

# DPs Syntax in acquisition

A case study on Italian L2 by Czech and Slovak learners

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Czech and Slovak are languages which don't exhibit a manifest position for the Articles in the Determiner Phrase. The aim of this paper is to show how this structure is accessed during the learning of Italian, a language which presents the articles as for the standard behavior for nouns.

**Keywords:** Determiner Phrase, Italian L2, Second Language Acquisition, Syntax

## Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Theoretical background</b>	<b>3</b>
2.1	The generative view on language . . . . .	3
2.2	The role and the study of interlanguage . . . . .	3
2.3	The position of DP and NP . . . . .	4
<b>3</b>	<b>The analysis of data</b>	<b>5</b>
3.1	The datasets . . . . .	5
3.2	Methods . . . . .	6
3.3	Results . . . . .	6
<b>4</b>	<b>Conclusion</b>	<b>9</b>
	<b>Abbreviations</b>	<b>9</b>
	<b>Financial coverage</b>	<b>10</b>

## 1 Introduction

Czech (ces) and Slovak (slk) are languages of the Slavic branch in the Indo-European family. Alongside a certain morphological complexity in noun declension systems, these languages –except for Bulgarian (3b) and Macedonian (Dryer, 2013)– don’t show an overt realization of the Determiner position inside the noun phrase (1) (Harkins, 1953). Conversely, Italian (ita) and the other romance languages explicit that position as a default behaviour, usually with a free morpheme preceding the noun (2) or by cliticization of the definite article (3a):

### (1) Articleless

- a. ces (Veselovská, 2014, 14)  
*Chlapec/Marie/Ona/každý miluje ryby/ {své rodiče}.*  
 Boy/Marie/She/Everyone Love.3sg Fish/ {POSS parent}  
 “SUBJ loves [the] fish/ his parents”
- b. slk (Kamenárová, 2007, 113)  
*Večer čítam knihy, píšem referáty...*  
 Evening Read.1SG Book.PL Write.1SG Paper.PL  
 “In the evening I read [the] books, I write (school) papers ...”

### (2) Proclitic

- a. ita (Bianco, 2017, 60)  
*Il terremoto ha distrutto la città.*  
 ART.DEF Earthquake AUX.3sg Destroy.PTCP.PST ART.DEF City  
 “The earthquake destroyed the city”
- b. fro (Dufournet and Lecoy, 2008, 3261)  
*La dame estoit devant la sale.*  
 ART.DEF Girl Be.3sg ADV ART.DEF Room  
 “The *dame* was in front to the room”

### (3) Enclitic

- a. ron (Cojocaru, 2003, 45)  
*Prieten=ul meu este aici.*  
 Friend=ART.DEF POSS Be.PRES.3sg Here  
 “My friend is here”
- b. bul (Leafgren, 2011, 37)  
*Къде е книга=та му?*  
 Where Be.3SG Book=ART.DEF POSS.1SG  
 “Where is my book?”

The general idea of this paper is to address the question of how linguistic structures which are not overtly marked in L1 can be accessed during the acquisition of a target language that show them. While doing this can be either both purely speculative as grounded on actual data, I will show how the usage of a target collection of linguistic corpora can be useful to test the main hypotheses

into narrower facts. The language under observation are indeed a few: on one side *ces* and *slk* as native languages—with no overt position for the articles—on the other *ita* as target language.

The section 2 provides a theoretical discussion on the top of different theories inside the Generative framework (Chomsky, 1995) on the status of DP and NP. The section 3 is twofold: firstly I present the methods used into the current study in terms of *reproducibility* of the research and an analysis of the expected results; while the second subsection is built upon a case study made off to test some hypotheses about the categorial differences of DPs during the acquisition of *ita* by *ces* and *slk* native speakers involved in the test. A summary conclusion (Section 4) closes the paper.

## 2 Theoretical background

### 2.1 The generative view on language

By a generative-oriented point of view, the human language is a computational procedure which relies on a hierarchical organization of structures, and language variations are reconducted to a parametrizing of choice among them (Adger, 2013; Chomsky, 1995, 1998, 2013, 2015; Rizzi, 2013):

We are concerned, then, with states of the language faculty, which we understand to be some array of cognitive traits and capacities, a particular component of the human mind/brain. The language faculty has an initial state, genetically determined; in the normal course of development it passes through a series of states in early childhood, reaching a relatively stable steady state that undergoes little subsequent change, apart from the lexicon. To a good first approximation, the initial state appears to be uniform for the species. (Chomsky, 1995)

In this perspective, the possibility of comparison is offered either by different languages than among different states of language acquisition: structures can be compared and analyzed into a coherent grid in order to perform analyses and reveal the similarity and the differences in the parametrizing of syntax.

