GRADIENCE IN SUBCATEGORIZATION? LOCATIVE PHRASES WITH ITALIAN VERBS OF MOTION

Michela Cennamo & Alessandro Lenci

Abstract. The study of the argument vs. adjunct status of the locative phrase optionally occurring with verbs of motion in Italian, both bounded (directed motion) and unbounded (manner of motion), points to the notion of scalar change as a useful model for the argument/adjunct distinction: locative prepositional phrases referring to the scalar change component entailed by a verb (either its endpoint(s) or its direction) have an argument status, otherwise they are adjuncts. This finding has a distributional correlation in the differences in the association strength (i.e., head-dependence) of locative prepositional phrases with this class of verbs.

1. Introduction[1]

In this paper we carry out a corpus-based investigation of the morphosyntax of verbs of motion in Italian, both bounded[2], i.e., verbs of directed motion (e.g., *andare* 'go', *arrivare* 'arrive', *venire* 'come') and unbounded, i.e., verbs of manner of motion (e.g., *nuotare* 'swim', *galleggiare* 'float', *rotolare* 'roll', *correre* 'run') in relation to the argument vs. adjunct status of the directional/goal phrase optionally co-occurring with them. More specifically, we explore the interplay of various types of parameters affecting the argument or adjunct status of such phrases:

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[2] The boundedness of motion verbs reflects the nature of the path associated with them in relation to a reference object (ground, source, goal). Directed motion verbs subdivide into verbs bounded at the upper (e.g., *go*) and lower (e.g., *depart*) ends and unbounded ones (e.g., *descend, rise*). They can also associate with either a two-point path (e.g., *exit, depart, go, arrive*) or with a multi-point path (e.g., *recede, advance*) (Rappaport Hovav & Levin 2010: 30–32, Rappaport Hovav 2014: 272–273). Although related and often identified in the literature, the notions of boundedness and telicity should be kept apart, in that they do not always coincide (Rappaport Hovav & Levin 2010: 30–32 also for the motion domain). More specifically, (un)boundedness refers to the presence/lack of a temporal boundary in the eventuality described by the verb; (a)telicity denotes the presence/lack of an endpoint in an eventuality (Depraetere 1995: 2, inter alia).

1. *Syntactic parameters*, such as obligatoriness, optionality/latency (Matthews 1981:125–126), and their semantic and pragmatic constraints (e.g., animacy and instantiation) (Fillmore & Kay 1993 in Croft 2001:276–277), different order constraints;
2. *Semantic parameters*, such as (i) the degree of lexicalization of the direction and result of movement in the verbal roots, (ii) the event structure template of predicates, (iii) the inherent and relational characteristics of the subject (e.g., animacy and agentivity), (iv) the semantics of the preposition(s) (Beavers et al. 2010, Iacobini 2012, inter alia);
3. *Distributional parameters*, concerning the co-occurrence frequency and statistic association between verbs and directional/goal phrases.

We argue that the syntactic, semantic and distributional behaviour of locative[3] phrases, which appears to reflect to a large extent the degree of aspectual specification of a verb, can be insightfully accounted for through the notion of scalar change (Beavers 2008b; Beavers 2013; Rappaport Hovav 2008, 2014): the optional phrase is an argument with verbs lexicalizing a scalar change, either in all their uses, as with achievements and accomplishments (e.g., *arrivare* 'arrive', *cadere* 'fall'), or only in some of them, as with the accomplishment use of activity verbs (e.g., *saltare* 'jump', *correre* 'run'), whilst it is an adjunct with non-scalar change verbs, as with activity verbs (e.g., *danzare* 'dance').

The discussion is organised as follows. Section 2 illustrates the general background and some diagnostic tests for argumenthood. Section 3 describes the argument/adjunct distinction in relation to directional/goal phrases with motion verbs in Italian. Section 4 provides some corpus-based evidence for the distributional behaviour of such phrases. Section 5 presents a scalar-based account of the Italian data and finally, section 6 draws the conclusions.

2. The argument-adjunct space: definitions and (some) diagnostics

The nature of the distinction between arguments and adjuncts and the criteria for identifying them have been a long-standing point of controversy in grammatical theory (see Vater 1978, Croft 2001:272–280, Van Valin 2001:92–96, Dowty 2003, Kay 2005, Mereu 2010, contributions in Wichmann 2014, Hole 2015, inter alia, and references therein). The issue has also been widely investigated in Natural Language Processing in relation to Prepositional Phrase (PP) attachment (i.e., the task of ascertaining, in the sequence V-NP-PP, whether the PP immediately following an NP attaches to the latter or to the preceding verb), semantic role labelling and subcategorization

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[3] The term is used to denote the location of an entity (the theme) on a path as well as the goal/source and direction of a path.

acquisition (see Schütze 1995, Schütze & Gibson 1999:409, Abend & Rappoport 2010:227–228, inter alia).

Given a (lexical) head, e.g., a verb, and its dependent(s), the relationship between them can be described both syntactically and semantically, in terms of the 'closeness' of dependents to their head. *Arguments* are syntactically and semantically closer to their head, e.g., the lexical verb, by which they are selected, and are part of its lexical entry. This is shown by their being obligatory constituents. *Adjuncts* are not selected by their head and are not part of the lexical entry of a verb. They describe instead the temporal, spatial or manner settings or circumstances in which the situation expressed by the verb takes place, and are, therefore, optional. Thus they modify the meaning of the event, rather than realizing one of its participants. However, not all optional dependents (NPs or PPs) are adjuncts and not all obligatory dependents are arguments. The distinction, therefore, can be better accounted for if viewed as a *semantic gradient with corresponding categorical syntactic distinctions,* characterized by the interplay of bundles of parameters reflecting the characteristics of the head (e.g., the aspectual template of the verb and the elements of meaning lexicalized in its root) and its dependent(s) (e.g., the nature of argument fillers and of prepositions in the case of adpositional phrases). In this respect, our proposal differs from some current views of the argument/adjunct distinction as scalar both at the semantic and syntactic levels (e.g., Arka 2014; see also discussion in Schütze 1995, Croft 2001:272–273, Van Valin 2001:92–96, Creissels 2014, Haspelmath 2014, Hole 2015, inter alia and further references therein).

Ultimately, the distinction reflects the theoretical perspective adopted (Van Valin 2001:95). In point of fact, whereas there is a large consensus as to the argument or adjunct status of dependents at the opposite poles of the (argument/adjunct) continuum, realized by obligatory and optional dependents respectively, as illustrated in (1) and (2) where the prepositional phrase (*on the shelf/at home*) is an argument in (1a-2a) and an adjunct in (1b-2b), the distinction is less clear-cut for optional dependents, as shown in (3a-b):

(1) a. John put the book on the shelf.
    b. John saw the book on the shelf.
(2) a. John stayed at home last night.
    b. John slept at home last night.
(3) a. John went (to the park/home) after work.
    b. John ran (to the park/home) after work.

The omission of the directional phrase in (3a), in fact, is only possible if its referent is known to the interlocutor/hearer (so-called Definite Null

Instantiation in Fillmore & Kay 1993, in Croft 2001:272)[4], unlike in (3b), where the goal of motion, *to the park/home*, can be freely omitted, without altering the grammaticality of the clause. Therefore the same dependent, e.g., the directional phrase in (3a–b), may have a dual status, according to the head it co-occurs with. It is an adjunct (or argument-adjunct, added argument, subcategorized adjunct, etc., depending on the paradigm) (see discussion below) with some predicates, as in (3b), where the PP is freely omitted, and an argument with other predicates, as in (3a).

In addition, a dependent may be regarded as an argument in one framework and as an adjunct in a different paradigm, with theory internal distinctions and differences. Generally all theories acknowledge the existence of intermediate points on the argument–adjunct continuum, subsumed under the notions of *argument-adjuncts* in Grimshaw (1990:108–109) and Role and Reference Grammar (3c) (Van Valin & La Polla 1997:159), although with a different interpretation and status[5], *added arguments* in some versions of Construction Grammar (3d) (Kay 2005), *subcategorized adjuncts* in Categorial Grammar (3d) (Dowty 2003) (see Abend & Rappoport 2010, Mereu 2010, Needham & Toivonen 2011, inter alia).

