

Prepositions as relators in Italian Prepositional Compounds

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Abstract

In this paper, we propose a morphosyntactic analysis of Prepositional Compounds in Italian. We argue that while prepositions are not meaningless, their content isn't too rich, either. We propose that they can be treated as general relators (along the lines of Manzini & Franco's (2016) treatment of locative and oblique prepositions) which can express different directions of inclusion between the nominal items which are part of the compound. The lexicalization patterns are coherent with the syncretism found in other aspects of the grammar (e.g. locative/oblique prepositions). At the same time, the specific lexicalizations of these prepositions are ultimately determined by the morphosyntactic context in which they are embedded, highlighting the key role played by the syntactic context in shaping a vocabulary entry. One advantage of our proposal lies in its minimality: the prepositions only encode general relators with varying directionalities; they are not burdened with semantic content. The relevant interpretations of Prepositional

Compounds are ultimately derived by pragmatic enrichment at the C-I interface on the basis of the elementary content expressed by the preposition.

Keywords: preposition; compounds; lexicalization; relator; Italian.

1. Introduction: empirical facts, general background and aims

In Italian and other Romance languages a class of nominal compounds is formed following the schema Noun + Preposition + Noun (N + P + N), as illustrated (1).

- (1) a. *cavallo da corsa* (Italian)
 ‘racehorse’ (lit. ‘horse *da* race’)
 a’. *borsa da viaggio*
 ‘travel bag’ (lit. bag *da* travel)
 a’’. *spazzolino da denti*
 ‘toothbrush’ (lit. brush *da* teeth)
 b. *barca a vela*
 ‘sailboat’ (lit. ‘boat *a* sail’)
 b’. *scala a chiocciola*
 ‘spiral staircase’ (lit. ‘staircase *a* snail’)
 b’’. *tubo a gomito*
 ‘elbow pipe’ (lit. ‘pipe *a* elbow’)
 c. *botte di ferro*
 ‘iron barrel/ safe place’ (lit. barrel *di* iron)
 c’. *piede di porco*
 ‘crowbar’ (lit. foot *di* pig)
 c’’. *scherzo di natura*
 ‘freak’ (lit. joke *di* nature)

These prepositional compounds (henceforth: PCs; cf. Busa & Johnston 1996, Johnston & Busa 1999) are generally considered to be one of the most problematic aspects of research on compounding and word formation in Romance languages. PCs have been treated very differently in research on compounding and have also been labeled with many different terms (cf. Hennecke 2020), such as *syntagmatic compounds* (Buenafuentes de la Mata 2010), *syntactic compounds* (Rio-Torto & Ribeiro 2009), *improper compounds* (Kornfeld 2009), *phrasal lexemes* (Masini & Thornton 2007), *frozen multiword units* (Guevara 2012), *lexicalized syntactic constructions* (Villoing 2012), *lexicalized phrases* (Fradin 2009), *syntactic words* (Di Sciullo & Williams 1987).

Some of these authors assume that PCs constitute lexical structures (which may show signs of internal syntactic patterns), while others take these items to be clearly generated via syntactic processes. Gaeta and Ricca (2009) argue against the compound-hood nature of PCs of the *ferro da stiro* (‘flatiron’) type. They propose three criteria to identify compounds; (i) the components of the compound cannot be interrupted by any intervening linguistic material; (ii) at least two lexical morphemes have to form part of the compound; (iii) no functional words have to be involved in the structure, in order to exclude any possible syntactic mechanism under their formation. Their third criterion clearly rules out PCs items such as *ferro da stiro* or *luna di miele* (‘honeymoon’). Gaeta and Ricca also claim that the lexical/conceptual

unity cannot be taken as evidence of compound-hood. In fact, according to them, not all compound words correspond to a unique (and unequivocal) concept. Following their assumptions, whenever syntactic processes are activated, we are dealing with something that cannot be labeled a compound: in their view only complex words deriving from morphological operations can be taken to be compounds.

Nevertheless, the whole issue is far more complex than that. Di Sciullo & Williams (1987) assume that PC units must be considered original lexical items (with the same status of, e.g., N-N or VN words), given the fact that they denote a conceptual entity, within which it is not possible to perform any syntactic operation. As shown by Bisetto & Scalise (1999: 35), Italian PCs are somewhat opaque to syntax and they obey a set of classic compoundhood tests (e.g. the impossible insertion of modifying material) (cf. Semenza & Mondini 2006: 92). Consider the examples in (2). Concord facts show that modification is allowed only in (2c), where the adjectival item modifies the whole lexical unit.

- (2) a. *sedia a rotelle* (Italian)
 chair *a* wheels
 ‘wheelchair’
- b. **sedia rotta* *a rotelle*
 chair.F broken.F *a* wheel.PL.F
- c. [*sedia a rotelle*] *rotta*
 chair.F *a* wheels.PL.F broken.F
 ‘broken wheelchair’
- d. ??*sedia a rotelle* *piccole*
 chair.F *a* wheels.PL.F little.PL.F

That is why it is quite realistic to consider PCs as fully productive compound words in Italian.¹ Dardano (2009: 223–225; 232–233) distinguishes between left-headed PCs (e.g. *uscita di sicurezza*, ‘emergency exit’, *pentola a pressione*, ‘pressure cooker’) and semantically exocentric PCs (e.g. *piede di porco*, ‘crowbar’, lit. foot of swine, *lingua di gatto* ‘cat tongue’ (a type of biscuit), lit. tongue of cat).