### 2.2 The role and the study of interlanguage

Amongst many scholar the role of the native language (L1) has been raised as a factor of possible conditionation in the way which the target language (L2) is acquired during the learning path: an emblematic case is the *transfer* of

the knowledge about the structures of the L1 to the target, revealing the intermediate steps of the acquisitional path, by the hypothesis of *interlanguage* addressed in (Selinker, 1972). One of the main area of research in Generative studies on Second Language Acquisition (GenSLA) regards the investigation about how the linguistic structures can be accessed in L2 and how the transitional stages of acquisition work into the learning *continuum* (Rothman and Slabakova, 2017).

Since the last 20 years, a considerable part of linguistic activity is involved in developing some sort of models to describe how the faculty of language can work, in its biological (Hauser et al., 2002), computational (Fodor, 2001) and cognitive components in a highly interdisciplinary environment. Studies on SLA is a fertile field, which relies on comparative and contrastive analyses of linguistic phenomena, either both from an applied view (Ellis, 1994) than by theoretically grounded perspective focused on GenSLA (Guasti, 2002; Hawkins, 2001; Rothman and Slabakova, 2017; Sorace, 2011).

### 2.3 The position of DP and NP

There are striking differences amongst languages that display an overt D position and those that do not do it in respect to the syntactic behaviour of NP, as such as Left Branch Extraction allowing, scrambling or adjective extraction. Those properties are summarized in the table below (in Salzmann, 2018, from Bošković (2009)):

Table 1: Typology of Overt D vs. Covert D languages

	Overt D	Covert D
allow adj extraction from NP	no	yes
allow LBE	no	yes
allow Neg-raising	yes	no
allow scrambling	no	yes
allow the majority superlative reading	yes	no
allow trans. nominals with 2 non-lex. genitives	yes	no
can be polysynthetic	no	yes
island sensitivity in head-internal relatives	no	yes
superiority effect in wh-mvt	yes	no

Since the seminal work of (Abney, 1987) there have been established two hypotheses to represent this structure: (i) NP-over-DP, for which the DP is at the edge of NP as specifier; (ii) DP-over-NP, where the DP dominates the NP:

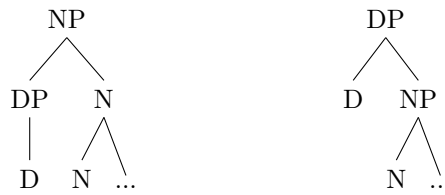


Figure 1: Phrase structure in NP-over-DP vs. DP-over-NP Hypotheses

Symmetries amongst the DP/NP phrase and the whole sentence are often referenced in terms of structure building and phase-related properties (Chomsky, 2013, 2015).

### 3 The analysis of data

#### 3.1 The datasets

For the analysis of ita as non native language by ces and slk learners, the 3 corpora below have been subsetting and collected into a dataframe (henceforth “*collection*”):

- **GranVALICO** and **VALICO** (Barbera, 2003)  
Learner corpora provided by Turin University. They represent the most valuable sources of Italian L2 corpora. They are composed by written texts composed by the students which have the assignment to describe the vignettes provided by the teachers. The corpora are accessible online with an advanced search that permits to filter the data by different parameters (e.g. learners’ L1 and education, assignments etc.).
- **MERLIN** (Abel, 2014)  
The MERLIN Corpus represents a wide-range multilingual documented resource which collects 2.286 texts written by learners of Czech, Italian and German. Started in 2012, the main objective is to show the different levels of acquiring languages by the usage of written texts, relying on the CEFR level schema on L2 acquisition. The Italian-L2 subcorpus contains 813 texts.
- **Czech-IT** (Petolicchio and Bolpagni, 2017)  
The Czech-IT corpus contains chat messages, emails, coversations, surveys and assignments by more than 70 Czech and Slovak learners of Italian language. Started in 2017, it is fully accessible online.

Alongside, two monolingual L1 corpora have been used for ita and ces:

- **Google nGram Viewer Italian** (Michel et al., 2011)  
With more than 40 billions words with an estimated accuracy rate of 95.6% for POS-tagging and 80.0% for dependency parsing (Lin et al., 2012), the Italian corpus represents a wide collection of data to study monolingual ita in written form. Developed at Google, the nGram Viewer represents the interface to deal with those corpora in a standalone way.
- **Syn2010** (Křen et al., 2010)  
Part of the big documentation project of Czech National Corpus (CNK, *Český Národní Korpus*), SYN2010 is a representative corpus of contemporary Czech writing containing more than 100 million words, which includes texts by fiction (40%), journal articles (27%), and professional literature (33%).