Thus, the PP phrase is an *argument-adjunct* in the RRG account of the optionality of *to the store* in (3c). The preposition (*to*) in (3c) is viewed as a predicate, selecting an argument (*store*), while also sharing an argument with the logical structure of the verb (*Paul*) (Van Valin & La Polla 1997:159–162). The obligatory PP *over the square* in (3d) is a *subcategorized adjunct* in Categorial Grammar (Dowty 2003:39), a term used for adjuncts that in some contexts behave like complements. *Added (path) argument* is the notion describing in Cognitive Construction Grammar the complement-like (i.e., argument-like) behaviour of a PP like *off the table* in (3e) that is not part of the minimal valence of the verb, since it can be freely omitted, and yet it behaves like an argument (e.g., it cannot be fronted) (Kay 2005):

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[4] The notion of instantiation (subsuming obligatoriness and latency, in the sense of Matthews 1981: 125–126) refers to the pragmatic constraints on the lack of syntactic expression of an argument (Croft 2001: 276–277, building on Fillmore 1986, Fillmore & Kay 1993, ch. 7). Three types of null instantiations are recognized in the literature, depending on the pragmatic status of the referent of the unexpressed argument/dependent: (i) *Free Null Instantiation,* where the identity of the referent can be freely identified, e.g., accessible in context, as in *She wrote a letter* Ø (e.g., on blue stationery) (Croft 2001: 276), (ii) *Indefinite Null Instantiation*, where the referent's identity is indefinite, e.g., unknown, as in *He ate*, (iii) *Definite Null Instantiation* (corresponding to Matthews' notion of latency), where the referent must be accessible to the hearer, as in *I did not finish* (sc. *the job*) (Matthews 1981: 126), *John arrived* (Croft 2001: 277).

[5] Grimshaw's (1990) notion of argument-adjunct includes only *by*-phrases with passive sentences and event nominal possessives (e.g., *the destruction of the camp by the police*).

(3) c. Paul ran to the store.
    d. The campanile towers over the square. (*The campanile towers)
    e. The top was spinning off the table. (*off the table, the top was spinning) (Kay 2005:89)

Even the obligatoriness of a dependent has been shown not to be a totally reliable criterion, since there are syntactically obligatory elements such as expletives which have no corresponding semantic function, as illustrated in (4a) (Kay 2005:87):

(4) a. It often rains in August on the lake Maggiore.
    b. John arrived at the station.
    c. John arrived home/went home.
    d. *home John arrived/went/at the station John arrived.

Thus, there are obligatory dependents that cannot be regarded as arguments, and, conversely, there are optional dependents that appear to be arguments, both syntactically and semantically (see further discussion in Van Valin 2001:93–95; Kay 2005:87–88, inter alia). For instance, the locative constituents *home* in (3a, 4c) and *at the station* in (4b), seem to be part of the semantic and syntactic valence of the verb: the goal, in fact, is semantically implied with the verbs *go* and *arrive* and cannot be fronted in unmarked declarative sentences, as in (4d), like 'true' arguments (section 2.4 and discussion below)[6].

The difficulty in identifying and distinguishing dependents that are clearly selected by their head from dependents that simply modify the eventuality described by the head has also led some scholars to call into question the validity of such a distinction. Already Vater (1978:21) proposed to replace the distinction between arguments and adjuncts with the notion of different "grades of verbal dependents, extending from those that are required by the majority of verbs (like the subject) to those that occur most frequently (but not exclusively) freely (like place and time phrases)" (Vater 1978: id.). More recently, Dowty (2003:33) has argued in favour of a "dual analysis of every complement as an adjunct, and potentially [...] of any adjunct as a complement", whilst Haspelmath (2014) recognizes the usefulness of the distinction for the description of individual languages, but denies it a universal status as a category, although there appears to be psycholinguistic evidence for it (Tutunjian & Boland 2008; see also further discussion of the theoretical status of these notions in Arka 2014:77–80, Haspelmath 2014, inter alia).

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[6] However, as suggested by an anonymous referee, fronting with directional/goal phrases is possible in English, as shown in (i), in what appears to be a marked, emphatic context (an issue that needs further investigation):

(i) He said he would go home and *home he went*

2.1. *Diagnostic tests*

Focusing on prepositional phrases, several tests have been identified in the literature in order to differentiate arguments from adjuncts, including *head-dependence, optionality, iterativity, ordering, fronting, pro-form replacement* (see Schütze 1995, Merlo & Esteve Ferrer 2006:344–349, Abend & Rappoport 2010, Needham & Toivonen 2011, inter alia, and further references therein):

i) *Head-dependence*. Arguments are selected by specific heads, thus they co-occur with a fixed and narrower range of heads than adjuncts (e.g., *on, down* with *put* (5a), *from* with *remove* (5b), *of* with *inform* (5c) (cf. Schütze 1995:102, Dowty 2003, Kay 2005, Merlo & Esteve Ferrer 2006:346):

(5) a. Mark put the book *on the table*/*from the table/put the book *down*.
   b. Mark removed the book *on/*from the table*.
   c. John informed/*surprised/*hit them *of the danger*.
   d. John informed/surprised/hit them *in the park/at work/down the road/on the bus*.

With verbs like *put,* however the PP, although an argument of the verb, since obligatorily selected by it (cf. **John put the book* vs. *he put the book down*), nevertheless it also contributes to the semantics of the clause (Van Valin & La Polla 1997:160–161, Van Valin 2005:22–23). In point of fact, the choice of the locative preposition within the fixed set is not governed by the verb, as in (5b), but it appears to reflect also the nature of its dependent noun (e.g. **he put the book in the shelf* vs *he put the book in the box*). These PPs therefore, seem to instantiate intermediate constituents between arguments and adjuncts, sharing properties of both arguments and adjuncts.[7]

ii) *Optionality*. Generally, arguments are obligatory dependents of a verb, while adjuncts are optional, since they do not contribute to the semantics of the verb, as in (6a–b) vs. (6c–d) (Schütze 1995:101–102, Schütze & Gibson 1999:426):

(6) a. John put the book on the shelf.
   b. *John put the book.
   c. John located the book on the shelf.
   d. John located the book.
   e. John lived in Rome/John lived alone/John lived for a long time.
   f. *John lived.

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[7] In Role and Reference Grammar, owing to their hybrid nature, these constituents are regarded as argument-adjuncts, similarly to path phrases with manner of motion (*run, walk*) and induced motion verbs (*push, move*) (Van Valin & La Polla 1997: 162, with a discussion of other types of PPs with an intermediate status).

Even this test, however, does not provide conclusive results, because there also occur obligatory adjuncts, as shown in (6e–f), where the verb requires an adverbial elaborator of space/time/manner, that is not part of its semantic valency, but without which the clause is ungrammatical (see Grimshaw & Vikner 1993 for a discussion of different types of obligatory adjuncts in English and their pragmatic account in Goldberg & Farrell 2001).

iii) *Iterativity*. Modifier phrases can iterate (7a), whilst argument phrases cannot (Schütze 1995:102, Schütze & Gibson 1999:426):

(7) a. John met Mary at the pub in a corner.
    b. *Chris rented the gazebo to yuppies, to libertarians.

Thus, in (7b) the dative argument headed by the preposition *to* cannot be repeated, unlike the locative adjunct, headed by the preposition *in*.

iv) *Ordering*. Arguments most typically precede modifiers (8a) vs. (8b) (Jackendoff 1977, Pollard & Sag 1987), whilst modifiers may follow other modifiers (8a) (Schütze 1995:107, Schütze & Gibson 1999:426):

(8) a. John saw the fire brigade in my road on Sunday.
    b. *John saw in my road on Sunday the fire brigade.
    c. *John gave to Mary a present on Sunday.
    d. *John gave a lift three times on Sunday to Mary.
    e. John gave the beans quicky to Bill (Schutze 1995:108)

For instance in (8a) the adverbial phrases (*in my road*, *on Sunday*) may occur in sequence after but not before the direct object (*fire brigade*) (8b). However, manner adverbs may precede PP arguments in the verb phrase (Jackendoff 1977), as in (8e), thus this diagnostics does not clearly distinguish arguments from adjuncts (Schütze 1995:108 for a detailed discussion of the difficulties with this test and further references therein).

v) *Fronting*. Generally (adpositional) arguments cannot be moved freely in a clause, for instance they cannot be fronted, unlike adjuncts:

(9) a. John read the newspaper in the kitchen.
    b. In the kitchen John read the newspaper.
    c. John put the book on the shelf/in the kitchen.
    d. *On the shelf/in the kitchen John put the book.

