The ICoN Corpus of Academic Written Italian (L1 and L2)

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Abstract
This paper describes the ICoN corpus, a corpus of academic written Italian, some of the directions of research it could open, and some of the first outcomes of research conducted on it. The ICoN corpus includes 2,115,000 tokens written by students having Italian as L2 students (level B2 or higher) and 1,769,000 tokens written by students having Italian as L1; this makes it the largest corpus of its kind. The texts included in the corpus come from the online examinations taken by 787 different students for the ICoN Degree Program in Italian Language and Culture for foreign students and Italian citizens residing abroad. The texts were produced by students having 41 different L1s, and 18 different L1s are represented in the corpus by more than 20,000 tokens. The corpus is encoded in XML files; it can be freely queried and it is available upon request for research purposes. The paper includes the discussion of preliminary research in the field of collocations, showing that, in the texts included in the corpus, while learners and natives do use multiword expressions in a similar way, learners can overuse relatively infrequent forms of multiword adverbials, or use some adverbials in a non-standard way.

Keywords: Corpus linguistics, Learners, Italian, multiword expressions, collocations

1. Introduction
Learner corpora are useful and widely used in the study of language and language learning. In this paper we describe the building of the largest (to date) learner corpus of academic written Italian as L2 and of a large comparable corpus of academic written Italian as L1, collectively called “The ICoN corpus”, already partially described in Tavosanis (2014) and (2016). The corpus can be queried online while its complete contents are available on request for research purposes.1

2. The Context of Learner Corpora Research and the Status of Learner Corpora for Written Italian
Being a learner corpus, the ICoN corpus belongs to a class of corpora well understood in theory and much appreciated for its practical uses (for an overview, see Granger, Gilquin and Meunier 2015). Learner corpora today number in the hundreds: the list of learner corpora maintained by Magali Paquot at the Université Catholique de Louvain includes to date 166 entries, while the Learner Corpus Bibliography maintained by the Learner Corpus Association (at the address www.learnercorpusassociation.org/resources/lcb/) includes more than 1,500 entries.

In the research tradition of the field, “in terms of medium and text type, the dominant focus was – and to a large extent still is – on writing, in particular essay writing” (Granger - Gilquin -Meunier 2015, 2). Well known examples of this include for example the ICLE (International Corpus of Learner English) corpus. This corpus (described in detail in Granger, Dagneaux, Meunier, Paquot, 2009) includes 2.5 millions of words coming from 3,640 unabridged essays, with an average length of 700 words, written by students with 11 different L1s. The essays do cover a variety of topics but for the most part are examples of argumentative writing and general use of English (rather than of English for specific purposes).

The ICoN Corpus, as will be described in detail in the following paragraphs, follows closely this tradition and, at least in size and composition, it can be roughly compared to the ICLE corpus. However, similar corpora are still relatively rare in the study of Italian as FL / L2. The most used resources of this kind are arguably the twin corpora VALICO (Varietà di Apprendimento della Lingua Italiana Corpus Online) and VINCA (Varietà di Italiano di Nativi Corpus Appaiato), realized at the University of Torino (Barbera - Marello 2004). Those corpora do include productions elicited with similar techniques from FL / L2 learners (VALICO) and mother tongue speakers of Italian (VINCA). In both contexts, informants were mainly university students, with levels of L2 located for the most part in the A2-B1 range. VALICO includes 3,804 texts while VINCA has 680 texts (Allora – Colombo - Marello 2011), for a minimum size of 100 words; the web site of the project currently declares an overall size of 568,000 tokens for VALICO. This twin-corpus approach has a self-evident usefulness for comparison between L1 and L2 productions and it was followed in the building of the ICoN corpus.

