

## AGAINST A LEXICALIST ACCOUNT OF INFLECTED PREPOSITIONS IN ITALIAN: EXPERIMENTAL EVIDENCE FROM APHASIA

Ludovico Franco<sup>1</sup>

Elisa Zampieri<sup>2</sup>

franco.ludovico@gmail.com

zampy81@yahoo.it

**ABSTRACT:** In this work we want to address the syntax of the so-called inflected prepositions (*preposizioni articolate*) in Italian, relying on experimental data from clinical linguistics. We argue against the arguments of Napoli and Nevis (1987) for the existence of a lexically independent "monadic" class of inflected prepositions. The data collected here - which represent an early stage of a broader on-going work on the morphosyntax of Italian prepositions in aphasic populations - clearly show that Italian inflected prepositions are not primitives in the Lexicon, but the morphological by-product of a syntactic process of incorporation / conflation (Baker, 1988; Hale and Keyser, 1993; Julien, 2002).

**KEYWORDS:** prepositions; Italian; aphasia; morphosyntax.

### 1. INTRODUCTION

In this brief paper we want to address the syntax of the so-called inflected prepositions (commonly prepositional articles; originally *preposizioni articolate*) in Italian, relying on data from clinical linguistics. This work reports preliminary research on the status of production and comprehension of Prepositions in Italian aphasics. The syntax of prepositions has been a somewhat neglected matter within the neurolinguistic literature: prepositions are reported to be widely omitted in both agrammatic and anomic aphasia (Menn and Obler, 1990). However, prepositions did not receive a great amount of attention in neurolinguistic research. Notable exceptions – especially from a syntactic viewpoint - include the works of Friederici and colleagues (Friederici, 1981; Friederici, 1982), Grodzinsky (1988), Lonzi and Luzzatti (1995), Lonzi, Luzzatti and Vitolo (2007), Froud, (2001), Druks and Froud (2002), Kemmerer and

---

<sup>1</sup> Dipartimento di Studi Linguistici e Culturali Comparati, Università Ca Foscari, Venezia.

<sup>2</sup> Dipartimento di Studi Linguistici e Culturali Comparati, Università Ca Foscari, Venezia.

Tranel (2000; 2003; Tranel and Kemmerer, 2004; Kemmerer. 2005). A detailed survey of these few works is given in Mätzig (2009) and Mätzig et al. (2010), in which prepositions have been found impaired in both Broca's and anomic aphasia and it have been proposed that a deficit at the post-syntactic level of (late) spell-out is the underlying reason for the prepositions deficit.

It is interesting to notice that the classification of prepositions is challenging because there is no consensus about which lexical items exactly belong in the P(repositon) category (cf. Jackendoff, 1973; Emonds, 1985). Furthermore, the syntactic nature of the category is controversial because prepositions do not fit well into the functional/lexical dichotomy (Froud, 2001).

## 2. ITALIAN INFLECTED PREPOSITIONS

In contemporary standard Italian five of the most commonly used prepositions contract with the definite articles to form single words. These items are: *a* (to), *da* (from), *di* (of), *in* (in), and *su* (on). Hence, articulated/inflected prepositions represent a merge of a definite article and a preposition, as in *alla* [a+la] fine di Settembre (at the end of September).

A classic proposal about the status of Italian inflected prepositions has been given in Napoli and Nevis (1987) (henceforth: N&N), starting from previous works on the phenomenon of *raddoppiamento sintattico* by Napoli and Nespor (1979) and Nespor and Vogel (1986). N&N (1987:207) argue that:

“In Italian, words that look like a coalescence of a preposition and an article are present in the lexicon as inflected prepositions and are not synchronically the result of phonological, morphological or cliticisation rules. These inflected prepositions belong to the natural class of non-predicative items that inflect for number and gender”.

Some of N&N arguments for the existence of a lexically independent class of inflected prepositions can be partially denied on the basis of certain Italian data (e.g. coordination of prepositions, see Wescoat, 2007), but striking facts, as we will see, emerge from the analysis of impaired aphasic language production. A welcome result of N&N analysis of inflected preposition is that we need no ad hoc phonological or morphological rules to produce them, but if they are right we expect a pattern of substitutions or errors in  $\phi$ -features of the inflected prepositions in damaged contexts, apart from a presence vs. absence context that can be

arranged either by a theory that assume inflected prepositions as independent lexical elements or by a theory that consider them as morpho-syntactically derived.