This test accounts for the ungrammaticality of (9d), where the locative PP (*in the kitchen*) is an argument, i.e., selected by the valency of the verb, unlike in (9b), where the PP (*on the shelf*) is instead an adjunct, a modifier of the clause (see further discussion in Section 2 and Kay 2005:92 for an account of the different behaviour of adjunct and adjunct-like constituents in Construction Grammar).

vi) *Pro-form replacement* (e.g., the *do so* test). (Adpositional) arguments can be deleted under pro-form replacement with the *do so* form, standing for a syntactic constituent consisting of a head and its internal

argument(s), as in (10a), where the verb and its arguments (the direct object and the PP) are replaced by the *do so* pattern.

(10) a. John <u>put a book on the shelf</u> and Mary <u>did so</u>.
    b. John <u>put a book</u> on the shelf and *Mary <u>did so</u> on the shelf.
    c. John <u>filled out the form</u> in pen, and Mary <u>did so</u> in pencil.

Also the ungrammaticality of (10b), where the *do so* form replaces just the verb and its direct object, stems from the argument status of the PP (*on the shelf*) with the verb *put*. In (10c), where the PP headed by *in* is not selected by the verb, but denotes the spatial setting of the event, the replacement (i.e., deletion) of just the verb and the direct object with the *do so* form leads to a grammatical sentence (see discussion in Schütze 1995:104–107, Schütze & Gibson 1999:427, inter alia).

3. (Adpositional) arguments, adjuncts and verbs of motion in Italian

3.1. *Some diagnostic tests*

In Italian, three useful syntactic tests for differentiating argument prepositional phrases from adjuncts with motion verbs are (i) variation in the number and type of adposition(s), i.e., head-dependence, (ii) optionality (e.g., instantiation) and, to a lesser extent, (iii) free permutation (e.g. fronting) (Cennamo 2015). The wider range of prepositions in (11a) shows that they are not selected by the verb, unlike the preposition *per* with the verb *partire* 'leave' in (12a), which is to be contrasted with (12e), where *per* 'to' and *su* 'on', head an adjunct PP. In (13a), on the other hand, *sul* (on.the) 'onto' heads an argument PP, as also shown by the impossibility of fronting (13b):

(11) a. Ieri   ho   visto   Marco a Roma/in
        yesterday I.have seen.PP.M.SG Mark   at Rome/in
          treno/sul treno.
          train/on-the train
        'Yesterday I saw Mark in Rome/on the train.'
    b. Ieri a Roma/in treno/sul treno ho visto Marco.
    c. A Roma/in treno/sul treno ieri ho visto Marco.

The fronting of PPs, in fact, is possible with adjuncts, as illustrated in (11a-c) and (12d-e), but not with arguments, as shown in (12a-b) and (13a-b) below:

(12) a. (Ieri)   sono partito   per/* a/* in Roma.
        Yesterday I.am leave.PP.M.SG for/ to/ in Rome
        '(Yesterday) I left for Rome'
    b. * (Ieri) per Roma sono partito.
    c. (Ieri) per Roma sono partito, non per Milano.
        '(Yesterday) I left for Rome, not for Milan'.

d. Marco dorme male sul   divano /in cucina/ per
   Mark sleeps badly on.the sofa   /in kitchen/ on
     terra.
     ground
   'Mark does not sleep well on the sofa/in the kitchen/on the
   ground'
e. Sul divano/in cucina/per terra Marco dorme male.

(13) a. Carlo   mise le chiavi sul   tavolo e   uscì.
        Charles put the keys on.the table and went out
        'Charles put the keys on the table and went out'
    b. * Sul tavolo Carlo mise le chiavi e uscì.
    c. Sul   tavolo Carlo mise le chiavi, non sullo   scaffale.
       on.the table Charles put the keys   not on.the shelf
       'Charles put the keys on the table, not on the shelf'

In contrastive focus, however, fronting is possible also with arguments, as in (12c) and (13c).

3.2. *Subclasses of motion verbs in Italian*

One-argument verbs of motion in Italian can be subdivided into three main classes on the basis of their morpho-syntactic behaviour, reflecting the association with and the degree of lexicalization of the direction/ result of movement in the verbal root, the event structure template of predicates, inherent and relational properties of the subject such as animacy and agentivity, as well as the semantics of the preposition(s) heading the optional PPs:

Class I. *Verbs lexicalizing the direction and/or result of motion* (i.e., path) (*arrivare* 'arrive', *partire* 'leave', *venire* 'come', *andare* 'go', *fuggire* 'run away', *scendere* 'go down', *salire* 'go up', *scivolare* 'slip'), selecting the auxiliary BE in compound tenses (comprising achievements and different types of accomplishments);

Class II. *Manner of motion verbs* selecting either auxiliary (HAVE/BE) in compound tenses, subdividing into two subsets, respectively allowing/not allowing aspectual reclassification, signalled by the selection of the auxiliary BE and presence of a path/result PP (i.e., activity verbs allowing an accomplishment use) (i.) *correre* 'run', *rotolare* 'roll', *saltare* 'jump', *planare* 'glide', *decollare* 'take off', *atterrare* 'land', vs. ii.) *ondeggiare* 'wave', *fluttuare* 'fluctuate', *veleggiare* 'sail', *trotterellare* 'toddle, trot', *galoppare* 'gallop');

Class III. *Manner of motion activity verbs allowing the overt expression of the direction of motion and marginally result*, although only with complex prepositions (e.g., *fino a* 'as far as'), with varying degrees of acceptability and no aspectual reclassification (e.g., **Marco incedeva fino a casa* (lit.)

'Mark proceeded as far as home' vs. *Marco incedeva verso casa* (lit.) 'Mark proceeded towards home') (*marciare* 'march', *danzare*, *ballare* 'dance', *camminare* 'walk', *passeggiare* 'stroll', *nuotare* 'swim', *sciare* 'ski', *incedere* 'proceed, advance', *marciare* 'march', *strisciare* 'crawl, creep', *zoppicare* 'limp') (see also discussion in Alonge 1997, Folli & Ramchand 2005:95–100, Folli 2008: 205–206).

As we shall see in the course of discussion, no syntactic test fully detects the argument-like or adjunct-like status of the directional/result phrase optionally occurring with these verbs, their application often giving contrasting results. Only head-dependence seems to provide more useful hints as to the argument or adjunct status of the optional PPs, pointing to a correlation between the degree of telicity of a verb/predicate and the status of the locative PPs collocating with them, an issue discussed for other languages and in different frameworks, but never explored for Italian (see Tsujimura 1994 for Japanese and, most recently, Van Luven 2014 for English).

3.2.1. *Class I Verbs lexicalizing direction/result of motion*

This class comprises achievements (e.g., *partire* 'leave', *arrivare* 'arrive') and different types of accomplishments (e.g., *cadere* 'fall', *fuggire* 'run away'). Thus one finds degree achievements such as *salire* 'ascend/go up/ rise', *scendere* 'descend', *scivolare* 'slip', which lexicalize an unbounded path and which can occur with both bounded and unbounded path PPs (14), as well as verbs which lexicalize a deictic direction, such as *venire* 'come', *andare* 'go', which also allow atelic uses, as in (15a-b), unlike (15c-d), exemplifying telic uses of these verbs with result motion phrases:

(14) a. Marco salì/scese   lungo il   pendio/verso
       Mark went-up/went-down along the slope/towards
          casa. (*unbounded*)
          home
       'Mark went up/down along the slope, towards home.'
    b. Marco è salito/sceso   a casa/a   Roma. (*bounded*)
       Mark is gone-up/gone-down to home/to Rome
       'Mark went home/to Rome.'