Among other learner corpora of written Italian, in addition to a wealth of spoken corpora, we would also like to cite: ISA (Italiano Scritto di Americani), cf. Rastelli 2006; ADIL2 (Archivio Digitale di Italiano L2), realized at the Università per Stranieri di Siena, 432,606 tokens of which two-third are spoken data, cf. Palermo 2000; CAIL2 (Corpus di Apprendenti di Italiano L2), realized at Università per Stranieri di Perugia, cf. Bratankova 2015 (see also Andorno – Rastelli 2009 for an overview of Italian research on the topic). Among those, however, the ICoN corpus is the only one specifically devoted to upper-intermediate and advanced varieties.

3. The ICoN Degree Program and the ICoN Examinations
The ICoN corpus has been assembled at the University of Pisa in close cooperation with ICoN (Italian Culture of the Net), a consortium composed of nineteen Italian

1 The paper was written jointly. However, for attribution of value, we declare that paragraphs 1-5 and 7 were the work of Mirko Tavosanis and paragraphs 6 and 8-10 were the work of Federica Cominetti.
universities whose aim is the promotion of the Italian language and culture all over the world through e-learning technologies (Tavosanis 2003). Among other educational initiatives, ICoN offers a three-year degree program in Italian Language and Culture, reserved to foreign students and Italian citizens resident abroad. The corpus is composed by short essays composed by the students during the examinations. Each exam of the ICoN degree program includes the writing of a short text on a specific topic relevant to some aspect of the Italian humanistic culture (e.g. “The Baroque restoration practices of Maratta and the nineteenth century restoration practices of Cavalcaselle: compare two different attitudes towards conservation of the work of art”; “Analyze the relationship between Petrarch and Humanism”; “Illustrate the concept of equivalence and its role in the method of interlinguistic confrontation”). The corpus ICoN collected all such texts written by the ICoN students from 2001, year of the start of the degree program, until 2014. Examination procedures in all cases required students to choose one topic for the essay among three different given topics. The task had to be completed in less than 90 minutes, but during this time students also had to answer to 30 fixed-choice questions (inside the limit of 90 minutes, students could freely choose how much of their time give to the questions or to the composition of the text). The use of supporting materials, such as textbooks and notes, was forbidden and enforcement of this rule was trusted to proctors in the examination rooms, set in the residence countries of students. As for the text, the reference length given to students was 300 words (corresponding to an average of around 2200 characters), with penalties for texts both too long and too short. Moreover, during the examination, the number of words was shown to the student by a counter inserted in the writing interface: not surprisingly, the average length of the corpus texts is of 302 tokens.

4. Composition of the ICoN Corpus

The corpus in its published form is composed of 12,556 essays written by 787 different students. A single student then produced 16 texts on average. The inclusion of texts written by students that dropped out of the program and the fact that many students were still completing the program at the time of corpus generation are the reasons why the average is below the 21 texts required by the degree course. On the other hand, some students took the same examination more than once, and therefore some students are credited in the corpus with more than 21 texts. The total corpus tokens are 3,794,000, of which about 2,115,000 written by Italian L2 students and approximately 1,769,000 written by Italian L1 students. The sum of the two sub-corpora is higher than the total, because some students were registered as “bilinguals” and their work has been included in both corpora. However, only 16 students are eligible for this, corresponding to a total of only 90,000 tokens (2.37% of the total). The texts included in the two subcorpora were composed by the two groups of students in identical circumstances. This makes it possible to compare the sub-groups according to the consolidated VALICO / VINCA model. In this perspective, two strengths of the ICoN corpus are undoubtedly:

- its size, far superior to the size of the other comparable corpora
- the fact that its contents have not been realized for linguistic purposes but represent actual and evaluated exams; since it was created in a real-life context outside of dedicated language instruction, this kind of output can been considered as somewhat more than “semi-natural” (in the sense of “a pedagogical task that is natural in the context of the language learning classroom”: Granger 2015: 10).