Interestingly, as we will see below, this expected pattern is unobserved in the production of aphasic patients in our sentence completion tasks. Contrariwise, we have found the following pattern, in which the main errors are represented by: a) presence of the functional uninflected preposition alone; b) presence of the determiner alone; c) omission of both / absence in the given context.

### 3. THE EXPERIMENT

#### 3.1 METHOD AND MATERIALS

##### 3.1.1 PARTICIPANTS

Given the fact that the study presented here is a preliminary *probe* study we have collected experimental data of three patients with three different diagnoses. Our data seems to be enough to uncover quite clearly the grammatical status (e.g. monadic vs. dyadic entities in the Lexicon) of inflected preposition, but they are still unable to univocally determine which is the underlying syntactic derivation involved in the compositional process leading to the formation of *preposizioni articolate*. Nevertheless, we are now updating and enhancing the research outlined here with a larger group of subjects, in order to obtain more remarkable results from a syntactic viewpoint.

In our study, we examined three aphasic subject, two women and a man. In the following table we present relevant informations about the participants.

	Age	Education	Pathology	Sex
Sbj1	35	18	Wernicke's aphasia	F
Sbj2	67	5	Disphonia	F
Sbj3	41	8	Broca's aphasia	M
Mean	47,6			

**Table 1:** Information about the participants of the study

### 3.1.2 STIMULI

We presented to participants a completion task of 128 sentences with (a) missing element(s). Specifically, 64 sentences lacked a preposition. All Italian simple prepositions have been represented in our battery. *Tra* and *fra* (both meaning between, among) have been considered as the same item and counted as one. Each preposition (*a* (to), *di* (of), *da* (from), *in* (in), *con* (with), *su* (on), *per* (for), *tra/fra*) appears in eight sentences, of which one contains the simple uninflected preposition, while the other seven contain an inflected one. Every possible combination with the Italian definite articles (P+*il*, P+*lo*, P+*la*, P+*i*, P+*gli*, P+*le*, P+*l'*) has been considered. We add to our battery 40 sentences, used as distracters, which lacked a noun or a lexical verb. The remaining 64 sentences lacked an article. Every definite article had to be inserted in 9 sentences, with the exception of the article *il*, who was missing in 10 sentences in order to obtain an equal number of items compared to those requiring a prepositional element.

As already introduced above, we also included 40 distracters, namely sentences in which patients had to insert 20 nouns (10 singular and 10 plural) and 20 lexical verbs (10 singular and 10 plural). In this way the participant was obliged to pay attention to the task, without giving automatic answers.

All items were conceived so that no ambiguous sentence was included and only one answer was possible.

Participants were instructed to read each sentence and complete it with the right element. In some cases, such as with the prepositions *con* and *per*, in contemporary standard Italian the preposition and the article do not form a single word, so the patients were apprised of the possibility to fill the gap with one or two words. A little training consisting of 4 sentences was presented to the patient, in order to be sure that he had correctly understood the task. In the four sentences all the possible gaps the patient could find in the test were shown (an article, a preposition, an inflected preposition and a lexical item).

### 3.2 RESULTS

The aim of our research was to investigate prepositions in their syntactic context; thus, we excluded from our analysis errors concerning distracter sentences. Hence, the number of items we took into consideration was 128.

First, we counted the number of total wrong answer given by the participants.

	% errors
Sbj1	29,69
Sbj2	23,44
Sbj3	20,31
Mean	24,48

**Table 2:** Total number of errors

Patients did on average the 24,48% of error as you can see in table 2. We still need to update our work with data from a control group, but the results depicted above are significant by themselves.

Then, we qualitatively analyzed error types, separately counting errors concerning articles, simple prepositions and inflected prepositions. Most of the wrong answers were related to inflected prepositions.