(15) a. Marco è venuto verso   casa/verso   me. (*atelic*)
       Mark is come   towards home/towards me
       'Mark came home/towards me.'
    b. Marco è andato verso   casa/ verso   i   colleghi.
       Mark is gone   towards home/ towards the colleagues
       'Mark went home/towards his colleagues.'
    c. Marco è venuto dai   colleghi/ a Roma.
       Mark is come   to-the colleagues/ to Rome
       'Mark came to his colleagues/to Rome.'

d. Marco è andato dai   colleghi/   a Roma. (*telic*)
   Mark is gone   to-the colleagues/ to Rome
   'Mark went to his colleagues/to Rome.'

Verbs denoting the 'gradual traversal of a path' (Rappaport Hovav & Levin 2010:30) (e.g., *cadere* 'fall', *scendere* 'descend, go down') most typically take bounded path PPs (16a), but may also occur with unbounded ones, especially in imperfective tenses, e.g., the progressive in (16b), in a clear case of aspectual coercion:

(16) a. Marco cadde a casa/in casa/ dentro casa/ dietro/
        Mark fell   at home/in home/ inside home/ behind/
          giù/*   verso   casa[8].
          down/* towards home
        'Mark fell at his home.'
     b. L' aereo stava cadendo verso   la   collina.
        the plane stayed fall.ger towards the hill
        'The plane was falling towards the hill'

Achievements too (e.g., *partire* 'leave', *arrivare* 'arrive', *entrare* 'enter') most typically only allow bounded path PPs, as in (17):

(17) a. Marco è partito per Roma/* verso   Roma.
        Mark is left   for Rome/ towards Rome
        'Mark left for Rome.'
     b. Marco è arrivato a Parigi/* verso   Parigi.
        Mark is arrived at Paris/* towards Rome
        'Mark arrived in Paris.'
     c. Marco è partito da   Roma per Parigi.
        Mark is left   from Rome for Paris
        'Mark left Rome for Paris.'
     d. Marco è arrivato a Parigi da   Roma.
        Mark is arrived at Paris from Rome
        'Mark arrived in Paris from Rome.'
     e. Marco entrò in casa/ dentro casa   a casa /* verso.
        Mark entered in house/ into   house/ to house / towards
          casa
          house
        'Mark entered his house'

However, with some of these verbs, although to a different extent, unbounded PPs are possible, especially in imperfective tenses, as exemplified in (17f) for the verb *partire* 'leave', frequently attested in

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[8] *Marco cadde verso casa* in (16a) would be possible with the meaning 'Mark fell near home', i.e., in the non-directional meaning of the preposition *verso* 'towards'.

the *itTenTen* corpus (Jakubíček et al. 2013) with unbounded PPs, also in perfective tenses (an issue that we leave for further investigation):[9]

(17) f. Partirono verso   nord/Roma.
       they.left   towards   north/Rome
       'They left heading North/towards Rome

With *arrivare* 'arrive' and *entrare* 'enter', on the other hand, this usage is very rare, attested almost exclusively in imperfective tenses for *arrivare*, as shown in (17g) and with only one example for *entrare* in the corpus (17h):

(17) g. Le onde arrivano verso   la   battigia.
        the waves arrive   towards   the foreshore
        'The waves are arriving at the foreshore (lit. towards)'
     h. La luce entra verso   la   retina.
        the light enters towards   the retina
        'The light is heading towards the retina (lit. is entering
        towards the retina)

   All achievement verbs, however, have a fixed and narrow range of prepositions heading the PP, unlike accomplishments. Thus the prepositions *per*[10] 'to(wards)', *a* 'to', *da* 'to/from' in (17a-d) appear to be selected by the verbs only. *Head-dependence* indeed seems to differentiate the optional path PPs, both bounded and unbounded, of accomplishments, from the optional PPs with achievements and appears to be a better test for identifying the argument or adjunct status of directional/result PPs occurring with these verbs.
   In point of fact, the optionality test may give contrasting results, as in (18), where the optionality of the directional phrase appears to reflect the animacy of the subject, rather than stemming from the predicate:

(18) a. Mario è venuto da   lì.   b. Mario è venuto.
        Mario is come from there   Mario is come
        'Mario has come from there.'   'Mario has come.'
     c. Il rumore è venuto da   lì.   d. *Il rumore è venuto.
        the noise is come from there   the noise is come
        'The noise has come from there.'   '*The noise has come.'

_____

[9] Also the nature of the ground/path (i.e., of the object of the preposition) might play a role in the acceptability of achievements with unbounded PPs, an issue that needs further study, and is explored for the directional interpretation of locative PPs in English by Nikitina (2008) and addressed for Romance by Levin et al. (2009), and references therein.
   [10] In Italian the prepositions *a* and *per* have both a location and directional meaning, with *per* also heading a beneficiary phrase, meaning 'for':

(i) Marco comprò un libro per sua sorella.
    Mark bought a book for his sister
    'Mark bought a book for his sister'.

With verbs belonging to Class 1 (either accomplishments or achievements), depending on the tense, when the path phrase is unexpressed an adverbial elaborator seems to be needed for the sentence to be grammatical, as shown in (19a-b). When the subject is inanimate, however, the pattern without the path phrase is possible if there is an adverbial elaborator, e.g., a temporal adjunct, as in (19c), to be contrasted with the ungrammaticality of (18d):

(19) a. ? Marco partì. *vs.* a'. Marco è partito.
    Mark left   Mark is left
    'Mark left.'   'Mark has left.'
   b. Marco partì improvvisamente.
    Mark left suddenly
    'Mark suddenly left.'
   c. La scossa/ il   rumore arrivò/ è arrivato improvvisamente.
    the quake/ the noise   arrived/ is arrived suddenly
    'The earthquake/the nose arrived/has arrived suddenly.'

To sum up, this subclass of motion verbs comprises (inherently) telic and/ or punctual verbs, i.e., *different types of accomplishments and achievements*. They lexicalize either path or result or both, depending on the verb, optionally surfacing as PPs, and select the auxiliary *essere* 'BE' in compound tenses, showing also past participle agreement with the subject. The expression of path/result PPs is, however, obligatory (i.e., no null instantiation is possible) when the subject is inanimate, unless there occurs an adverbial elaborator, such as a temporal or manner adjunct.

3.2.2. *Class II Manner of motion verbs optionally allowing aspectual reclassification*
This class includes manner of motion verbs selecting either auxiliary (HAVE and BE, respectively without and with past participle agreement with the subject) in compound tenses) (e.g., *correre* 'run', *rotolare* 'roll', *galoppare* 'gallop', *fluttuare* 'fluctuate'). They show different constraints on the occurrence of locative (directional/result) PPs, reflecting tense (i.e., the temporal boundedness of the event) and the presence/absence of a reference object (RO) in their lexical root. For instance, with *correre* 'run' the locative PP can be unexpressed only if it is either contextually recoverable or known to the hearer (Definite Null Instantiation) as in (20a) vs (20b) (where in compound tenses only BE is selected). In (20c), instead, the clause is grammatical without a goal/directional PP, although in imperfective (i.e., unbounded) tenses. In compound tenses the auxiliary HAVE is selected. The focus is on the running activity, not on the spatial distance covered, thus the verb in this use is not associated with a reference object:

(20) a. *Marco corse/ è corso.
   Mark ran/ is run
   'Mark ran/has run'
  b. Marco corse (a casa)/ è corso.
    Mark ran home/ is run
     (a casa)   (Definite Null Instantiation)
     to home
    'Mark ran (home)'
  c. Marco corre/ ha corso (nel parco).
    Mark ran/ has run in.the park
     (*a casa)   (Free Null Instantiation)
     to home
    'Mark ran/has run (in the park) (*home)'
  d. Marco ha corso lungo il fiume/* è corso lungo il
    Mark has run along the river/ is run along the
     fiume.
     river
    'Mark ran along the river'

The same constraints apply to the verb *rotolare* 'roll', as shown in (20e–g). Unlike *correre* 'run', however, this verb alternates either auxiliary in compound tenses with a spatial extent PP headed by *lungo* 'along', as in (20g) vs. (20e), where only HAVE may occur (an issue that we leave for further study):

  e. *La palla rotolò/ è rotolata.
    the ball rolled/ is rolled
    'The ball rolled'
  f. La palla rotolò/è rotolata nel buco. (*result location*)
    the ball is rolled has rolled into-the hole
    'The ball rolled into the hole'
  g. La palla è rotolata/ ha rotolato lungo il
    the ball is rolled / has rolled along the
     pendìo.   (*direction*)
     slope
    'The ball rolled along the slope'