### 3.2 Methods

The data from the three corpora have been subsetting for the relevant analysis, including only the data which present ita as the target language by ces and slk learners and merged into a collection which consists of 411 texts and 35391 tokens. The texts in the collection are computationally processed in subsequential steps in order to retrieve a comparable basis for data analyses. In first place from their original dataset were extracted only the relevant pieces and then they were processed towards the use of the library UDPIPE (Straka and Straková, 2017) in R. The corpora were cleaned by the deletion of non-informative structures (e.g. punctuation marks), and merged (Table 2):

	Texts		Tokens	
	ces	slk	ces	slk
Czech-IT	212	74	11129	4440
Merlin	1	0	256	0
Valico	107	17	16250	3316

Table 2: Structure of data in the collection

Alongside, mono-lingual data have been analyzed for the comparison. For Czech language the analysis relies on the work of (Veselovská, 2014) based on SYN2010 (Křen et al., 2010). The statistics on Italian corpus are been provided by the submission of syntactic queries against the Google NGram API (Michel et al., 2011) on Google Books ITA (1500-).

### 3.3 Results

The data in the collection was computationally processed in order to retrieve quantitative information about the overall distribution of the syntactic phrase, specifically elicited in the environments that present a Noun element. These clusters have been analyzed by their condition in the environment, giving the possibility to compare the distribution of the single tags in the antecedent position of a noun or in the subsequent position. A general POS tagging pipeline was established with the usage of the free library UDPIPE for R. While those tools can reach far beyond the 90% of accuracy in POS-tagging for mono-lingual corpora, it has to be evaluated that learner-based corpora posit a challenge for automated tasks.

The chart below (Figure 2) represents the occurrences of the bigrams clustering with N, extracted by the collection of corpora.

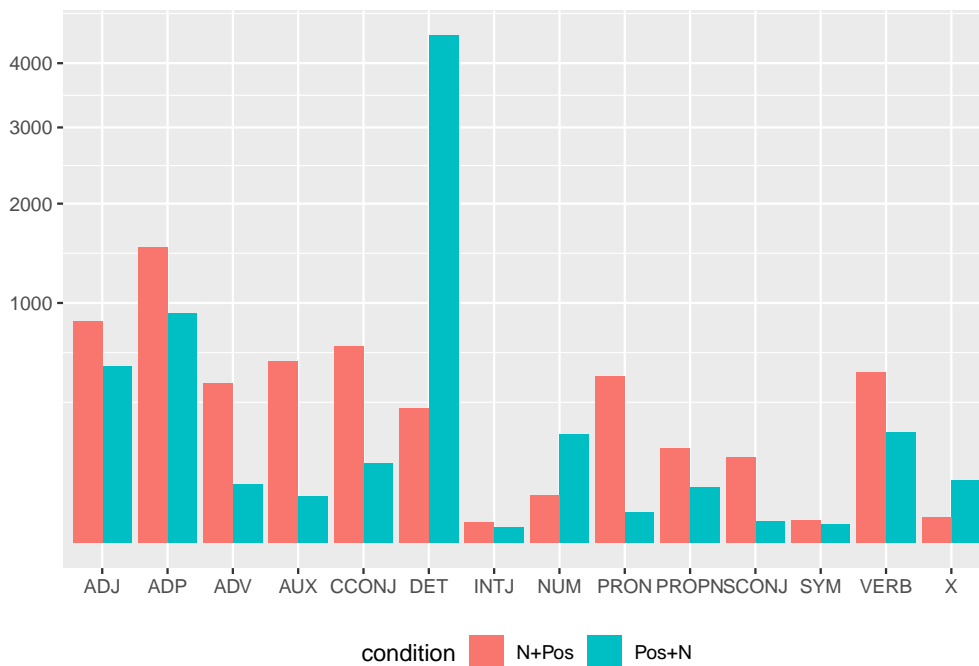
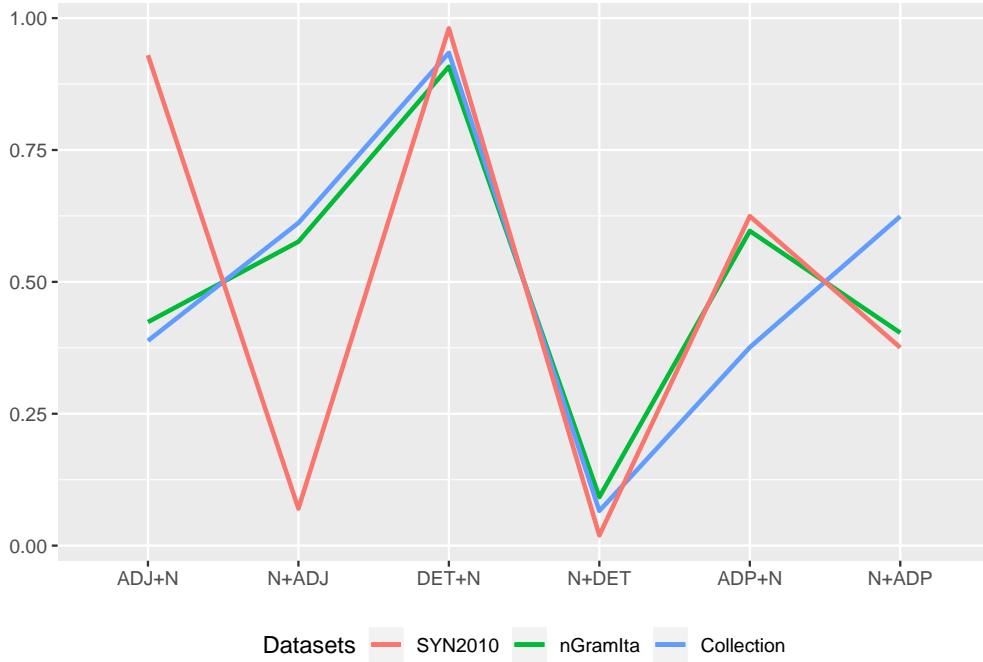