The prepositions linking the two nouns within the compound are sometimes labelled *colourless* (e.g. Cadiot 1997, Bartning 1993, among others) or *light* prepositions (e.g. Delfitto and Melloni 2009). A widespread idea (cf. Fradin 2009) is that they are different from regular prepositions, the latter only being lexically meaningful elements. Kampers-Manhe (2001: 107) indeed observes that the prepositions can sometimes be omitted without altering the meaning of the compound, as illustrated in (3) for French. Thus, the semantic contribution of the prepositional item in PCs would be null, according to that view.

- (3) a. *robe à fleurs* (French)
 a’. *robe-fleurs*
 ‘dress with flowers’

¹ Actually, the same Gaeta and Ricca (2009) mention Bisetto and Scalise’s (2005) classification of NN compounds (*subordinate*, *attributive* or *coordinate*), based on the grammatical relation holding between the two nouns involved in a compound. Accepting this classification, they implicitly admit that grammatical relations are active at the level of words and ‘intervene’ in compound formation.

- b. *sac de poubelle*
 b'. *sac-poubelle*
 'garbage sac'

However, Franco et al. (2013) bring evidence in support of the view that PCs do have internal morphosyntactic structure, and that the P is meaningful. They show how agrammatic subjects are selectively impaired in retrieving the Ps linking N1 to N2 in PCs in reading and repetition tasks.

- (4) a. *Cavallo da corsa* -> *Cavallo corsa*. (Italian)
 'racehorse'
 b. *Mulino a vento* -> *Mulino di/∅ vento*
 'windmill'

A similar poor performance in agrammatic subjects was also found with the P of modified NPs (e.g. *la madre di Gianni* 'the mother of Gianni'), suggesting a unified (syntactic) analysis for both PCs and 'standard' cases of NPs modified by PPs.

Still, Masini (2009) and Masini & Scalise (2012) (cf. also Bisetto 2015) argue that Italian PCs are *phrasal words/ multiword lexemes* and that the preposition inside the compound does not act as the head of a PP phrase. The main arguments for their view are that the interpretation of the preposition is rather narrow and not always transparent, and that - differently from what happens with canonical phrases - no substitution by a near-synonym of the first noun is allowed in PC items, as illustrated in (5) (examples from Masini 2009: 259–260).²

- (5) a. *casa di cura* (Italian)
 a'. **abitazione di cura*
 lit. home of treatment 'nursing home' vs. dwelling of treatment
 b. *camera a gas*
 b'. **stanza a gas*
 lit. chamber *a gas* 'gas chamber' vs. room *a gas*

At any rate, the debate on the (phrasal vs. lexical) nature of PCs is still open. In this work, we roughly follow the original claim of Di Sciullo and Williams (1987) that assumes that PCs must be considered genuine lexical items, even when syntactic operations are involved in word formation (cf. Di Sciullo 2005, 2015). Specifically, we endorse a view of grammar which allows syntactic operations to be performed at the level of words (cf. Marantz 1997, Manzini & Savoia 2011, Manzini & Savoia 2017 among others). This idea stems from Hale and Keyser's (1993) hypothesis according to which lexicalization processes are driven by syntax. Thus, in a nutshell, we argue that words are built by the same operations that drive syntactic computations.³

² Furthermore, according to Masini (2009: 260) the difference between [N- P - N] sequences of *multiword lexemes* and standard PPs is also tied to the impossibility for the former to select a determiner on the embedded noun (cf. *casa di cura* vs. **casa della cura* 'nursing home'), unless it is obligatory present (cf. *camera del lavoro* vs. *camera di lavoro* 'Trade-Unions Headquarters'):

³ This view contrasts with the analysis put forth in Cecchetto & Donati (2019), where the authors assume that PCs differ from other nominal idioms which involve a syntactic

Starting from this basic assumption, we assume that the role of the preposition in PCs is not that narrow. In this paper, we precisely focus on the role of the P in PCs and its contribution at the C-I interface. We attempt to provide a formal account to the observation that “the prepositions *da*, *di* and *a* in Italian [PCs] [...] are specialized for different kinds of modification” (Masini 2009: 262).

Before doing so, we provide some relevant descriptive facts from Italian/Romance. Piunno (2016) provides a functional characterization of the role of the prepositions in what we have labelled PCs, assuming that they determine a set of ‘templates’ in which the lexical shape of the prepositional item can be actually linked to productive patterns.

In particular, as shown by the examples in (6), she assumes that the preposition *a* is involved in [N1 [*a* + N2]] configurations entailing the semantic relations of: a) *shape* (6a); b) *working principle, means and instrument* (6b), while the preposition *da* appears in [N 1[*da* + N2]] configurations for which the semantic relation of *purpose and suitability* can be recognized, as in (6c).