In compound tenses, however, the selection of BE signals the aspectual reclassification of the verb from activity to accomplishment (20f,h) (active accomplishment in Role and Reference Grammar) (Van Valin 2005:32–50), as also shown by its co-occurrence with a goal and directional PP (headed by *a* 'to' and *verso* 'towards', respectively), to be contrasted with (20i), with the auxiliary HAVE and a goal PP:

(20) h. Marco è corso a casa (goal)/ verso   casa.   (directional)
      Mark   is run   to home/   towards home
      'Mark ran home/towards home'
   i. *Marco ha corso a casa.
      Mark   has run   to home
      'Mark ran home'

Not all motion verbs alternating HAVE and BE, however, appear to allow aspectual reclassification (an issue that needs further investigation). For instance *fluttuare* 'fluctuate'*, ondeggiare* 'wave', do not allow a goal PP headed by the preposition *a* 'to', unlike *correre* 'run' (20h), when BE is selected, but only a complex PP (e.g., *fino a* 'as far as'). The latter preposition, however, is not a dedicated goal marker[11] and has a different internal aspectual structure, denoting the time interval during which the eventuality takes place, until the theme comes to be at a particular location (i.e., until the goal is reached) (20j), rather than the goal/result of motion, like *a* in (20i) (see also Beavers 2008a: 297ff., Beavers et al. 2010:16 for *until*-markers as expressing 'general delimitation, providing a static boundary point'):

(20) j. La barca ha fluttuato/ è fluttuata   fino a/   verso
      the boat has fluctuated/ is fluctuated as far as/ towards
        riva/* a riva.
        shore/ to shore
      'The boat fluctuated as far as the shore/towards the shore

In relation to aspectual reclassification, therefore two subsets can be identified within this class. Verbs like *saltare* 'jump', *planare* 'glide', *decollare* 'take off', *atterrare* 'land' pattern like *correre* 'run' and *rotolare* 'roll', whereas verbs like *ondeggiare* 'wave', *trotterellare* 'toddle, trot', *galoppare* 'gallop'*, volteggiare* 'whirl' pattern like *fluttuare* 'fluctuate' (see also discussion in Section 4.2).

3.2.3. *Class III Manner of motion verbs with no aspectual reclassification*
This class comprises activity verbs, with varying degrees of acceptability of PPs expressing the path/result location of motion, and always selecting the auxiliary *avere* 'HAVE' in compound tenses, as shown in (21)−(22):

(21) a. ??*Marco ha passeggiato verso   il   fiume. (*direction*)
      Mark   has strolled   towards the river
      'Mark strolled towards the river'
   b. Marco ha passeggiato fino casa.   (*result location*)
      Mark   has strolled   until at home
      'Marked strolled home (lit. until at home)'

---

[11] *Fino a* is a temporal adposition that can be used to express goal of motion in Italian, as in other languages (see discussion in Beavers et al. 2010: 345–347 for *until*-markers as introducing PPs with different types of boundaries and Folli & Ramchand 2005, Folli 2008, who view this PP as involving path and place in Italian).

(22) a. Marco ha   nuotato verso   riva.   (*direction*)
       Mark   has swum   towards shore
       'Mark swam towards the shore'
   b. Marco ha   nuotato fino a riva.   (*result location*)
       Mark   has swum   until at shore
       'Mark swam ashore'

However, these PPs are not selected by the verb. They should be regarded as adjuncts modifying the eventuality described by the verb and providing a spatial setting. They are indeed headed by a wide range of prepositions that have a very loose relation with the verb, as also shown by their optionality. Also for these verbs head-dependence seems to be the main syntactic test detecting the adjunct-like nature of the PP optionally co-occurring with them.

3.3. *Interim summary*

The analysis of the variation encountered in the status of locative PPs for the Italian motion verbs confirms the role played by the interplay between the inherent aspect of a verb's meaning, the root, and its event structure template in determining argument realization. With achievements, PPs show argument-like properties, as revealed by the test of head-dependence, whilst with different subtypes of accomplishments PPs seem to have an intermediate status, with the prepositions heading them behaving as predicates in their own right whilst at the same time closely related to the verbal head. With activity verbs the optional PPs seem to have an adjunct-like status. The decrease in the degree of aspectual specification of the verb correlates with a looser relation between a verb and the prepositions heading the PPs optionally co-occurring with them, i.e., with a less clear-cut, more ambiguous nature of the dependent element, as shown by the syntactic test of head-dependence.

4. Italian verbs of motion and locative PPs: the view from the corpus

In this section we discuss the use of corpus-derived distributional statistics as diagnostics for the argument versus adjunct status of locative PPs with motion verbs in Italian. The identification of reliable distributional features for argumenthood has been actively pursued in computational linguistics, more recently by Merlo & Esteve Ferrer (2006) and Abend & Rappoport (2010). Unlike this work, aiming at the automatic classification of PPs as arguments or adjuncts, the present study focuses on the verb-PPs co-occurrence statistics in order to achieve a quantitative characterization of the adjunct vs. argument opposition, viewed as a gradient notion at the semantic level, with opposite poles where the distinction is clear-cut and intermediate points where the distinction appears to be blurred.

We carried out a corpus-based analysis of a sample of 31 Italian verbs of movement, belonging to the three classes illustrated in Section 3 (cf. Table 1):

- *Class 1 – verbs lexicalizing the direction and/or result of motion* (8 verbs)
- *Class 2 – manner of motion verbs allowing aspectual reclassification* (13 verbs)
- *Class 3 – manner of motion verbs with no aspectual reclassification* (10 verbs)

We investigated the frequency of co-occurrence of each verb with different types of directional PPs in *La Repubblica Corpus*, consisting of about 331 million tokens and based entirely on newspaper texts. The corpus was first lemmatized and part-of-speech tagged, and then parsed with DeSR (Dependency Shift-Reduce), a stochastic dependency parser (Attardi & Dell'Orletta 2009).

Table 1. The verb sample, classes, and frequency in *La Repubblica*.

Verb	Class	Frequency	Verb	Class	Frequency
andare 'go'	1	563,612	*saltare* 'jump'	2	33,835
arrivare 'arrive'	1	295,189	*sgattaiolare* 'run away'	2	139
fuggire' run away'	1	13,589	*trotterellare* 'toddle, trot'	2	149
partire 'leave'	1	104,154	*veleggiare* 'sail'	2	824
salire 'ascend, rise'	1	57,597	*volteggiare* 'whirl'	2	1,000
scendere 'go down'	1	77,062	*ballare* 'dance'	3	5,573
scivolare 'slip'	1	11,255	*camminare* 'walk'	3	9,618
venire 'come'	1	221,220	*danzare* 'dance'	3	1,822
atterrare 'land'	2	4,959	*incedere,* 'advance'	3	325
correre 'run'	2	61,136	*marciare* 'march'	3	6,657
decollare 'take off'	2	4,762	*nuotare* 'swim'	3	1,551
fluttuare 'fluctuate'	2	616	*passeggiare* 'walk'	3	3,931
galoppare 'gallop'	2	931	*sciare* 'ski'	3	1,347
ondeggiare 'wave'	2	1,288	*strisciare* 'crawl, creep'	3	512
planare 'glide'	2	670	*zoppicare* 'limp'	3	497
rotolare 'roll'	2	1,895			

Verb-PP co-occurrence statistics have been collected using *LexIt* (Lenci 2014), a computational framework to build and explore *distributional profiles* of Italian nouns, verbs and adjectives from corpora. The *LexIt* distributional profiles contain a vast array of statistical information, automatically extracted form corpora with state-of-the-art computational linguistic methods:

- *syntactic slots* (subject, complements, modifiers, etc.) and combinations of slots (*frames*) with which words co-occur. Crucially, *LexIt* distributional profiles do not encode the argument/adjunct distinction. All PPs, irrespectively of their status, are in fact represented with the slot COMP, further distinguished by its preposition (e.g., the PP headed by *a* corresponds in *LexIt* to the slot COMP-*A*). Therefore, both (23a,b) are regarded as instances of the same syntactic frame even if by syntactic tests (e.g., head-dependence and optionality) the PP is an argument in (23a) and an adjunct in (23b):

  (23) a. Gianni è   arrivato al   ristorante.
          John   is arrived   at.the restaurant
          'John arrived at the restarurant.'
       b. Gianni ha mangiato al   ristorante.
          John   has eaten   at.the restaurant
          'John ate at the restaurant.'