As for the encoding, texts were exported and collected as XML files with UTF-8 encoding. Personal data were thoroughly anonymized by the ICoN consortium: birth date was given as year of birth; country of residence was the only information given regarding residence. The encoding was carried out including each text as plain text inside a <doc> element including as attribute values the information regarding the student, as in this sample:

```
<doc id = "pre2008_esamistudente_9489.xml" idstudente="9489" risposta="RISPOSTA 4" Area_Titolo_Studio="Linguistica" Condizione_Lavorativa="In Altra Condizione" Data_Nascita="1976" Lingue_Conosciute="Rus Eng Pol" Madrelingua="Cze" Naz="Rep. Ceca" Posizione_Lavorativa="" Provincia="" Sesso="F" Titolo_Studio="Laurea 1° Livello">
```

The XML files generated in this way were then used both for direct search and as sources for the search engine with Web interface described below.

5. Level of Knowledge of Written Italian

Students enrolled in the ICoN degree program are supposed to have reached a level at least equal to B2. In many cases, their level is definitely higher, while in some rare cases we feel it would be more appropriate to classify their production ability at level B1. Texts included in the corpus are therefore relatively homogeneous productions. At the moment no attempt has been made to evaluate more accurately the level of real competence of each individual student. An example of a full text is this (Greek L1):

Dialoghi con Leucò è una raccolta di poesie scritte da Pavese e pubblicata nel 1947.L'opera consiste nei 27 componimenti in forma di dialogo fra personaggi mitici.Probabilmente l'autore si ispirò dalla Tesalique Mitologie dell’autrice Paula Phillipson.Nell'opera traspore una teatralità intesa non come visione ma come forma diallettica, basata appunto nei dialoghi che si svolgono fra i vari personaggi a volte in maniera tragica a volte in maniera ironica. Nel centro d'ispirazione del poeta è la sacralità del mito inteso come quel sostrato culturale insostituibile che accomuna tutta l'umanità. Sono gli antichi miti della cultura greca che appartengono a un’era remota ma che tornano nel nostro tempo con una ciclicità come il continuo alternarsi della vita e della morte, come simboli privilegiati della transcendenza.
umana. In tutte le culture, e specialmente in quella classica, sono i miti che hanno dato conforto alle angoscie umane della morte e dei fenomeni inspiegabili. Pavese e reduce di letture antropologiche, psicologiche ed etnologiche che nel dopoguerra lo avevano appassionato. Autori come Forbenius, Fraser, Levy-Bruhl, opere dello Jung e Levy Strauss. In questo aspetto molto lo influenzò anche la sua conoscenza con Bianca Garufi. Questi temi già apparsi nella sua opera Feria d’Agosto diventano più marcati, mentre l'idea della donna, dea e belva insieme, riempie la concezione della femmina. La donna appare come forza della terra e della fertilità, la stessa che da vita e morte, in tutta la sua materialità e mai come una transcendenza.

L'autore considerò questi componimenti come la sua opera più completa, non a caso una coppia fu trovata accanto allo scrittore quanto morì suicida nel 1950.

Another factor to take into account is the frequency of imitation, sometimes almost literal, from the teaching materials used by the students. This phenomenon is obvious and natural in all circumstances; it is even more so in a situation in which both didactic materials and final papers take the form of written texts displayed on computer screens.

6. L1s of Students

Regarding geographic distribution, students graduated with ICoN come from more than 60 countries around the world. Their L1s reflect this variety: in the registration phase students have indicated in fact 41 different L1s, including Italian. The L1s whose speakers have produced more than 20,000 tokens in total are 18 (as shown in Table 1).

| Language                  | Tokens     |
|---------------------------|------------|
| Spanish                   | 704,643    |
| Portuguese                | 233,275    |
| Serbian and Croatian      | 173,279    |
| Russian                   | 147,605    |
| Greek                     | 128,307    |
| Polish                    | 122,878    |
| German                    | 68,430     |
| Albanian                  | 66,470     |
| French                    | 45,694     |
| English                   | 44,721     |
| Rumanian                  | 43,518     |
| Bulgarian                 | 35,165     |
| Japanese                  | 33,552     |
| Latvian                   | 25,652     |
| Lithuanian                | 25,158     |
| Hungarian                 | 24,618     |
| Turkish                   | 23,797     |
| Czech                     | 21,568     |
| Sum                       | 1,968,330  |