- (6) *shape* (Italian)
- a. *curva a gomito; cappello a cono*
 ‘sharp bend’ (lit. bend *a* elbow); ‘cone hat’ (hat with the shape of a cone)
- working principle, means & instrument*
- b. *armonica a bocca; pentola a pressione*
 ‘mouth organ’; ‘pressure cooker’
- purpose and suitability*
- c. *coltello da pane; spazzolino da denti*
 ‘bread knife’; ‘toothbrush’

As for the preposition *di* in PCs, Piunno (2016: 27), who is interested in ‘endocentric’ PCs only (namely items where an adjectival or adverbial value is conveyed by the modifier) in her survey on modifying ‘multi-word expressions’, considers those configurations entailing a temporary state, as in (7), and assumes that the same value can be expressed by the preposition *in* in Italian, as shown in (8).

component in their formation. Specifically, they assume that there are idioms in which the head only is responsible for triggering the idiomatic meaning (e.g. *uno straccio di marito/di lavoro/di prova* ‘a very poor job/evidence/husband’, lit. a rug of husband/job/evidence). This kind of idioms (which they label PP-less idioms) would differ from a regular PC in that the latter would not allow D-N agreement within the embedded constituent (cf. e.g. *piele di porco* ‘crowbar’ vs. *piele del porco* ‘pig’s foot). From Cecchetto & Donati viewpoint, absence of agreement would be a key criterion to distinguish words and phrases, given that the syntactic operation responsible for agreement would take place inside phrases but not inside (compound) words. Actually, there are many examples of idioms in which D-N agreement seems available, given that the preposition is inflected (e.g. *braccio della morte* ‘death row’ lit. arm of the death), but the rule of Agree does not seem to be freely exploitable, given that shifts in number destroy the idiomatic meaning (e.g. **braccio delle morti*). This seems to weaken Cecchetto & Donati’s proposal.

(7) *medico di turno, attore di scena, uomo di guardia* (Italian)
 ‘attending physician’, ‘on-scene actor’, ‘duty man’

(8) *prezzi in calo, passeggeri in attesa, uomo in pantofole* (Italian)
 ‘decreasing prices’, ‘waiting passengers’, ‘man in slippers’

Actually, the distribution of PCs where the *di* preposition is involved is surely wider, at least once idiomatic uses are included in the discussion. Just consider, at this point, that other widespread semantic values expressed by *di* are *part-whole* as in (9) or *material* as in (10) (cf. the discussion in Dardano 2009, and the formal considerations in the rest of the paper).

(9) *part-whole* (Italian)
dente di cane, bocca di leone, barba di frate
 ‘barnacle’, ‘snap dragon’, ‘Italian dandelion’

(10) *material*
botte di ferro, cuore di pietra, palla di neve
 ‘safe place’, ‘cold heart’, ‘snowball’

Piunno’s work is quite interesting from a descriptive viewpoint, because she provides a comprehensive characterization of PCs in Italian, French and Spanish, showing that the selection of the preposition follows regular patterns (cf. Masini 2009).

In particular, the configurations entailing the semantic relations of *shape*, which is encoded through the preposition *a* in Italian, trigger the use of the preposition *de/en* in French, as illustrated in (11) and the preposition *de* in Spanish as in (12) (see Piunno 2016: 15).

(11) *pantalon de/en cigarette, tuyau en coude* (French)
 trousers of/in cigarette, pipe in elbow
 ‘cigarette trousers’, ‘elbow pipe’

(12) *pantalones de pitillo, tubo de codo* (Spanish)
 trousers of cigarette pipe of elbow
 ‘cigarette trousers’, ‘elbow pipe’

The configuration entailing the relation *working principle, means and instrument*, which is again encoded in Italian by the item *a* is mirrored by the one with the preposition *à* in French (13), while Spanish mainly employs *de* with nouns denoting natural force, substance, means, body parts and events, as illustrated in (14) (cf. Piunno 2016).

(13) *moulin à vent, bagage à main* (French)
 mill at wind, bag at hand
 ‘windmill’, ‘handbag’

(14) *molino de viento, equipaje de mano* (Spanish)
 mill of wind, bag of hand

‘windmill’, ‘handbag’

Finally, the syntactic template expressing the semantic relation of *purpose and suitability*, according to Piunno’s taxonomy, which is expressed in Italian by the preposition *da*, is rendered in French with two different prepositions, *de* and *à*, as in (15). The preposition *à* is usually followed by concrete nouns (15a), while *de* is employed with event nouns (15b). Spanish employs again the preposition *de*, as shown in (16).

- (15) a. *couteau à pain* (French)
knife at bread
‘bread knife’
b. *sac de voyage*
bag of travel
‘travel bag’
- (16) *cuchillo de pan, bolso de viaje* (Spanish)
knife of bread, bag of travel
‘bread knife’, ‘travel bag’

Piunno (2016) argues, in a constructionist fashion, that some sequences are formed on the basis of regular patterns which can structure and organize the semantic information associated with words: the more a multiword configuration is schematized, the more productive a constructional schema. We actually take a view by which the notion of *productivity* and *construction* are external from the architecture of grammar.

The rest of the paper is structured as follows. In Section 2, we briefly discuss the analysis of Italian PCs made in Johnston & Busa (1999) and provide a general theoretical background to our own approach. Section 3 describes our analysis of Italian Ps in PCs. Finally, Section 4 concludes the discussion.