- *lexical sets* containing the *fillers* (e.g., the nouns) realizing the syntactic slot. For instance the lexical set of the COMP-*A* slot of *arrivare* 'arrive' contains the nouns *conclusione* 'conclusion', *traguardo* 'goal', *fine* 'end', *destinazione* 'destination', etc.
- *semantic classes* to describe the selectional preferences of the syntactic slots. In *LexIt*, the selectional preferences of a verb have been obtained through an automatic process of inductive generalization from the prototypical lexical fillers of the verb syntactic slots. Specifically, the selectional preferences of a slot *s* are formed by a ranked list of the noun semantic classes (e.g. LOCATION, PERSON, etc.) that best describe the semantic types of the fillers of *s*. Currently, the selectional preferences have been characterized in terms of 24 broad semantic classes, corresponding to the so-called "top nodes" dominating the semantic noun taxonomy in the Italian section of MultiWordNet (Pianta et al. 2002).

The statistical salience of each element in the distributional profile is estimated with Local Mutual Information (LMI):

$$(24) \qquad\qquad \text{LMI} = O^* \log_2 \frac{O}{E}$$

O is the *observed frequency* of a pair of linguistic items co-occurring in the corpus (*La Repubblica* in the present case), and E is its *expected frequency*, i.e. the co-occurrence frequency of the pair that we should expect if the two items were statistically independent. LMI computes the *log*-ratio between the observed and the expected frequency, like the widely used Pointwise Mutual Information (PMI), but then multiplies

it by the observed frequency, to avoid the bias of the latter towards overestimating the significance of low frequency events (Evert 2008).

We use LMI as a quantitative measure of the degree of *head-dependence* of directional PPs, apparently the only reliable criterion for distinguishing the optional path PPs with motion verbs in Italian (cf. Sections 2 and 3). The fact that argument PPs are more head-dependent than adjuncts is assumed to have a distributional correlate in a stronger statistical association of such PPs with verb heads. Being selected by verbs, argument PPs are in fact more strongly "associated" with the predicate than adjuncts. Thus, LMI can be viewed as 'measuring' the degree of dependence between the verb and the preposition it co-occurs with. Abend and Rappoport (2010) also use the highly similar PMI as one of a set of quantitative indexes to distinguish adjuncts from arguments PPs. Similarly, we argue that LMI can be used as a quantitative diagnostics to explore the argument/adjunct opposition, with arguments expected to have a higher LMI with their verb head than adjunct complements. In particular, we apply LMI to measure the association strength between verbs and prepositional slots of Location (Loc) semantic type: for instance, the slot COMP-*A*:LOC, corresponds to the locative PP headed by *a*. The semantic type of PPs is determined with the *LexIt* procedure, as described above. This type of slot is usually regarded as an argument with a verb like *arrivare* 'arrive', but as an adjunct with a verb like *mangiare* 'eat' (cf. (23) above and discussion of diagnostic tests in Section 2.1). Interestingly, the LMI between *arrivare* 'arrive' and COMP-*A*:LOC is 7803.84, while the LMI between *mangiare* 'eat' and COMP-*A*:LOC is 49.9. As we can see, in this case the different status of this slot with the two verbs finds a clear distributional correlate in a strong difference in association strength. The latter can therefore be used to model the different degrees of head-dependence between the slots and the verb head. Our goal here is to apply this diagnostics to the three classes of Italian motion verbs we have selected, in order to explore the different status of locative PPs.

4.1. *Distributional data*

We focus our analysis on the distributional data from two types of locative PPs, headed by the prepositions *a* 'to' and *verso* 'towards', and with the Loc semantic type (corresponding, respectively, to the *LexIt* slots COMP-*A*:LOC, COMP-*VERSO*:LOC), investigated according to auxiliary selection. The data were obtained by extracting only the verb tokens appearing in the corpus with the auxiliaries *essere* 'BE' and *avere* 'HAVE' (a much smaller subset of the whole original data), and by computing the LMI between the locative PPs and the auxiliary-verb pair. For Class 2, this amounts to having separate statistics for the verbs with *essere* 'BE' (e.g., *essere + correre* 'BE + run', and for the same verb with *avere*

'HAVE' (e.g., *avere* + *correre* 'HAVE' + run'). It is thus possible to analyse the dependence of locative PPs on verbs selecting a specific auxiliary, a fact that is particularly interesting for Class 2 verbs (see discussion below).

Table 2, reporting the verbs of our sample ranked by their LMI with the locative *a*-PP with the slot COMP-A, shows a strong tendency for verbs of Class 1 to occur in the highest ranks, thereby revealing the highest degree of association strength (i.e., head-dependence) between verbal heads and the locative *a*-PP. The only exception is exemplified by *partire* 'leave', that lexicalizes the source of motion and shows, therefore, a bias towards source rather than goal PPs. This confirms the strong tendency for verbs expressing directed/result motion to co-occur with the locative *a*-PP, expressing the goal of the motion event. Verbs of Class 3, instead, systematically occur in the lower ranks, showing a low degree of association strength head-dependence with path PPs.

Table 2. LMI ranking of motion verbs by auxiliary selection with *a*-PPs. (A): *avere* 'HAVE, (E): *essere* 'BE'

Verb	Class	LMI	Verb	Class	LMI
andare 'go' (E)	1	3338.07	*sciare* 'ski' (A)	3	5.77
arrivare 'arrive' (E)	1	3022.33	*fluttuare* 'fluctuate' (A)	2	3.856
salire 'rise, go up' (E)	1	852.19	*marciare* 'march' (A)	3	3.67
venire 'come' (E)	1	419.78	*camminare* 'walk' (A)	3	3.55
atterrare 'land' (E)	2	381.53	*volteggiare* 'whirl,' (A)	2	2.09
correre 'run' (E)	2	285.74	*passeggiare* 'stroll' (A)	3	0.37
scendere 'go down' (E)	1	182.55	*strisciare* 'crawl' (A)	3	0.25
fuggire 'run away' (E)	1	121.89	*decollare* 'take off' (E)	2	0.05
scivolare 'slip' (E)	1	39.39	*saltare* 'jump' (A)	2	−4.04
atterrare 'land' (A)	2	22.75	*saltare* 'jump' (E)	2	−9.45
rotolare 'roll' (E)	2	11.56	*correre* 'run' (A)	2	−11.01
danzare 'dance' (A)	3	6.47	*partire* 'leave' (E)	1	−32.55

As for Class 2, comprising verbs alternating the auxiliaries BE and HAVE in compound tenses, there is a clear distinction between the patterns with BE and those with HAVE. In Table 2, Class 2 verbs with a preference for BE in compound tenses appear close to Class 1 verbs in the top ranks, while Class 2 verbs with a preference for HAVE in compound tenses appear close to Class 3 verbs, in the lowest ranks. The only exceptions are *decollare* 'take off' and *saltare*

'jump', whose tendency to occur with PPs denoting directed motion from a source might reflect their inherent lexical properties (i.e., the lexicalization of the source of movement). Thus, these data show that the co-occurrence of path PPs with motion verbs in the corpus strongly correlates with auxiliary choice.

We now move to analyze the distribution of *verso*-PPs. Table 3 reports motion verbs ranked by the LMI values with the COMP-*VERSO*: Loc slot. Here again we notice the tendency for Class 1 verbs to appear in the top ranks, including *partire* 'leave'. However, it is especially noteworthy that Class 2 (*correre* 'run') and Class 3 (*marciare* 'march' and *camminare* 'walk') verbs are interspersed with Class 1 in the highest positions, with *correre* 'run' even appearing at the top (cf. Section 5).