Table 1: Tokens according to the L1s of students

Languages with fewer tokens are, in descending order, Arabic, Maltese, Luo, Macedonian, Finnish, Leonese, Slovenian, Ukrainian, Dutch, Bosnian, Estonian, Maithili, Faroese, Azerbaijani, Tagalog, Slovenian, Vietnamese, Urdu, Kohati Hindko (the latter, along with the Leonese, has no ISO 639-2 code). Serbian and Croatian were merged, not only because most of the linguists consider Serbian and Croatian a single language, but also because in many cases the students themselves (both Serbs and Croats) stated that their mother tongue was “Serbian and Croatian”.

In addition to the above mentioned case of 16 students declaring to be bilinguals in Italian and another language, one student declared to be bilingual in Russian and Belarusian, one in Spanish and Catalan and one in Italian and Venetian dialect, while three native speakers of Maltese are bilingual with English. In all cases, speakers were counted as L1 for all the languages in which they had indicated this competence. In the currently on-line interface it is also possible to search in relation to these speakers also “Belarusian”, “Catalan” and “Venetian”, which (unlike Maltese) are not represented by speakers who have these languages as exclusive L1.

7. Publication and Web Interface

The corpus has been put online at the Web address http://corpusicon.fileli.unipi.it/ and it is hosted by the University of Pisa. Its current search interface, created by Net7 s.r.l., is shown in Figure 1.

![Figure 1: The interface of the ICoN Corpus](http://corpusicon.fileli.unipi.it/)

In its current form, the interface allows to search for single words. The search can be filtered by L1, country of birth, country of residence, current nationality, sex, age (by age brackets), academic qualifications and area of academic qualifications. Results are displayed as shown in Figure 2.

It is planned to replace the current interface with a more flexible interface by the first half of 2018. In a further
step, the contents of the corpus could be POS-tagged to improve the quality of research.

‘Romanticism, realism and naturalism of the nineteenth century have been substituted from movements that are more attuned to the new philosophical concerns of this age’.

(2) Monteverdi esordì molto giovane con il Primo libro dei madrigali, il genere molto in voga nel Cinquecento, che lo fece famoso. (L1 Russian).

‘Monteverdi made his debut very young with his first madrigal book, that rendered him famous’.

(3) Carducci al suo turno fece un ampio studio del autore e dopo molti anni di ricerca pubblicò la sua opera che conteneva dettagliate annotazioni del Canzoniere. (L1 Luo).

‘Carducci on his time made a large study of the author and after many years of research published his work that included detailed notes of the Canzoniere’.

(4) La situazione porta a volte il carattere drastico per la gioventù che, spinta dal malessere, entra nei cerchi criminali. (L1 Russian).

‘The situation carries sometimes the drastic character to the young that, driven by unease, enter the crime circles’.

In (1) the preposition per ‘by’ is selected instead of da ‘from, by’. In (2) the support verb rendere ‘make’ is wrongly substituted by fare ‘make, do’. In (3) and (4) respectively, the paradigmatic fixity of idioms a sua volta ‘on his turn’ and giri criminali ‘crime rings’ is violated, since the correct words volta and giri are substituted by synonyms turno and cerchi.

A quantitative analysis reveals that, if the three mentioned kinds of errors are relatively frequent, the specific examples prove to be rare. For example, the wrong expression al suo turno, found in (3), is attested only 4 times in the corpus, while the standard form a sua volta counts 93 occurrences in the L2 sub-corpus (a very similar figure is found in the L1 sub-corpus, where 114 occurrences are attested).

