People can learn default patterns even when they are infrequent

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Introduction

The present study examines how people learn pluralization patterns.

- Default: suffix used “elsewhere” (i.e., everywhere except where there are exceptions)
- Frequent default: exceptions occur less than the default
- Minority default: exceptions occur more than the default (Marcus et al., 1995)
- Exception groups: narrow classes of words (e.g., words limited to certain word endings) that do not take the default

Hypotheses

1. When frequency is held constant, learners will generalize the suffix that goes “elsewhere” (i.e., the default) to new words
2. When the default is infrequent, they will pluralize “elsewhere” words with the default and frequent suffixes (McCurdy et al., 2020)

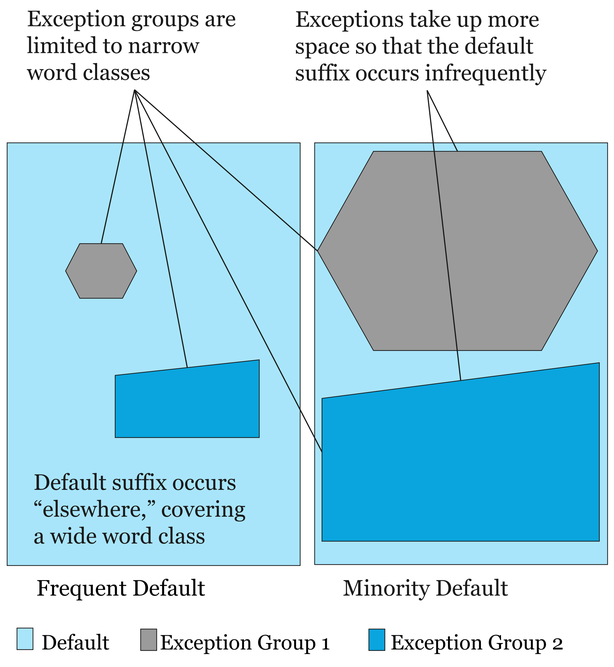

Figure 1: Frequent vs. Minority defaults

Methods

	Experimental (40 words)	Control (39 words)
One Exception group	18 words (45%) *Frequent/narrow*	13 words (33.33%) *Narrow*
Other Exception group	14 words (35%) *Mid-Freq./narrow*	13 words (33.33%) *Narrow*
Elsewhere Category	8 words (20%) *Default/wide*	13 words (33.33%) *Default/wide*

Table 1: Distribution of categories in the training phases for the experimental and control languages

Control artificial language:

- Frequency held constant
- Narrow word classes vs. wide word class

Experimental artificial language:

- Default occurs least frequently
- Frequent/narrow word classes vs. infrequent/wide word class

Training Phase 1:

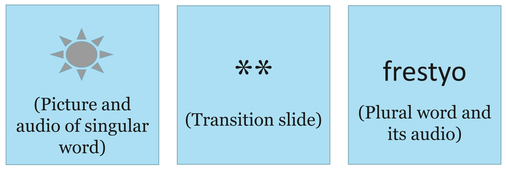

Figure 2: Format of 1st training phase

Training Phase 2 (same words from Phase 1):

Figure 3: Format of 2nd training phase

Testing phase (New words):

- Same format as Phase 2 but no feedback

Results

The participants’ testing phase responses were analyzed. In both languages, they chose the correct suffixes above chance.

Control language summary:

- Exception group 1 > Elsewhere
- Exception group 2 > Elsewhere
- Narrow > Wide

Experimental language summary:

- Frequent > Mid-frequent
- Frequent > Elsewhere
- Mid-frequent > Elsewhere

The more frequent a category was, the better learners performed.

However, the default was learned equally well in both languages—even when it occurred least frequently.

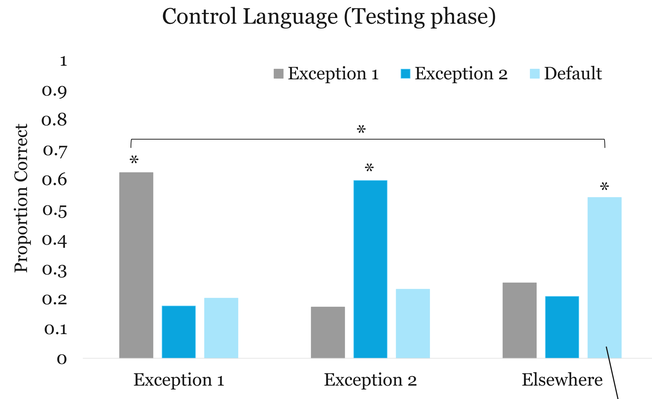

Figure 4: Participants’ performance when the default suffix occurs as frequently as the exceptional suffixes

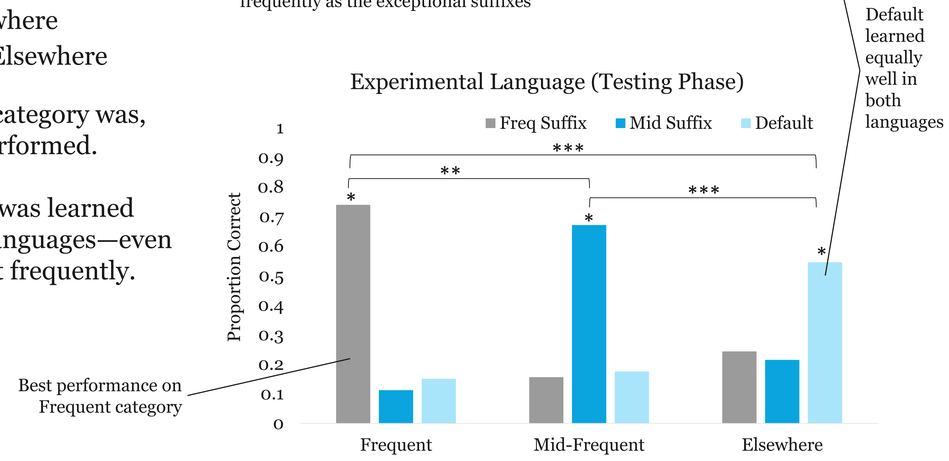

Figure 5: Participants’ performance when the default occurs more infrequently than the other suffixes

Conclusions

- Hypothesis 1 supported: when frequency was held constant, learners used the Elsewhere category suffix as the default and generalized it to new Elsewhere words
- Hypothesis 2 unsupported: when the default was least frequent, learners still used it to pluralize new Elsewhere category words above chance. They did not overwhelmingly use the frequent suffixes instead.

The observed learning patterns can apply to other domains. For example, sports and traffic rules may also have patterns that depend on what occurs normally vs. exceptionally.

References

Marcus, G. F., U. Brinkmann, H. Clahsen, R. Wiese, & S. Pinker. (1995). German Inflection: The Exception That Proves the Rule. *Cognitive Psychology, 29*(3), 189-256.

McCurdy, K., Goldwater, S., & Lopez, A. (2020). Inflecting when there's no majority: limitations of encoder-decoder neural networks as cognitive models for German plurals. *arXiv preprint arXiv:2005.08826*.