2. Previous analyses and theoretical background

2.1. Prepositional compounds and qualia structure

Before discussing our own approach, in this section we briefly consider an alternative generative analysis of Italian PCs outlined in Johnston & Busa (1999; cf. Busa & Johnston 1996, Delfitto & Melloni 2009, Fábregas 2020) and based on the framework of the Generative Lexicon (GL; Pustejovsky 1995). Johnston & Busa (1999) argue that a theoretical approach to a (crosslinguistic) interpretation of PCs has to rely on a rich representation model, such as that provided by the four levels of predicate structures within the GL framework and roughly illustrated in (17) (from Johnston & Busa 1999: 79). In the *qualia* structure representation, the meaning of a lexical concept, such as the modifier in an ‘endocentric’ PC is defined in terms of four elements representing concept attributes along with their use and purpose. Under this framework, compound formation would involve the specification, provided by the modifier, of a particular argument within the *qualia* structure of the head noun. Namely, the *qualia* structure provides a relational template that enables the compositional interpretation of the modifier in relation to the head.

$$(17) \left[\begin{array}{l} \alpha \\ \text{TYPESTR} = \left[\text{ARG1} = \text{the type of } \alpha \right] \\ \text{ARGSTR} = \left[\text{D-ARG1} = \text{other arguments in the qualia} \right] \\ \text{EVENTSTR} = \left[\text{E1} = \text{events in the qualia} \right] \\ \text{QUALIA} = \left[\begin{array}{l} \text{FORMAL} = \text{isa-relation} \\ \text{CONSTITUTIVE} = \text{parts of } \alpha \\ \text{TELIC} = \text{purpose of } \alpha \\ \text{AGENTIVE} = \text{how } \alpha \text{ is brought about} \end{array} \right] \end{array} \right]$$

With respect to Italian PCs, Johnston & Busa (1999) assume that the Ps involved are capable of triggering the activation of different *qualia* within the lexical entry of the head noun (i.e., FORMAL (*di*), TELIC (*da/di*), CONSTITUTIVE (*a*), AGENTIVE (*di*)). For instance, in a compound like *coltello da pane* ‘bread knife’, the preposition *da* enables the specification of an argument coindexed with the modifier *pane* within the TELIC role of *coltello*, which gives rise to the ‘purpose’ interpretation of the compound.

The main issue with this approach from our perspective is that it requires burdening the content of Ps with semantic notions. Specifically, it is unclear how *qualia* should be represented in the syntax, as they conceal rich semantico-pragmatic relations that should have no place in a minimalist syntax. Of course, the extent to which Ps can be semantically rich is a question open for debate, but from a minimalist standpoint their content should be reduced to the bare minimum, if empirical coverage can be maintained. Another problem with the GL approach in capturing the distribution of Ps in Italian PCs is that it requires assuming that Ps can activate different *qualia* (e.g., *di* can trigger the activation of FORMAL, TELIC, or the AGENTIVE *qualia*; for Delfitto & Melloni (2009), *a* can also be implicated in the activation of the TELIC *quale*, alongside the CONSTITUTIVE *quale*; etc.). This entails non-uniformity in the contents expressed by Ps, which moreover raises issues of explanatory adequacy — in particular, it raises the question why Ps should be associated with the activation of *those* particular *qualia*, rather than others.

2.2. Prepositions as elementary relators

We assume that prepositions are predicates introducing a relation between an argument they select and another argument. In our work we are not interested in functional taxonomies triggering the occurrence of one preposition or another in PCs. We embrace a notion of explanation in grammar where external, function-based explanations have no place.

We start from the consideration that the same prepositions showing up in PCs are recruited in Italian to convey oblique and locative relations, namely they are morphophonologically syncretic with locative and oblique prepositions in Italian, as illustrated in (18)-(20).

- (18) a. *Mario è da Gianni* (Italian)
 ‘Mario is at Gianni’s’

- b. *Mario è stato baciato da Lucia*
‘Mario has been kissed by Lucia’
- (19) a. *Mario è/va a Roma* (Italian)
Mario is/goes to Rome
b. *Mario dà il libro a Gianni*
‘Mario gives the book to John’
- (20) a. *Gianni è di Roma* (Italian)
‘John is from Rome’
b. *Il libro di Gianni*
‘Gianni’s book’

Why should this syncretism obtain? Can this syncretism tell us something meaningful about the lexicon-syntax interface? An influential analysis of prepositions takes these to be meaningless elements acting as a sort of repairers for derivations that would otherwise crash, with the reparation being performed either in the syntax (to assign case to caseless objects; Chomsky 1981, 1986), or at PF (to avoid an illicit N-N string; Richards 2010). However, the use of a specific preposition in PCs can be argued to generate predictable patterns of relations between the nominals in the compound (cf. Section 1), suggesting that the characterization of prepositions as elements devoid of interpretive content cannot be entirely correct (cf. Hale 1986). On the other hand, we also reject views of prepositions that attribute too much structure or meaning to them, as in the GL approach (discussed above) and the cartographic/nano-syntactic framework (e.g., Caha 2009, Cinque 2010, Pantcheva 2011, among others).

We take our bearings from a series of works by Manzini & Savoia (2011), Manzini et al. (2015), Manzini & Franco (2016), Franco et al. (2021) – works that deal with the genitive/dative oblique(s), which happen to be syncretic in many different languages. The basic idea of these authors can be grasped by reference to data like (21). In (21), the genitive inflection ‘s or the preposition *of* introduces a possession relation between the argument it selects, namely ‘the woman’ (the possessor), and the head of the DP, namely ‘(the) children’ (the possessum). The same relation holds in (21a) between the dative *Mary* and the theme of the ditransitive verb *the book*.