Figure 2: Distribution of 2-grams with N in Collection

Alongside, SYN2010 and Google NGram data were compared to the collection. While the analysis of the SYN2010 corpus relies on the study of (Veselovská, 2014) except for the statistics of ADP+N/N+ADP clusters, the results yielded by the diachronic analysis on Google nGram were processed by their central tendency, calculated by the arithmetic mean (AM). With a data set containing the values  $a_1, a_2, \dots, a_n$  then the arithmetic mean is defined by the formula:

$$AM = \frac{1}{n} \sum_{i=1}^n a_i = \frac{a_1 + a_2 + \dots + a_n}{n} \quad (1)$$

Then, the amounts of the clusters in the dataset have been weighted by their absolute distribution and refactored to a value equal to 1. The plot in Figure ?? shows the fine-grained comparison of these clusters in the dataset<sup>1</sup>.



The presented data does not deal directly with the problem of the evaluation of the automated tasks involved in the process, has to be cleared out that there can be some weaknesses in the usage of mono-lingual trained processors in learner corpora. Alongside, while they can be implemented towards their application in multilingual contexts, it appears that an overall elicitation of this issue cannot be done flawlessly since the complexity of the language acquisition path. Moreover, the different size of the corpora involved in the analysis, which display different magnitude of wideness (nGram is over 40 billions of tokens, the collection 39 thousands), plays a role in the analysis of the data itself and imposes a certain relax in threatening univocal consequences.

In this sense it appears that a certain tendency can be shown in the examples discussed above. While it shows a certain uniformity in absolute value of DET-

<sup>1</sup>The category of DET in SYN2010 corresponds to DEM, Q, PRON (not POSS) (Veselovská, 2014, 20).



N clusters in the dataset, a major shift arises in the position of the adjectives, which can be traced by the typological differences amongst the languages under analysis:

(4) Position of adj

a. ces

*To červené auto.*

DEM.NT ADJ.NT NOUN.NT

“That red car”

b. ita

*Quella macchina rossa.*

DEM.FEM NOUN.FEM ADJ.FEM

“That red car”

Conversely, the position of the *collection* in respect to ADP-N clusters can be due either to some lexical choices present in the texts in that dataset which can gain a certain complexity in the noun phrases as well to some inconsistencies due to the application of such tools, than to an effective syntactic difference in such cases.

## 4 Conclusion

This study aims to show the possibility of a data-based comparison across mono-lingual corpora and learner corpora which yield quantitative information usable in the understanding of second language acquisition, specifically in the syntactic domain of the noun phrases in the Italian grammar by Czech and Slovak learners. On one side it reconnects to generative framework and deals with the problem of the understanding the phrase structure of the nominal domain (Abney, 1987, Bernstein (2008), Zamparelli (1995)) and its place in the study of non-native language acquisition (Rothman and Slabakova, 2017). For doing it there was established a computational method to deal with different linguistic datasets (Sinclair, 2005) in order to obtain absolute values of the distribution of the spotted elements in order to retrieve some tendencies in the linguistic productions of non-native speakers.

In this sense, a diachronic study on such types of learner-based research can shed a light on more fine-grained analyses, specifically to spot on forms of *analogy* or *overcorrection* during the learning path of those construction, and it appears an encouraging perspective to move on in the following steps, aware of the necessary interplay of quantitative and qualitative processes in such interdisciplinary models.

## Abbreviations

Languages are indicated by the abbreviations provided in the ISO 639-3 format (SIL International, 2009). Morphological glosses styles adhere to the widely recognized *Leipzig Glossing Rules* (Comrie et al., 2008), while other abbreviations respect (Boeckx, 2012).

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