Table 3. LMI ranking of motion verbs by auxiliary selection with *verso*-PPs.

Verb	Class	COMP-*VERSO*	Verb	Class	COMP-*VERSO*
correre 'run'	2	1230.1217	*decollare* 'take off'	2	28.5847
andare 'go'	1	809.5668	*galoppare* 'gallop'	2	25.1563
fuggire 'run away'	1	395.7422	*planare* 'glide'	2	22.7238
marciare 'march'	3	380.1827	*trotterellare* 'trot'	2	12.7569
scivolare 'slip'	1	329.3616	*strisciare* 'crawl'	3	12.2243
scendere 'go down'	1	252.6837	*ondeggiare* 'wave'	2	5.7167
salire 'rise, go up'	1	195.5149	*passeggiare* 'walk'	3	5.5340
camminare 'walk'	3	175.4897	*atterrare* 'land'	2	−0.2169
partire 'leave'	1	123.0239	*saltare* 'jump'	2	−0.6571
veleggiare 'sail'	2	55.7309	*venire* 'come'	1	−14.8472
nuotare 'swim'	3	54.3420	*arrivare* 'arrive'	1	−18.5727
rotolare 'roll'	2	45.7559			

When we focus on the relationship between the *verso*-PP and the auxiliary selected by the verb, we see that there is a strong tendency for this PP to occur with *essere*-verbs. This already emerges from Table 3, where top positions are occupied by the verbs of Class 1, only selecting *essere* 'BE', but it is also confirmed if we zoom on Class 2. The *verso*-PP is not very frequent in the corpus. If we consider the subset of verb tokens appearing with an auxiliary, the frequency of COMP-*A* in *La Repubblica* is 808,557, against only 4,794 of COMP-*VERSO*. Despite the sparse data, the trend that can be observed in Table 4 is quite clear. In fact, the verbs of Class 2 that take the *verso*-PP tend to select *essere* 'BE', rather than *avere* 'HAVE'. The most striking case is represented by *correre* 'run', which is by and large the most frequent

verb of Class 2. There are 78 occurrences of auxiliary + *correre* 'run' co-occurring with *verso*-PPs, and 74 of these (i.e., almost the 95%) appear with *essere* 'BE'. The same pattern exists also with other verbs in Class 2, for which the *verso*-PP never appears with *avere* 'HAVE'. The only exceptions are *veleggiare* 'sail' and *galoppare* 'gallop'. It also worth noticing the general distribution of the verbs of Class 2 with *essere* 'BE' and *avere* 'HAVE', reported in the second and third columns of Table 4.

Table 4. Distribution of auxiliaries with Class 2 motion verbs.

Verb	*essere* 'BE'	*avere* 'HAVE'	*essere*+ COMP-*VERSO*	*avere*+ COMP-*VERSO*
rotolare 'roll'	138	5	2	0
saltare 'jump'	4274	903	1	0
planare 'glide'	48	8	1	0
decollare 'take off'	657	77	9	0
atterrare 'land'	960	61	1	0
correre 'run'	2296	2294	74	4
sgattaiolare 'run away'	4	0	0	0
ondeggiare 'wave'	1	38	0	0
fluttuare 'fluctuate'	2	8	0	0
veleggiare 'sail'	0	30	0	2
volteggiare 'whirl'	2	46	0	0
trotterellare 'trot'	1	9	0	0
galoppare 'gallop'	1	51	0	2

The interesting fact shown by Table 4 is the non-homogenous nature of Class 2 with regard to auxiliary selection preferences. This class, in fact, appears to be split into two subclasses. On the one hand, we find the subset of verbs like *rotolare* 'roll', planare 'glide', *decollare* 'take off', *atterrare* 'land', *correre* 'run' and *sgattaiolare* 'run away', that tend to occur mostly with *essere* 'BE'. On the other hand, there is a second subset, comprising *ondeggiare* 'wave', *fluttuare* 'fluctuate', *veleggiare* 'sail', *volteggiare* 'whirl', *trotterellare* 'trot' and *galoppare* 'gallop', that instead tend to occur mostly with *avere* 'HAVE'. The verb *correre* 'run' seems to be almost equally split between *avere* 'HAVE' and *essere* 'BE', but we must take into account the fact that *correre* 'run' has also transitive uses (cf. *Gianni has corso un grande rischio* 'John has run a great risk'), which select *avere* 'HAVE'. Once we exclude the 915 transitive occurrences of these verbs, we see that more than 62% of the occurrences of *correre* 'run' with an auxiliary are with *essere* 'BE'.

4.2. *Interim summary*

As illustrated in 4.1, Class 1 verbs show a fairly uniform behaviour with both types of locative/directional PPs investigated in the corpus. We take the high LMI values of such PPs with these verbs as a sign of the high degree of head-dependence of path PPs, the main (and often the only) criterion identifying the argument or adjunct function of the optional path PPs with Italian motion verbs. The distributional behaviour of Class 2 verbs resembles the one of Class 1, but only when they select the auxiliary *essere* 'BE'. In general, Class 3 verbs behave the opposite of Class 1 verbs. However, *camminare* 'walk', *nuotare* 'swim' and *marciare* 'march' pattern like directional verbs with respect to *verso*-PPs, as shown by their high values of LMI in Table 3. Class 3 too is indeed non-homogenous. There are verbs like *danzare* and *ballare* 'dance', that are totally resistant to any co-occurrence with both *a*-PP and *verso*-PPs (being only marginally attested with the latter), but also verbs like *camminare* 'walk', *nuotare* 'swim' and *marciare* 'march', that co-occur with *verso*-PPs much more frequently.

5. **Italian verbs of motion: arguments, adjuncts, distributional data and the notion of scalar change**

As discussed in Sections 3 and 4, syntactico-semantic diagnostics and distributional corpus-derived quantitative data jointly suggest that the argument(-like) and adjunct(-like) status of optional locative PPs with Italian motion verbs reflects the aspectual and thematic characteristics of the subclasses of verbs they co-occur with, as well as the nature of the prepositions heading the optional PPs.

In this section, we show that they can be insightfully accounted for within a scalar approach to the aspectual properties encoded in verb meaning, following proposals by Beavers (2008b), (2013), Rappaport Hovav and Levin (2010), Rappaport Hovav (2008, 2014)[12] Under this perspective dynamic verbs can be viewed as (potentially) involving the notion of change (Dowty 1979), and can be classified accordingly, in relation to the type of change, as scalar/non-scalar change verbs. A scalar change in an entity involves a change in the value of an attribute in a particular direction along the scale, with the direction specified by the ordering relation. A scale is a set of ordered values for an attribute; not all verbs lexicalize a scale. The change lexicalized by activities such as *jog, run, waltz* is non-scalar (i.e., it involves a complex, unordered change) (Rappaport Hovav 2008, 2012). The change lexicalized by change of state verbs (e.g., *die, break*) and verbs of directed motion (e.g., *arrive, come, ascend*) is scalar. It specifies "ordered change(s) in the values of an attribute/property" (e.g., warmth for change

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[12] For recent work on the application of the notion of scalar change to the typology of motion verbs see Beavers and Koontz-Garboden (2017).

of state verbs such as *warm and cool*, being at a location along a path, with respect to a reference object, i.e., a location, for directed motion verbs, such as *go, arrive, rise*). Verbs which lexically specify a scalar change, may be further distinguished, in relation to the nature of the scale, as associated with a binary, two-point scale (e.g., *die*, *break*, *arrive, enter*), or a polar, multi-point scale (e.g., *ascend, rise, come, go*, etc.) (Beavers 2008b, Rappaport Hovav 2014). Thus, the following classification has been proposed (Rappaport Hovav 2008, 2014), implementing the Vendler/ Dowty system with the notion of scalar change: states (*resemble, have, know, stay, sit*), encoding no change; achievements, encoding a two-point scalar change (e.g., *crack, arrive, exit*); accomplishments (e.g., *open, swell, rise, ascend, come*), encoding a multi-point scalar change; activities, encoding a non-scalar change (Beavers 2008b 2013, Rappaport Hovav 2008, 2014, also Rappaport Hovav & Levin 2010).