Subjects	% errors Inflected P	% errors Simple P	% errors Article
Sbj1	86,84	2,63	10,53
Sbj2	60,00	6,67	33,33
Sbj3	80,77	0,00	19,23
Mean	75,87	3,1	21,03

**Table 3:** Errors involving inflected prepositions, simple prepositions, determiners

As you can see in the table above, inflected prepositions are far more affected than simple ones ( $p < 0.0001$ ) and articles ( $p < 0.005$ ). This result seems striking at first sight but, in a nutshell, can only confirm a higher complexity of the element we want to investigate, and it is not sufficient by itself to prove the hypothesis of a syntactic process involved in its formation. Thus, to better exploit our data, inflected prepositions' errors were specifically analyzed. First of all, we separated answer containing substitution errors from those containing omissions.

Subjects	% substitutions	% omission
sbj1	42,42	78,79
sbj2	44,44	66,67
sbj3	52,38	52,38
Mean	46,41	66

**Table 4:** Inflected prepositions: substitutions vs. omissions

Interestingly, table 4 shows that the number of omissions is higher or equal than that of substitutions. As we have anticipated above, this type of error is unexpected following N&N proposal. In languages with rich morphology, like Italian, omissions never affect bound morphemes, but only free ones. Through substitution-errors aphasic patients avoid the production of a *non-word*. The high percentage of omission-errors in inflected prepositions production clearly shows that this element cannot be considered a primitive in the Lexicon, but that it is a morphosyntactic product. We want to underline that the deletion of the inflected morpheme of *preposizioni articolate* does not lead to the production of a simple one. For instance, the simple preposition *in* with the article *il* (the) becomes *nel* (in the). In this case, omission of gender and number features would cause the production of *ne-*, namely a non-word in this context, but it never happens.

Moreover, as we can see in the table [4], both prepositions and articles can be omitted in aphasic production. The resurface of uninflected prepositions or determiners in pathological speech demonstrates that, given a deficit in functional morphology and/or movement operations, a possible adopted strategy is to select either the uninflected (functional) P or the determiner; a strategy that would have been unavailable according to the classic proposal by N&N. Furthermore, no data such as, for example [*in il*]; [*ne il*] instead of [*nel*] (in the) has been detected. N&N are right saying that inflected preposition do not involve phonological rules; still they are not primitives in the Lexicon, but the morphological *by-product* of a syntactic process.

Finally, we have found only very few substitutions and errors in number and gender agreement, as shown in table [5].

	% gender errors	% numbers errors
Sbj1	0	3,03
Sbj2	16,67	0,00
Sbj3	0,00	0,00
Mean	5,55	1,01

**Table 5.**  $\phi$ -features errors

#### 4. DISCUSSION

Given our data on aphasic patients' behavior, we argue against a “monadic” lexical nature of inflected prepositions: they are syntactic (complex) objects, derived by incorporating/conflating the Determiner head into the Prepositional head (Baker, 1988; Julien, 2002). Thus, the process outlined above is an instance of “morphological incorporation”, triggered by a syntactic operation. Notice that our results can be easily interpreted following (interrelated) germinations within the generative framework, such as Cartography (for an introduction see Cinque and Rizzi, 2010), Distributed Morphology (for introductory purposes see Halle and Marantz, 1993; Harley and Noyer, 1999) or Nanosyntax (see Hale and Keyser, 1993 Starke, 2009; Caha, 2009). A more fine-grained analysis will be available when we will complete our work on prepositions in aphasics populations.

Both determiners and prepositions are assumed here to be functional items: they share a merely ‘abstract’ meaning and fulfill a grammatical function within a linguistic context. From a naïve viewpoint, we may say that they are able to *glue* the content words together (Muysken, 2008).

The functional status of the prepositions involved in the *preposizioni articolate* morphosyntactic process outlined in this work is quite uncontroversial. Different is the case of complex prepositions (e.g. spatial or temporal prepositions), which seems to be inherently more lexical (but see Svenonius, 2006 for a functional account of the so-called *Axial Parts*). This fact has been recently explored in the field of theoretical linguistics (for an outline of the fine-grained internal syntax of prepositions, see Asbury *et al.* 2008 and Cinque and Rizzi, 2010, see also Corver and Van Riemsdijk, 2001).