- (21) a. I gave the books to Mary
b. The woman’s children/the children of the woman

This stream of literature uses the label \subseteq for the relation instantiated by the preposition *to* in (21a) or the genitive inflection/*of* in (21b). They take the content of \subseteq to be what Belvin & den Dikken (1997: 170) call *zonal inclusion*: “Entities have various zones associated with them, such that an object/eventuality may be included in a zone associated with an entity without being physically contained in that entity”. A rough representation of the sentences in (21) can be as in (22).

- (22) a. [VP gave [_{PredP} the books [[\subseteq to] John]]]
b. [_{DP} the children [_{PP} \subseteq of the woman]]

The \subseteq proposal for genitives and datives has been further articulated in order to account for the fact that formally identical genitive/dative DPs display different interpretive behaviors — as well as for the fact that cross-linguistically, syntactico-semantic differences can result in different patterns of lexicalization. Manzini et al. (2015) and Manzini & Franco (2016) have addressed these issues with respect to datives with ditransitive verbs, with unergative verbs, as experiencer subjects, as DOM objects and as oblique (ergative) subjects. Franco et al. (2021) demonstrate that, while the locative preposition system varies within Romance, its general shape is very consistent. Location and direction are expressed by the general relator \subseteq , to which it is hard to impute any specific locative/directional content. Thus, different locative meanings are construed in language on the basis of the interaction between the general relators, their complements and the event structures that they embed.⁴

Relevant for our discussion is the fact that Franco & Manzini (2017) extend the *zonal inclusion* proposal to the other oblique item, most likely to occur as a case inflection in natural languages (cf. Caha 2009), namely the instrumental; in English the core lexicalization of the instrumental is by the preposition *with* (*con* in Italian). Franco & Manzini employ the cover term ‘instrumental’ for all the semantic values that can be rendered with *with*-like morphemes. Their starting point is the observation made by Svenonius (2007) and Levinson (2011) that ‘possession’ relations may be realized by *with*, as illustrated in (23). It is quite clear that the relation expressed in the sentence in (23) is reversed with respect to that in (22), since the preposition *with* embeds the possessum, while the possessor is the head of the DP.

(23) The woman with the children

Thus, Franco & Manzini (2017) show that instrumental inflections/prepositions denote the reverse relation with respect to genitives/datives, by which the possessum, rather than the possessor, is in the oblique case. For instrumentals they adopt the \supseteq content and label, as illustrated in (24). What (24) says is that the complement of *with* (‘the children’) is the possessum (a part) of the possessor (the whole) encoded by the DP *the woman*, namely *the children* are zonally included by *the woman*.

(24) [DP the woman [PP (\supseteq) with the children]]

Franco & Manzini further claim that *with*-type items provide very elementary means of attaching (i.e., including) extra participants (themes, initiators, etc.) (in)to events — with specialized interpretations derived by pragmatic enrichment (contextual, encyclopedic) at the C-I interface. In a nutshell, relators would involve a minimal

⁴ As pointed out in Manzini & Franco (2016: 211), the part/whole or zonal inclusion relation is very wide-ranging, encompassing partitives, inalienable and alienable possession, and also the notion of location. Languages typically partition the potential space covered by the inclusion relation, by introducing specialized partitive, genitive, dative and locative cases/relations. Furthermore, because of its very general denotation, the part/whole or inclusion predicate (whether it corresponds to a case inflection or to a prepositional head) does not have sufficient lexical content to characterize, say, specific subtypes of possession, location, etc.

meaning, which may be enriched (interpreted) at C-I given specific pragmatic conditions.⁵

In the following section, we adopt Manzini et al.'s hypothesis that prepositions encode *minimal relators*, and extend it by arguing for the inclusion of an additional relator: intersection (\cap).

3. Analysis

We assume that PCs are generated via regular Merge. In particular, we assume Merge of {NP, PP} followed by Merge of PP with the embedding DP. The resulting syntactic configuration of PCs is illustrated in (25). Note that we assume that PP embeds an NP, rather than a full DP, as suggested by several properties of the embedded nominal (e.g., lack of overt determiners and (in-)definiteness, inability to undergo further modification).

(25) [DP [PP [NP]]]

Our focus is on the analysis of P. Assuming a minimal content for such Ps (as in Manzini et al.'s work) the question arises as to how the distribution of *da*, *a*, and *di* can be captured. Here we argue in favor of the lexical entries in (26) for Ps in PCs. The rules for the lexical entries state that the relator is associated at the Externalization interface (EXT) with its idiosyncratic morphophonological exponent, given a suitable morphosyntactic context (i.e., [DP [PP [NP]]]). The specification of a morphosyntactic context is necessary in order to account for the different patterns of lexicalization that the relators give rise to in other environments, as we discuss below. Note for now that while we assume the relator of (reverse) inclusion, we also introduce a novel relator, intersection (\cap), in order to shed light on the distribution of the preposition *di*.

