

Michela Cennamo & Alessandro Lenci
 (University of Naples Federico II - University of Pisa)
 (micennam@unina.it - alessandro.lenci@ling.unipi.it)

Gradience in subcategorization? Locative phrases with Italian verbs of motion

Explorations in Syntactic Government and Subcategorization

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1. Introduction

- Discussion of one aspect of government, the *relationship between a (verbal) head and its dependent(s), with reference to the argument-adjunct status of the locative phrase optionally co-occurring with verbs of motion in Italian*, both bounded, i.e., directed motion – e.g., *andare* 'to go', *arrivare* 'to arrive', *venire* 'to come' – and unbounded, i.e., manner of motion – e.g., *nuotare* 'to swim', *galleggiare* 'to float', *rotolare* 'to roll', *correre* 'to run'.
- *Investigation of the interplay of syntactic criteria* (e.g., obligatoriness, latency (Matthews 1981)/Definite Null Instantiation (Fillmore & Kay 1993 in Croft 2001: 276-277), different order constraints) *with semantic parameters*: (i) the *degree of lexicalization of the direction of movement* in the verbal roots, (ii) the *event structure template of predicates*, (iii) the *inherent and relational characteristics of the subject*, (iv) the *semantics of the preposition(s)* (Beavers et al. 2010, Iacobini forthc., Levin et al. 2009, int. al.).

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 longstanding *point of controversy in grammatical theory* (see Croft 2001, Van Valin 2001, Dowty 2003, Kay 2005, Mereu 2010, int. al. and references therein) and *has also been widely investigated in Natural Language Processing*, in relation to *prepositional phrase (PP) attachment* (i.e., the task of ascertaining whether a PP which immediately follows an NP attaches to the latter or to the preceding verb), *semantic role labeling (SRL)* and *subcategorization acquisition* (see Schütze 1995, Schütze & Gibson 1999, Abend & Rappoport 2010, int. al.).
- *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 verb. They describe instead the temporal, spatial or manner settings or circumstances in which the situation described by the verb takes place, and are, therefore, optional. Thus they modify the meaning of the described event, rather than realizing one of its participants.
- Not all optional dependents (NPs or PPs) are adjuncts.
- The distinction, therefore, can be better accounted for if viewed as a *semantic gradient with corresponding categorical syntactic distinctions*, characterized by the *interplay 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) (Croft 2001: 272-273, Van Valin 2001: 92-96).
- Ultimately, the distinction reflects the theoretical perspective adopted (Van Valin 2001: 95).
- 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 in (1a-b), where the prepositional phrase (*on the shelf/at home*) is an argument in (1a-2a) and an adjunct in (1b-2b).

(1) a. *John put the book on the shelf*

b. *John saw the book on the shelf*

c. *John located the book on the shelf*

(2) a. *John stayed at home last night*

b. *John slept at home last night*

- The distinction is less clear-cut and more difficult to draw for optional dependents, as in (3a-b):

(3) a. *John went (home)*

b. *John ran (home)*

The omission of the directional phrase in (3a) is only possible if its referent is known to the interlocutor/hearer (Definite Null instantiation (Croft 2001: 272), unlike in (3b), where the goal of motion, *home*, can be freely omitted, without altering the grammaticality of the clause.

- A dependent may be regarded as an argument in one theory and as an adjunct in a different theory, with theory internal distinctions and differences (e.g., *argument-adjuncts* in Grimshaw (1990: 108-109) and Role and Reference Grammar, although with a different interpretation/status (Van Valin & La Polla 1997: 159), *added (path-)arguments* in Construction Grammar (Kay 2005), *subcategorized adjuncts* in Categorical Grammar (Dowty 2003) (see also Abend & Rappoport 2010, Mereu 2010, int. al.).

- Generally all theories recognize the existence of intermediate points on the argument-adjunct continuum, generally subsumed under the notions of argument-adjunct, added argument or subcategorized adjunct, depending on the theory:
 - *Argument-adjunct PPs* (RRG): the preposition (e.g., *to* in (3c)) is a predicate in its own right, and selects an argument (*store* in (3c)), while also sharing an argument with the logical structure of the verb (*Paul*)(Van Valin & La Polla 1997: 159-162):
 - (3) c. *Paul ran to the store*
 - *Subcategorized adjunct* (Dowty 2003, int. al.): an adjunct that in some contexts behaves like a complement (e.g., *over the square* in (3d)):
 - (3) d. *The campanile towers over the square* (> **The campanile towers*)
 - *Added (path) argument* (Kay 2005): a PP that is not part of the minimal valence of the verb and yet it behaves like an argument (e.g., it cannot be fronted) (3e):
 - (3) e. *The top was spinning off the table* (> **off the table, the top was spinning*) (Kay 2005).
- *Obligatoriness* is not a totally reliable criterion: there are syntactically obligatory elements such as expletives which have no corresponding semantic function (4) (Kay 2005: 13):
 - (4) *It often rains in August*
- *Optionality* too is not always a good test for adjunctood: *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 is semantically implied with the verbs *go* and *arrive* and cannot be fronted, like for 'true' arguments:
 - (4) b. *John arrived at the station*
 - c. *John arrived home/went home*
 - d. **home John arrived/went/at the station John arrived*
- *Point*: some obligatory dependents cannot be regarded as arguments, and, conversely, optional dependents may appear to be arguments, both syntactically and semantically (Van Valin 2001: 93-95; Kay 2005: 13-14, int. al.).
- 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) has argued in favour of a "dual analysis of every complement as an adjunct, and ... of any adjunct as a complement".