From a typological viewpoint, Persian, for instance, can represent an interesting case study for prepositions and the lexical/functional divide. In this language, traditionally, prepositions are divided into two main classes with respect to the *Ezafe* morpheme, which basically is an unstressed vowel /e/ that is appended to nouns in speech. Samiian (1994),

Ghomeshi (1997) and others agree that only the class that do not ever take the *Ezafe* is composed by true functional items, while the categorial status of the other class of elements, which generally occur with *Ezafe*, is quite controversial. Ghomeshi (1997) for example argues that items that do take *Ezafe* are nothing more than (unprojecting) nouns (see Ghomeshi 1997; Kayne, 2009).

Data coming from aphasic patients can also be used to give a possible explanation of aphasic syntactic deficit. Thus, as for theoretical syntax, we agree with Den Dikken (2010), which draws an explicit parallel between PP and both the functional domains above VP and NP, finding functional categories corresponding to Tense and Aspect in all three domains (for an outline of the fine-grained internal syntax of PP, see Asbury *et al.*, 2008 and Cinque, 2010).

If Den Dikken's claim is on the right track, we can arguably test and apply those hypotheses which have been arranged for CP/IP, within the PP domain. In particular, one can test Friedmann (1997)'s Tree Pruning hypothesis (TPH) claim - which in turn relies on a layered inflection hypothesis (e.g. Pollock, 1989; Belletti, 1990) - that, in Broca's Aphasia, structures that depend on the high nodes (e.g. CP and TP are impaired, while structures that require only lower nodes (e.g. AgrP, VP) are intact. Actually, our data can say nothing on the fine-grained internal syntax of preposition/determiners, but we can address the point from a distinct perspective. TPH predicts that, given an array of functional categories (CP>IP; PP>DP), the lower category would be more preserved. In our case, we should have observed a pattern in which determiners were more preserved than preposition, but the opposite was true. Hence, TPH, at first glance and at least for some kinds of prepositions, gives wrong predictions (See table [6]). Nevertheless, we have to extend our work before finding definitive answers.

	% omission P	% omission Art
Pz1	30,30	42,42
Pz2	11,11	11,11
Pz3	9,52	38,10
Mean	17,50	30,54

**Table 6:** determiners vs. prepositions' omission

Our data - from a theoretical viewpoint - seem to be at least another hint for assuming an undespecification (vs. hierarchy) approach to language deficits, along the lines of Burchert *et al.* (2005) and Grillo (2009).

With regard to Italian inflected prepositions, which - under our analysis – are the coalescence of two functional elements built up by a morphosyntactic derivation, we may generally say that our data are coherent with the theoretical claims made in Ouhalla (1993). He argued that in the language of aphasic patients (specifically, agrammatic ones) the structural representation of sentences lacks functional nodes. Consequently, all linguistic operations that require functional nodes and functional categories that are hosted in functional nodes (e.g., determiners, simple prepositions, pronouns or even verbs, see Kayne, 2009; Franco *et al.*, 2010) become less available (see e.g. Froud, 2001).

It is clear that the unavailability of functional categories does not prevent the (occasional) occurrence of functional categories in the speech of patients because each functional category is represented in a grammatical Lexicon (probably dissimilar to a content words' one) that contains its corresponding entry. As Ouhalla (1993:28) wrote: “*the impairment affects the structural representation of functional items but not necessarily their appearance*”.

## 5. CONCLUSION

In this paper we have presented *a work* on inflected prepositions in Italian. In particular, we collected evidence from pathological speech, which show that inflected prepositions are not present in the Lexicon as a unique lexical entry. They are the syntactic *conflation* of two functional items: article & preposition. Our hypothesis is not compatible with N&N one, which assume the *preposizione articolata* to be a preposition with inherent  $\phi$ -

features, directly selected from the Lexicon. Our proposal is coherent with current assumptions in theoretical syntactic fields.

## ACKNOWLEDGMENTS

We thank Anna Cardinaletti, Guglielmo Cinque, Martina Garzon, Francesca Meneghello and Carlo Semenza for useful discussion and comments. All errors are ours.