(26) a. \subseteq \Leftrightarrow /da/ / [DP [PP [NP]]]
 b. \supseteq \Leftrightarrow /a/ / [DP [PP [NP]]]
 c. \cap \Leftrightarrow /di/ / [DP [PP [NP]]]

The preposition *da* maintains its usual content of (zonal) inclusion expressed in other morphosyntactic environments. By associating *da* with this content, we can account for the particular 'functional' relationships entailed by *da*-compounds. In (27) we illustrate the 'purpose'/'telic' function of *da*-compounds and its underlying morphosyntactic analysis. In the particular case of (27), the referent expressed by *canna* is zonally included in the event denoted by *pesca*. Note that here the former is contained in the latter in a concrete sense: there is an event of fishing and such an event physically includes a rod. The pragmatic inference of telicity is obtained at C-I via encyclopedic and/or contextual enrichment. The details of how this enrichment should be properly formalized need not concern us here, and we leave the question open to future studies. What is important for our purposes is that the enrichment is viable on

⁵ The meaning of the relator is 'minimal' in the sense that it is not wholly devoid of content (as in e.g. Chomsky 1986), though it is also not too rich (as in cartographic/nano-syntactic approaches).

the basis of the (minimal) content expressed by \subseteq . This seems plausible: a fishing event is prototypically carried out by means of an instrument included in its zonal domain. Similar remarks apply to other ‘purpose’ *da*-compounds, such as *cavallo da battaglia* (‘battle horse’), *fuscile da caccia* (‘hunting rifle’), etc.

- (27) a. *Canna da pesca*
 Rod da fishing
 ‘fishing rod’
 b. [DP *canna* [PP \subseteq [NP *pesca*]]]

As described in Piunno (2016), *da* is also involved in compounds entailing a ‘suitability’ function, such as those in (28) and (29). Again, this specific function needs not be encoded in the syntax, and we can therefore dispense with specific *qualia* activation or richly articulated functional hierarchies. The relation of inclusion is sufficient to generate the relevant interpretations at C-I. For instance, (28) denotes a *hat* belonging to a (non-specific) *priest*; clearly, a telic entailment between *hat* and *priest* is principally ruled out here, which makes available a ‘suitability’ interpretation on the basis of the ‘possession’ relation entailed by \subseteq .⁶ Informally, at C-I ‘suitability’ is a deductive step, of the type that would normally apply to conjunctive statements (cf. e.g. Pietroski 2018) of the type ‘that kind of *hat* is included in the domain of *priest*’ \rightarrow ‘that *hat* is suitable/good for a *priest*’.

- (28) a. *Cappello da prete*
 Hat da priest
 ‘priest’s hat’
 b. [DP *cappello* [PP \subseteq [NP *prete*]]]
- (29) a. *Vita da cani*
 Life da dogs
 ‘a dog’s life’
 b. [DP *vita* [PP \subseteq [NP *cani*]]]

Note indeed that the content expressed by *da* in this case is syncretic with the content expressed by *di* in prototypical genitive modification, as in (30). This allows us to maintain uniformity in the content expressed by the relator in these different morphosyntactic environments. In other words, we are assuming morphosyntactic syncretism between the *da* in PCs and the ‘genitive’ *di* of cases like (30).

- (30) a. *Il cappello del prete*
 The hat of-the priest
 b. [DP *il cappello* [PP \subseteq [DP *il prete*]]]

⁶ An anonymous reviewer suggests that *hat* is a garment and *wearing* is its telic predicate. So a telic entailment would emerge here, since *cappello da prete* is the hat typically worn by priests. As already pointed out, we believe that the pragmatic inference of telicity is obtained at C-I via encyclopedic and/or contextual enrichment.

The morphophonological variation in externalized content can be accounted for by assuming that EXT assigns exponents to (non-)terminal nodes by paying attention to their morphosyntactic environment. More concretely, we can assume that \subseteq lexicalizes as *da* in [DP [NP]] contexts, and as *di* in environments involving a [DP [DP]] configuration, as in the lexical entries in (31).⁷ Further lexicalizations are possible as long as EXT has access to specific properties of the morphosyntactic context without making reference to semantico-pragmatic notions that could arise at C-I (e.g., telicity, suitability, etc.). Finally, as far as we can see, nothing precludes the various functional readings associated with \subseteq in *da*-compounds from arising in other environments (cf., e.g., the purpose reading of infinitival relatives like *libro da leggere* ‘book to read’); such readings seem available to us upon preliminary considerations, though we will not dwell further on the matter here.

$$(31) \quad \subseteq \quad \Leftrightarrow \quad \begin{array}{ll} /di/ & / [\text{DP} [\text{P} \subseteq [\text{DP}]]] \\ /da/ & / [\text{DP} [\text{P} \subseteq [\text{NP}]]] \end{array}$$

Turning now to *a*-compounds, we assume that *a* expresses the reverse relation of inclusion as that expressed by *da*. This content (essentially identical to the instrumental/comitative case; Franco & Manzini 2017) is sufficient to capture the distribution of *a* in all of its functions in PCs. In (32)-(33) we illustrate the ‘working principle, means & instrument’ function (cf. Section 1) of *a*-compounds and its underlying analysis. At C-I, the object denoted by (32) comes to represent a boat physically including a sail within its zonal domain. The ‘initiator’ role that the sail plays in the boat’s zonal domain is again interpreted on the basis of the reverse inclusion relator. Note in this regard that the interpretation of *a*-compounds like (32) closely mirrors the purpose interpretation of *da*-compounds, in the sense that in the former type of PCs it is the most embedded NP that entertains a ‘telic’ function with respect to the portrayed event (cf. *canna da pesca* ‘fishing rod’ vs. *pesca a mosca* ‘fly fishing’). This generalization is straightforwardly captured by our analysis, and as far as we can see cannot be easily captured by proponents of the assumption that Ps in PCs activate *qualia*-related structures/features.

