbs by their CUR and the adult tokens (transformed by a base 2 logarithm) and of the lines fitted by the statistical model.

• The more input from adults for a particular verb, the easier the verb is for children (as indicated by the slope).
•1st conj. verbs are tougher (the red line is lower than the blue line).

### 4.2 Main findings

1. Many instances of overregularizations were found (345). No instances of overirregularizations were found.
2. The two main predictors of a verb's CUR are:
(a) adult input
(b) membership in the first conjugation
3. There are significant differences in the verb's correct usage according to both conjugation and type of irregularity.
4. Some verbs have a perfect CUR of 1, although there was no adult input in our data

**Not consistent with the WR model!**

## 5. Conclusions

• Can the Words and Rules model account for all the findings?

• NO!
• WR predicts that irregular verbs are individually stored in the lexicon.
• Conjugation or type of irregularity should not have any effect on how well the verb is used, contrary to the facts.
• The gap between the blue and the red line in Figure 3 should not be significant, but it is.

• All the findings are compatible with the Rules and Competition model, which proposes that irregular verbs are organized in subclasses and derived by rules

## References

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