## REFERENCES

1. ASBURY Anna; DOTLAČIL Jakub; GEHRKE, Berit; NOUWEN, Rick. *Syntax and Semantics of Spatial P*. Amsterdam, John Benjamins, 2008.
2. BAKER, Mark. *Incorporation*. Chicago, University of Chicago Press, 1988.
3. BELLETTI, Adriana. *Generalized Verb Movement*. Torino, Rosenberg & Sellier, 1990.
4. BURCHERT, Frank; SWOBODA-MOLLA, Maria; DE BLESER, Ria. Tense and Agreement dissociations in German agrammatic speakers: Underspecification vs. hierarchy. *Brain and Language*, 94, 2005.
5. CAHA, Pavel. *The Nanosyntax of Case*. Doctoral dissertation, University of Tromsø, Norway, 2009.
6. CINQUE, Guglielmo. Mapping Spatial PPs: An Introduction. In CINQUE, Guglielmo; RIZZI, Luigi. (eds.) *The Cartography of Linguistic Structures, volume 6*. Oxford, Oxford University Press, 2010.
7. CINQUE, Guglielmo; RIZZI, Luigi. The cartography of syntactic structures. In HEINE Bernd. and NARROG, Heiko (eds.), *Oxford Handbook of linguistic analysis* (pp. 51-65). Oxford Oxford University press, 2010.
8. CORVER Norbert; RIEMSDIJK, Henk van. *Semi-lexical categories: The function of content words and the content of function words*. Berlin, Mouton de Gruyter, 2001.
9. DIKKEN den, Marcel. On the functional structure of locative and directional PPs. In CINQUE, Guglielmo; RIZZI, Luigi. (eds.), *The Cartography of Linguistic Structures, volume 6*. Oxford, Oxford University Press, 2010.
10. DRUKS, Judit; FROUD, Karen. The syntax of single words: evidence from a patient with a selective function word reading deficit. *Cognitive Neuropsychology*, 19, 2002.

11. FRANCO, Ludovico; ZAMPIERI, Elisa; GARZON, Martina; MENEGHELLO, Francesca; CARDINALETTI, Anna; SEMENZA, CARLO. Noun verb distinction as a consequence of Antisymmetry: evidence from Primary Progressive Aphasia. *Procedia – Social and Behavioral Sciences*, 6, 2010.
12. FRIEDERICI, Angela D. Production and comprehension of prepositions in aphasia. *Neuropsychologia*, 19, 1981.
13. FRIEDERICI, Angela D. Syntactic and semantic processes in aphasic deficits: The availability of prepositions. *Brain and Language*, 15, 1982.
14. FRIEDMANN, Naama; GRODZINSKY, Yosef. Tense and Agreement in Agrammatic Production: Pruning the Syntactic Tree. *Brain and Language*, 56, 1997.
15. FROUD, Karen. *Linguistic theory and language pathology: Evidence for the morphology interface from a case of acquired language disorder*. Doctoral dissertation, University College London, UK, 2001.
16. GHOMESHI, Jila. Non-projecting nouns and the Ezafe construction in Persian. *Natural Language and Linguistic Theory*, 15, 1997.
17. GRILLO, Nino. Generalized Minimality: Feature impoverishment and comprehension deficits in agrammatism, *Lingua*, 119, 2009.
18. GRODZINSKY, Yosef. Syntactic representations in agrammatic aphasia: the case of prepositions. *Language and Speech*, 31, 1988.
19. HALE Kenneth; KEYSER Samuel J. On argument structure and the lexical expression of grammatical relations. In HALE Kenneth; KEYSER Samuel J. (eds.), *The view from Building 20*. Cambridge, MA, MIT Press, 1993.
20. HALLE, Morris; MARANTZ, Alec. Distributed morphology and the pieces of inflection. In HALE Kenneth; KEYSER Samuel J. (eds.), *The view from Building 20*. Cambridge, MA, MIT Press, 1993.
21. HARLEY, Heidy; NOYER, Rolf. Distributed Morphology. *GLOT International*, 4, 1999.
22. JULIEN, Marit. *Syntactic heads and word formation*. New York, Oxford University Press, 2002.
23. KAYNE, Richard. Antisymmetry and the Lexicon. *Linguistic Variation Yearbook*, 8, 2009.
24. KEMMERER, David. The spatial and temporal meanings of English prepositions can be independently impaired. *Neuropsychologia*, 43, 2005.