- (32) a. *barca a vela*
boat a sail
‘sailboat’
b. $[\text{NP barca} [\text{PP} \supseteq [\text{NP vela}]]]$
- (33) a. *lente a contatto*
lense a contact
‘contact lense’
b. $[\text{NP lente} [\text{PP} \supseteq [\text{NP contatto}]]]$

⁷ Of course, this is not to say that the two structures in (31) preserve the same interpretation by virtue of sharing the \subseteq relator. Indeed, the presence vs absence of the DP layer can give rise to definite/specific interpretations of the embedded nominal, as it does in (30) as opposed to (28). We thank an anonymous reviewer for bringing our attention to this point.

The relator of reverse inclusion is also apt at capturing the ‘shape’ function of *a*-compounds (cf. 34). In these cases, too, the object denoted by the PC represents a zonal domain including the entity denoted by NP. The ‘shape’ function could arise from the fact that the NP is contained figuratively, rather than physically, in the DP’s zonal domain. The relevant interpretations are again established at C-I without burdening the syntax with semantic notions.⁸

- (34) a. *cacciavite a croce*
 screwdriver a cross
 ‘cross-head screwdriver’
 b. [DP *cacciavite* [PP \supseteq [NP *croce*]]]

Under our approach, then, *a* lexicalizes \supseteq in PCs. This content is syncretic with the content expressed by the instrumental/comitative preposition *con* analyzed in Franco & Manzini (2017). It is therefore interesting to note that [*a* + NP] structures are often interchangeable with [*con* + DP] structures (cf. 35-36). We already saw a similar case obtaining with the lexicalization of the inclusion relator (*da* vs. *di*). We tentatively propose to entertain a similar hypothesis when it comes to the analysis of the morphophonological variation in the expression of the \supseteq relator, i.e., as in the lexical entries in (37).

- (35) a. *pesca a mosca*
 fishing a fly
 b. *pesca con la mosca*
 fishing with the fly
 ‘fly fishing’
- (36) a. *macchina a motore*
 car a engine
 ‘engine car’
 b. *macchina con il motore*
 ‘car with the engine’

⁸ An anonymous reviewer objects that it is not clear how \supseteq could be the common denominator underlying *a*-compounds on the basis of contrasts between (33) and (34). According to the reviewer, in (34) the cross shape can be thought to belong to the screwdriver because the cross ‘finds its place’ in the screwdriver (along the lines of what we argue in the text). Crucially, however, the reviewer goes on to claim that this loose notion of belonging does not extend to (33), since there is no obvious sense in their view in which the contact ‘finds its place’ in the lense. It is important to stress in this regard that the notion of (zonal) inclusion is not to be intended in a literal, locative sense. We believe that in (34) the contact can indeed be thought to ‘find its place’ in the lense (in a non-locative sense) as e.g. one of its properties, which gives rise to the ‘working principle, means & instrument’ function of nominal in the compound. In this sense, the (property of working via) contact belongs to the lense, or, put another way, the lense ‘has’ the contact as one of its parts. Similar remarks apply to other *a*-compounds such as *granata a frammentazione* ‘fragmentation grenade’ and *mulino a vento* ‘windmill’. The enrichment at C-I is once again crucial for determining the relevant interpretation of the NP in the compound (e.g. ‘shape’ vs ‘initiator’).

- (37) \supseteq \Leftrightarrow a. /kon/ / [DP [P \supseteq [DP]]]
 b. /a/ / [DP [P \supseteq [NP]]]

Let us finally turn to *di*, for which we propose the lexicalization of the intersection relator (\cap). \cap is a novel aspect of our proposal, which we characterize as intersecting (relevant) properties of the two elements in the PC in a single zonal domain. More specifically, whereas the relator of (reverse) inclusion characterizes a conceptual embedding of properties (where an overarching event/object has properties distinct from those of an included event/object), the intersection relator entails no such embedding. In other words, the object denoted by *di*-compounds represents a single zonal domain containing properties of both elements in the PC. Which of the properties come to be interpreted as adequate for intersection is again a matter established at C-I via run-of-the-mill semantico-pragmatic enrichment.

Consider the ‘material’ interpretation of *di*-compounds like (38). In these cases, the object denoted by the PC represents a zonal domain containing properties of both ‘juice’ and ‘lemon’. There is therefore no conceptual separation (i.e., in terms of zonal domains) between the relevant properties of ‘juice’ and those of ‘lemon’ in the object represented by ‘lemon juice’. This analysis — we submit — is what gives rise (among others) to the ‘material’ or ‘source’ interpretation of such compounds at C-I.

- (38) a. *succo di limone*
 juice of lemon
 ‘lemon juice’
 b. [DP SUCCO [PP \cap [NP limone]]]

The analysis could in fact be extended to less straightforward cases of intersection, as in (39)-(40). Even though in (39) the ‘card’ is not physically made out of ‘credit’ (for obvious reasons), it is still reasonable to assume that the compound is interpreted as involving a sort of formal relation, though only at a figurative level.⁹

- (39) a. *carta di credito*
 card of credit
 ‘credit card’
 b. [DP carta [PP \cap [NP credito]]]
- (40) a. *medico di turno*
 medic of turn
 ‘attending physician’
 b. [DP medico [PP \cap [NP turno]]]

Finally, we need to address *di*’s content in compounds which seemingly involve part-whole relations, as in (41)-(42).