A more accurate statistical analysis on the topic has been conducted using EXTra (Passaro - Lenci 2016), a term recognition system that evaluates the association measure of structured POS-sequences. Both effect-size measures (i.e. Mutual information) and significance measures (i.e. t-score, log-likelihood) are used, so that the dimension of the corpus and the particularly high frequency of some tokens (like articles, prepositions) do not affect the results. In particular, the following kinds of multiword lexicon and word collocations have been investigated up to now: multiword nouns with structure Noun Prep Noun (i.e. punto di vista ‘point of view’) and Noun Adj (i.e. essere umano ‘human being’), multiword verbs (Verb Noun, Verb Prep Noun, Verb Noun Adj) and adverbials (Prep Noun, Prep Adj Noun, Prep Noun Adj) and prepositional locations (Prep Noun Prep).

Any preliminary analysis has shown that the most frequent multiword expressions included in the L1 and L2 sub-corpora tend to be the same. See, for example, in Table 2 (cf. Annex), the list of the 20 multiword nouns (structure Noun Prep Noun and Noun Adj) characterized
by the highest LMI in L1 and L2 sub-corpora. Table 3 includes the adverbials characterized by the highest LMI. In general, both in the case of nouns and adverbials, the two sub-corpora share the same forms. As for nouns, the datum that learners’ behavior is not far from natives’ is interesting and could not be easily assumed. As for adverbials, however, being the adverbials a grammatical class, the similarity of the L1 and L2 lists is less surprising. Actually, any significant difference can in this case highlight untypical or distorted uses. For example, in STRA, alongside the very cohesive *allo stesso tempo* ‘at the same time’, the synonym *nello stesso tempo* is found, while the latter does not appear in the ITA list. In fact, 117 occurrences of *nello stesso tempo* are found in STRA and only 32 in ITA, while *allo stesso tempo* is found 172 times in STRA and 151 in ITA. The ITA data are compatible with standard Italian as testified by a Google search: *nello stesso tempo* has 1.5 million occurrences while *allo stesso tempo* appears 13.3 million times. However, the same search on the CORIS corpus (Rossini Favretti 2000) finds 1771 occurrences for *nello stesso tempo* and just 1908 for *allo stesso tempo*, so it is necessary to be careful in drawing conclusions from rough data.

Another interesting example is provided by the adverbial *dall’altra parte* ‘on the other side’, quite frequent in *dall’altra parte*, while it does not appear in ITA. In this case, the surprisingly high frequency reveals a feature that learners’ behavior is not far from natives’ as it is clear in the following example:

(5) Allora potevano lavorare di più d’estate quando il tramonto del sole veniva molto più tardi dell’inverno e *dall’altra parte* potevano cominciare a lavorare molto più presto di mattina come il sole d’estate veniva molto più prima. (L1 Czech).

‘Then they could work more in the summer when the sunset arrived much later than in winter and on the other side they could start working much earlier in the morning since the summer sun rises earlier’.

Moreover, in the STRA LMI list the adverbial *da un’altra parte* ‘somewhere else’ appears as well (25 occurrences), while it does not appear in ITA’s list (only 1 occurrence). Also in this case, the surprisingly high frequency reveals a non-standard use by the learners: in fact, an analysis of the occurrences in STRA reveals that *da un’altra parte* is often used in contrast to *da una parte* ‘on one side’, in a context where natives normally use *dall’altra parte* ‘on the other side’. In other cases, *da un’altra parte* is wrongly used instead of *da un altro lato* ‘on the other side’.

In the mentioned examples, the data extracted from the two sub-corpora testify that ITA more accurately reflects the use of the adverbials typical of standard Italian, while in STRA two tendencies emerge: relatively infrequent forms can be overused, while some adverbials can be used in a non-standard way.

9. Future Work

To date, the corpus has been used for didactic purposes and for traditional research, especially for the use of Italian definite articles. It is expected that use will continue.