- The status of one and the same dependent varies according to the head it co-occurs with. For instance a directional phrase is an adjunct/argument-adjunct with some predicates, as in (5b), where the PP is freely omitted, and an argument with other predicates, as in (5a) (so-called definite null instantiation):

- (5) a. *Mark went to the park/home after work*
- b. *Mark ran to the park/home after work*

2.1 Diagnostic tests (Schütze 1995, Merlo & Esteve Ferrer 2006: 344-349, Abend & Rappoport 2010, int.al.)

2.1.1 Head-dependence

- Arguments occur with a narrower/fixed range of heads than adjuncts (Schütze 1995: 102, Schütze & Gibson 1999: 426-428, Dowty 2003, Kay 2005, Merlo & Esteve Ferrer 2006: 346):

- (6) a. *Mark put the book on/under/behind/*at/*onto the table*
- b. *John died from pneumonia/*of pneumonia*
- c. *John informed (*surprised/*hit/*admired them) of the danger*

2.1.2 Optionality

- Arguments are obligatory dependents of a verb, while adjuncts are optional, since they do not contribute to the semantics of the verb, as illustrated in (7) (Schütze 1995: 101-102, Schütze & Gibson 1999: 426):

- (7) 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*

2.1.3 Iterativity

- Modifier phrases can iterate, whilst argument phrases cannot (Schütze 1995: 102, Schütze & Gibson 1999: 426):

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

2.1.4 Ordering

- Arguments generally precede modifiers, whilst modifiers may follow other modifiers and arguments may follow other arguments (Schütze 1995: 107, Schütze & Gibson 1999: 426):

- (9) a. *John saw the fire brigade three times on Sunday*
- b. **John gave to Mary a lift three times on Sunday*

c. **John gave a lift three times on Sunday to Mary*

2.1.5 Fronting

- (Adpositional) Arguments cannot be moved freely in a clause, for instance they cannot be fronted, unlike adjuncts, as in (10) (Van Valin 2001: 94):

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

2.1.6 Pro-form replacement (e.g., the *do so* test)

- Arguments can be replaced by a pro-form such as *do so* for verbs, unlike adjuncts, as in (11) (Schütze & Gibson 1999: 427):

- (11) a. *John put a book on the shelf and Mary did so*
 b. **John put a book on the shelf and Mary did so on the shelf*
 c. *John filled out the form in pen, and Mary did so in pencil*

2.1.7 Null Instantiation

- 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 Instantiations* are recognized in the literature, depending on the pragmatic status of the referent of the unexpressed argument/dependent: (i) *Free Null Instantiation* (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* (the referent's identity is indefinite, e.g., unknown), as in *He ate*, (iii) *Definite Null Instantiation* (corresponding to Matthews' notion of latency (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).

3. (Adpositional) Arguments and adjuncts in Italian

- In Italian two syntactic tests differentiate argument prepositional phrases from adjuncts: (i) fronting and (ii) variation in the number and type of adposition(s), i.e., head-dependence) (Cennamo forthc).

- The fronting of PPs, in fact, is possible with adjuncts, but not with arguments, as in (12a-c) and (13a-b), (14a-b). In addition, the range of prepositions in (12a) shows that they are not selected by the verb, unlike the preposition *per* with the verb *partire* 'leave' in (13a), which is to be contrasted with (13d), where the prepositions *per* 'to', *su* 'on', head an adjunct PP/dependent, unlike *di* 'of' in (14a), which heads an argument PP, as also shown by the impossibility of fronting (14b):

(12) a. *Ieri ho visto Marco a Roma/in treno/sul treno*
 yesterday I.have seen.PP.M.SG Mark at Rome/in 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*