⁹ This could in principle be linked to the relation holding between the elements in PCs headed by so called *light nouns* (cf. Masini and Simone 2014, Masini 2015), like *colpo di telefono* ‘ring’, *colpo di fortuna* ‘fluke’ where the head displays a lower referentiality with respect to the embedded NP.

- (41) a. *occhio di bue*
 eye of bull
 ‘sunny-side up’
- (42) a. *piede di porco*
 foot of pig
 ‘crowbar’

We may formulate two alternative hypotheses to account for the distribution of *di* in cases like (41)-(42).

One hypothesis is that *di* lexicalizes the \subseteq relator in (41)-(42), as it does in standard genitive modification. However, this would raise the question why \subseteq is lexicalized by /*di*/ and not by /*da*/. Note that the morphosyntactic context in which /*di*/ is realized in these cases is non-distinct from the contexts in which /*da*/ appears in PCs (i.e., both exponents are involved in the same [DP [NP]] configurations). In other words, we would expect *di* to freely alternate with *da* in these cases, contrary to fact. In order to solve this issue, we might propose a further contextual rule in the morphophonological realization of the relator. In particular, the rule would appeal to the referential properties of the DP. Recall indeed from Section 1 that such *di*-compounds as (41)-(42) generally receive an idiomatic or ‘exocentric’ interpretation at C-I. In (41), for instance, *occhio di bue* does not refer to an actual eye belonging (either physically or figuratively) to a (non-)specific bull; rather, the compound refers exocentrically. This hypothesis would thus lead to the formulation of the lexical entries in (43) for the inclusion relator, where the c-entry is sensitive to the non-referentiality of the embedding DP.

- (43) \subseteq \Leftrightarrow a. /*di*/ / [DP [P \subseteq [DP]]]
 b. /*da*/ / [DP [P \subseteq [NP]]]
 c. /*di*/ / [DP_[-ref] [P \subseteq [DP]]]

The idea that *di* could spell out different relator contents in Italian is not implausible when considering closely related languages like Spanish, where *de* can appear in virtually all PCs (cf. Section 1). Nonetheless, this solution is problematic in that it is unclear how semantic notions such as referentiality could be interpreted at EXT, assuming the standard Y-model of grammar. Moreover, encoding such a notion via, e.g., a syntactic [+ref] feature (which could presumably be read at EXT after TRANSFER) would be merely stipulatory, as far as we can see.¹⁰

An alternative is to assume that /*di*/ realizes the \cap relator in all [DP [NP]] configurations. One advantage of this hypothesis is in maintaining a uniform content for the lexicalization of *di* in PCs. Following this approach, we can therefore dispense with the problematic entry in (43).¹¹ Furthermore, we might speculate that the

¹⁰ A reviewer also suggests that the use of a [+ref] feature would be incongruent given recent approaches which re-evaluate the idea that linguistic meanings should be specified in terms of features and operations for determining truth/reference/satisfaction conditions (cf. e.g. Pietroski 2005).

¹¹ The reason for maintaining a uniform intersection relator rather than the (reverse) inclusion relator for *di* in PCs is that doing otherwise would face the empirical problem of

idiomatic interpretation arises precisely because the \cap relator is involved in these cases, rather than the relator of (reverse) inclusion. Note indeed that the idiomatic interpretation is missing in other contexts that arguably involve \subseteq/\supseteq . We therefore tentatively propose to capture this observation by having the idiomatic interpretation arise at C-I on the basis of the \cap relator. In (41), for instance, the represented object denotes the intersected zonal domain of some relevant properties of its components (e.g., shape of ‘eye’, size of ‘bull’), along with exocentric ones (e.g., flavor, color) added via enrichment at C-I.

Whichever hypothesis will ultimately turn out to be correct for *di* in PCs, the main argument of this paper would still go through if its distribution can be captured by maintaining a minimal content that EXT can lexicalize on the basis of specific morphosyntactic properties of the context of insertion.

4. Conclusions

In this paper, we have proposed a morphosyntactic analysis of PCs in Italian. The focus of our discussion has been the role of the preposition. We have argued that while prepositions are not meaningless, their content isn’t too rich, either. We have proposed that they can be treated as general relators (along the lines of Manzini & Franco (2016)’s treatment of locative and oblique prepositions) which can express different directions of inclusion between the nominal items that are part of the compound.

The lexicalization patterns are coherent with the syncretism found in other aspects of the grammar (e.g., locative/oblique prepositions). At the same time, the specific lexicalizations of these prepositions are ultimately determined by the morphosyntactic context in which they are embedded, highlighting the key role played by the syntactic context in shaping a vocabulary entry. One advantage of our proposal lies in its minimality: the prepositions only encode general relators with varying directionalities; they are not burdened with semantic content. We have extended Manzini & Savoia (2011)’s hypothesis that prepositions encode minimal relators, arguing for the inclusion of an additional relator instantiated by the preposition *di*: intersection (\cap). The relevant interpretations of PCs are ultimately derived by pragmatic enrichment at the C-I interface on the basis of the elementary content expressed by the preposition.

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accounting for the lack of free distribution between *di*- and *da/a*-compounds (cf. *coltello da pane* vs. **coltello di pane* ‘bread knife’).

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