However, approaches with a stronger computational side are also envisaged. Preliminary results as those seen in § 8 are promisingly showing that collocations are one of the features – although subtle – that allow detecting non-native productions even in presence of an advanced L2 competence and native-like grammatical behaviors. For this reason, we are willing in particular to explore the possible application of this feature to the setting of tools for the task of Automatic Native Language Identification, which has already been tested to a limited extent on the corpus ICO

10. Acknowledgements

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| STRA                      | LMI  | ITA                      | LMI  |
|--------------------------|------|--------------------------|------|
| STRA                     | LMI  | ITA                      | LMI  |
| 1 punto di vista (1)     | 1928 | punto di vista (1)       | 1213 |
| 2 punto di riferimento (6)| 579  | essere umano (3)         | 352  |
| 3 essere umano (2)       | 544  | mezzo di comunicazione (5)| 324  |
| 4 stato d’animo (4)     | 445  | stato d’animo (4)        | 316  |
| 5 mezzo di comunicazione (3)| 440  | messa in scena (15)      | 311  |
| 6 movimento culturale (14)| 365  | punto di riferimento (2) | 308  |
| 7 centro urbano (7)      | 356  | centro urbano (7)        | 306  |
| 8 opera d’arte (8)       | 350  | opera d’arte (8)         | 258  |
| 9 punto di partenza (12)| 346  | presa di coscienza (-)   | 241  |
| 10 classe sociale (-)   | 329  | classe dirigente (11)    | 239  |
| 11 classe dirigente (10)| 266  | pena di morte (-)        | 216  |
| 12 tasso di natalità (17)| 248  | punto di partenza (9)    | 199  |
| 13 rito di passaggio (19)| 226  | diritto di voto (16)     | 174  |
| 14 posto di lavoro (-)  | 208  | movimento culturale (6)  | 164  |
| 15 messa in scena (5)   | 202  | sala cinematografica (-) | 146  |
| 16 diritto di voto (13) | 195  | servizio di leva (-)     | 139  |
| 17 storia d’amore (18)  | 175  | tasso di natalità (12)   | 136  |
| 18 capo del governo (-) | 159  | storia d’amore (17)      | 107  |
| 19 mezzo di trasporto (-)| 154  | rito di passaggio (13)   | 106  |
| 20 gioco di parole (-)  | 141  | via d’uscita (-)         | 102  |

Table 2: Multiword nouns (Noun Prep Noun, Noun Adj) in STRA and ITA ordered by decreasing LMI.

| STRA                      | LMI  | ITA                      | LMI  |
|--------------------------|------|--------------------------|------|
| 1 per la prima volta (1) | 11383| per la prima volta (1)   | 8541 |
| 2 allo stesso tempo (2)  | 11217| allo stesso tempo (2)    | 6341 |
| 3 per esempio (3)       | 7516 | ad esempio (4)           | 5933 |
| 4 nello stesso tempo (-) | 5235 | per esempio (3)          | 2946 |
| 5 ad esempio (3)        | 5124 | al tempo stesso (-)      | 2704 |
| 6 dall’altra parte (-)  | 3088 | in un certo senso (8)    | 1952 |
| 7 in gran parte (10)    | 2112 | in primo luogo (-)       | 1940 |
| 8 in un certo senso (6) | 2068 | allo stesso modo (13)    | 1826 |
| 9 a volte (13)          | 1538 | a livello internazionale (-) | 1359 |
| 10 in primo piano (14)  | 1448 | in gran parte (7)        | 1338 |
| 11 nel primo caso (-)   | 1336 | in particolare (-)       | 1201 |
| 12 nello stesso modo (-)| 1235 | in modo particolare (-)  | 1176 |
| 13 allo stesso modo (8) | 1109 | a volte (9)              | 1108 |
| 14 al primo posto (-)   | 1105 | in primo piano (10)      | 1091 |
| 15 da un’altra parte (-)| 1048 | in seguito (-)           | 1070 |

Table 3: Preposition-headed adverbials in STRA and ITA ordered by decreasing LMI.