25. KEMMERER, David; TRANEL, Daniel. A double dissociation between linguistic and perceptual representations of spatial relationships. *Cognitive Neuropsychology*, 17, 2000.
26. KEMMERER, David; TRANEL, Daniel. A double dissociation between the meanings of action verbs and locative prepositions. *Neurocase*, 9, 2003.
27. LONZI, Lída; LUZZATTI, Claudio. Omission of prepositions in agrammatism and the universal grammar constraint of recoverability. *Brain and Language*, 51, 129-132, 1995.
28. LONZI, Lída; LUZZATTI, Claudio; VITOLO, Francesca. Recoverability of deletion in agrammatic production: the omission of prepositions. *Italian Journal of Linguistics*, 18, 2007.
29. MÄTZIG, Simone. *Spared syntax and impaired Spell-Out: The case of prepositions in Broca's and anomic aphasia*. Doctoral dissertation, University College London, 2009.
30. MÄTZIG, Simone; DRUKS, Judith; NEELEMAN, Ad; CRAIG, Gordon. Spared syntax and impaired spell-out: The case of prepositions. *Journal of Neurolinguistics*, 23, 2010.
31. MENN, Lise; OBLER, Loraine K. *Agrammatic Aphasia: A Cross-Language Narrative Sourcebook*. Amsterdam, John Benjamins, 1990.
32. MUYSKEN, Peter. *Functional categories*. Cambridge, Cambridge University Press, 2008.
33. NAPOLI, Donna J.; NESPOR, Marina. The syntax of word-initial consonant gemination in Italian, *Language*, 12, 1979.
34. NAPOLI, Donna J.; NEVIS, Joel. Inflected prepositions in Italian, *Phonology Yearbook*, 4, 1987.
35. NESPOR, Marina; VOGEL, Irene. *Prosodic Phonology*. Dordrecht, Foris, 1986.
36. OUHALLA, Jamal. Functional categories, agrammatism and language acquisition. *Linguistische Berichte*, 143, 1993.
37. POLLOCK, Jean-Yves. Verb Movement, UG, and the Structure of IP. *Linguistic Inquiry*, 20, 1989.
38. SAMIAN, Vida. The Ezafe Construction: Some implications for the theory of X-bar Syntax. In MARASHI, Mehdi (ed.). *Persian Studies in North America*. Bethesda, Md Iranbook, 1994.
39. STARKE, Michal. Nanosyntax: A short primer to a new approach to language, *Nordlyd*, 36, 2009.

40. WESCOAT, Michael T. Preposition-determiner contractions: an analysis in optimality-theoretic lexical-functional grammar with lexical sharing. In BUTT, Miriam; HOLLOWAY KING, Tracy (eds.) *Proceedings of the LFG07 Conference*. Stanford, CSLI publications, 2007.

**RESUMO:** Neste trabalho, queremos investigar a sintaxe das chamadas preposições flexionadas (*preposizioni articolate*) em italiano, baseando-nos em dados experimentais de clínica linguística. Argumentamos contra as posições de Napoli & Nevins (1987) sobre a existência de uma classe “monádica” lexicalmente independente de preposições. Os dados coletados aqui – que representam um estágio inicial de um trabalho em andamento mais abrangente sobre a morfossintaxe de preposições italianas em populações afásicas – claramente mostra que as preposições flexionadas do italiano não são primitivas no léxico, mas um produto morfológico de processos sintáticos de incorporação / confluência (Baker, 1988, Hale & Keyser, 1993, Julien, 2002).

**PALAVRAS-CHAVE:** preposições; italiano; afasia; morfossintaxe.

Article received on September 02<sup>nd</sup>, 2011.

Article approved for publication on February 23<sup>rd</sup>, 2012.