The scale of change lexicalized by verbs of directed motion involves displacement of an entity along a path. Motion verbs can be classified accordingly, depending on their degree of lexicalization of the path scale (i.e., of the direction of motion) and on its boundedness/unboundedness, Verbs such as *ascend, rise, fall* fully lexicalize the direction of motion: they denote 'traversals of a path whose points are ordered in relation to the direction of gravity', i.e., motion along a vertical axis (Rappaport Hovav & Levin 2010:29–30). The direction of motion instead is not fully lexicalized with deictic verbs like *come, go*, which denote motion towards or away from a 'deictic centre', which is often determined by context. Also verbs such as *arrive, depart, enter* do not fully lexicalize the direction of motion: the various points on the path scale they lexicalize, in fact, are determined with respect to a reference object, i.e., a particular location (source or goal of motion) (see further discussion in Rappaport Hovav & Levin 2010, Levin & Rappaport Hovav 2011, Rappaport Hovav 2014).

The notion of scalar change, in particular the distinction between a two-point and a multi-point scalar change, together with the idea that the different morphosyntactic behaviour of a verb may reflect the different meaning components lexicalized in its various uses, seem to offer an interesting generalization for capturing the adjunct vs. argument status of locative/directional PPs with motion verbs in Italian. Adopting a scalar change perspective on the difference between manner and result verbs (Beavers 2008b, Rappaport Hovav 2008, Rappaport Hovav & Levin 2010), we can argue that a major distinction exists in Italian verbs of motion between verbs lexicalizing a scalar change (i.e., an ordered change on a path), such as *partire* 'leave', *arrivare* 'arrive', *salire* 'rise', and verbs lexicalizing a non-scalar change, i.e., verbs involving a pattern of movement that does not represent changes in a particular direction along a path (i.e., different positions along a path), such as *danzare* 'dance'.

With verbs lexicalizing a two-point scalar change (i.e., achievements in Class 1) the optional PP is an argument. With verbs which lexicalize a

non-scalar change (i.e., activities in Class 3, such as *passeggiare* 'stroll', *camminare* 'walk', *nuotare* 'swim', etc.) the optional PP is an adjunct:[13]

(25) Marco ha camminato fino a riva.
     Mark has walked   as-far-as shore
     'Marco waked to the shore.'

With motion verbs lexicalizing a multi-point scalar change (i.e., accomplishments), either in all their uses (as with some Class 1 verbs) or only in some uses, as with activity verbs with an accomplishments use, i.e., a subset of Class 2 verbs (e.g., *saltare* 'jump', *saltellare* 'hop', *trotterellare* 'trot, toddle', *correre* 'run'), the optional PP has an argument status, despite the contrasting results of diagnostic tests (e.g., headedness and optionality/null instantiation), pointing to an intermediate status of these phrases. Thus, in (26a), the non-scalar change (i.e., activity) use of the verb *saltare* 'jump', the PP behaves like an adjunct: it is omissible, it can be headed by a wide range of prepositions and the verb occurs with the perfective auxiliary *avere* 'HAVE', as with non-scalar change verbs (i.e., activities). In contrast, in (26b) the PP shows features of both arguments and adjuncts: it cannot be omitted, it is headed by a fixed and narrow range of prepositions, and the presence of a path component, lacking in (26a) and characteristic of the accomplishment use of activity verbs, is signalled by the selection of *essere* 'BE' in compound tenses:

(26) a. Marco ha saltato (fino al/   nel/ verso   il fosso).
        Mark has jumped as-far-as-the/ into/ towards the ditch
        'Marco jumped as far as the ditch.'
     b. Marco è saltato *(nel   fosso/sul letto/* verso/*
        Mark is jumped onto-the ditch/ bed/* towards/
           fino al   fosso/ letto).
           as far as the ditch/ bed)
        'Marked jumped onto the ditch/bed.'

The optional path PPs of a subset of directed motion verbs, i.e., class 1 (e.g., *venire* 'come', *andare* 'go', *salire* 'ascend, rise' *cadere* 'fall'), realized by different types of accomplishments, and a subset of manner of motion verbs, i.e., Class 2, comprising the accomplishment uses of activity verbs (e.g., *correre* 'run', *saltare* 'jump', etc.) behave alike in relation to two syntactic tests, head-dependence and optionality/null instantiation. These

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[13] As pointed out by an anonymous reviewer, translational motion verbs like *camminare* 'walk' or *passeggiare* 'stroll' have a path as part of their lexical semantic content (cf. Krifka 1998). If paths are scales then these verbs should be regarded as scalar too. However, a path constitutes a scale only if the various points on the spatial dimension are ordered (in relation to a reference object). Verbs such as *camminare* 'walk', *passeggiare* 'stroll' do not encode a scale, i.e., the path of motion. The change that they encode is 'unordered' (cf. Rappaport Hovav 2014: 273–274), unlike with scalar change verbs like *arrivare* 'arrive' or *partire* 'leave', which lexicalize a scale, i.e., a path, consisting of a set of ordered points along the path of motion.

verbs co-occur with a fixed but wider range of prepositional heads than achievements, which show instead a fixed and narrow range of prepositional heads for the optional path PPs.

The question is how to characterize those PPs that appear to lie in the grey area between full-fledged arguments and true modifiers of the eventuality described by the verb. A first hypothesis is that these PPs are instances of a truly intermediate grammatical construct, argument-adjuncts, added path arguments, subcategorized adjuncts, etc. (Grimshaw 1990, Van Valin & La Polla 1997:159, Kay 2005, inter alia). Another possibility is to keep the argument vs. adjunct opposition binary and to account for the gradient status of locative PPs at the lexical semantic level, as we propose in this study.

More specifically, we argue that the optional PP is an argument with verbs lexicalizing a two-point scalar change (i.e., achievements), i.e., Class 1, and with verbs lexicalizing a multi-point scalar verbs (i.e., accomplishments), either in all their uses (as in Class 1) or in the accomplishment use of activity verbs (as in a subset of Class 2). With verbs lexicalizing a non-scalar change (i.e., activities), instead, the optional PP is an adjunct. Thus, the notion of scalar change proves to be a useful tool for modelling the argument/adjunct distinction: locative PPs referring to the scalar change component entailed by a verb (either its endpoint or its direction) have argument status, otherwise they are adjuncts. As we have seen in 4.2, this claim has a distributional correlate in the differences in the association strength (i.e., head-dependence) of optional locative PPs with one-argument motion verbs.

6. Conclusions

The study of the extent and the limits of the variation encountered in the argument/adjunct space in the domain of Italian motion verbs has revealed the existence of three subtypes of motion verbs, (i) verbs lexicalizing the direction and/or the result of motion (Class 1), (ii) manner of motion verbs allowing aspectual reclassification, from activity to accomplishment uses (a subset of Class 2, alternating the auxiliaries HAVE/BE in compound tenses), (iii) manner of motion verbs with no aspectual reclassification.

There appears to be a correlation between the degree of aspectual specification of the verb/predicate and the status of the PP phrases (optionally) co-occurring with them, which can be insightfully accounted for within a scale-based classification of the inherent temporal properties of verbs: the optional locative PP of motion verbs in Italian is an argument with verbs lexicalizing scalar changes, whilst it is an adjunct with non-scalar changes, regardless of the contrasting results provided by the application of diagnostic tests.

This generalization seems to overcome the problem of the structuring of the intermediate points within the argument-adjunct continuum, with different types of dependents being identifiable, only some of which appear

to fall under the various intermediate categories usually recognized in the literature to account for constituents that appear to be predicates in their own right while at the same time related to the verbal head.

Finally, the co-occurrence statistics of verbs with locative phrases (from a large corpus of written Italian) hints at interesting distributional correlates (to be further investigated) of the proposed analysis, also providing distributional statistical evidence for the existence of two subclasses of manner of motion verbs alternating BE/HAVE in compound tenses.

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Michela Cennamo
Department of (Arts &) Humanities
University of Naples "Federico II"
Via Porta di Massa 1
I-80133 NAPLES
Italy
micennam@unina.it

Alessandro Lenci
Computational Linguistics Laboratory
Department of Philology, Literature, and Linguistics
Università di Pisa
Via Santa Maria 36
I-56126 PISA
Italy
alessandro.lenci@unipi.it