(13) a. *(Ieri) sono partito per Roma/*a - *in Roma*

- b. **(Ieri) per Roma sono partito*
 c. *Marco dorme male sul divano/in cucina/per terra*
 d. *Sul divano/in cucina/per terra dorme male Marco/Marco dorme male*

(14) a. *Carlo parlò di politica tutta la sera*

- b. **di politica Carlo parlò tutta la sera*

- The possibility of occurring as a core argument (subject) in a related transitive pattern, as in (15), helps one to detect the argument status of an instrumental adpositional phrase, as shown by the ungrammaticality of (15d), to be contrasted with the grammaticality of (15b) (Levin 1993: 81, Van Valin 2001: 94, Cennamo forthc):

(15) a. *Marco ruppe la finestra con un sasso*

Mark broke the window with a rock
 'Mark broke the window with a rock'

b. *Un sasso ruppe la finestra*

a rock broke the window
 'A rock broke the window'

c. *Marco mangiò la pasta con le mani*

Mark ate the pasta with the hands
 'Mark ate pasta with his hands'

d. **le mani mangiarono la pasta*

the hands ate the pasta

4. Arguments, adjuncts and verbs of motion in Italian

- Three subclasses of one-argument verbs of motion in Italian, reflecting the degree of lexicalization of the path of movement in the verbal root, the event structure template of predicates, inherent and relational properties of the subject (e.g., animacy and agentivity), as well as the semantics of the preposition(s) heading the optional PPs:
 - (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') (comprising achievements and different types of accomplishments);
 - (ii) *manner of motion verbs with optional expression of the direction/result of motion and ensuing aspectual reclassification* (i.e., activity verbs allowing an accomplishment use) (*rotolare* 'roll', *saltare* 'jump', *planare* 'glide', *decollare* 'take off', *atterrare* 'land', *ondeggiare* 'wave', *fluttuare* 'fluctuate', *veleggiare* 'sail', *troterellare* 'toddle, trot', *galoppare* 'gallop');
 - (iii) *manner of motion verbs allowing the overt expression of the direction of motion and marginally result* (although only with complex prepositions and varying degree of acceptability (e.g., **Marco incedeva fino a casa* (lit.) 'Mark proceeded as far as home' vs. *Marco incedeva verso casa* (lit.) 'Mark proceeded towards home') (e.g., *fino a* 'as far as') (*marciare* 'march', *danzare*, *ballare* 'dance', *camminare* 'walk', *passaggiare* 'stroll', *nuotare* 'swim', *sciare* 'ski', *incedere* 'proceed, advance', *marciare* 'march', *strisciare* 'crawl, creep', *zoppicare* 'limp') (i.e., activity verbs).
- No syntactic test fully detects the argument-like or adjunct-like status of the path PP optionally occurring with these verbs, their application often giving odd/contrasting results.
- Only *head-dependence seems to provide hints* as to the argument-adjunct status of the optional PPs, *pointing to a correlation between the degree of telicity of a verb/predicate and the status of the path PPs collocating with them.*

4.1 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', *venire* 'come', *andare* 'go', *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 (16), as well as verbs which lexicalize a deictic direction, such as *venire* 'come', *andare* 'go', which also allow non-telic uses (17-b) vs (17c-d), exemplifying telic uses of these verbs with result motion phrases:

(16) a. *Marco salì/scese lungo il pendio/verso casa* (unbounded)

Mark went-up/went-down along the slope/towards 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'

(17) a. *Marco è venuto verso casa/verso me*

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*

Mark is gone to-the colleagues/to Rome
'Mark went to his colleagues/to Rome'

- *Entrare* 'enter', *cadere* 'fall', only take bounded path PPs, not unbounded ones (18):

(18) a. *Marco entrò in casa/dentro casa a casa/*verso casa*

Mark entered in house/into house/to house/ towards house
'Mark entered his house/*towards his house'

b. *Marco cadde a casa/in casa/dentro casa/dietro/giù/*verso casa. Argument-adjunct?*

'Mark fell at home/in home/inside home/behind/down/*towards home
'Mark fell at his home'

- Achievements (e.g., *partire* 'leave', *arrivare* 'arrive') only allow bounded path PPs:

(19) a. *Marco è partito per Roma*

Mark is left for Rome
'Mark left for Rome'

b. *Marco è arrivato a Parigi*

Mark is arrived at Paris
'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'

- Achievements have a fixed and narrow range of prepositions heading the PP, unlike accomplishments. Thus the prepositions *per*, *a*, *da* in (18a-d) appear to be selected by the verbs only. *Head-dependence* seems to differentiate the optional path PPs, both bounded and unbounded, of accomplishments, from the optional PPs with achievements and seems to be a better test for identifying the argument-adjunct-like status of the path PPs occurring with these verbs.
- In point of fact, *optionality* may give odd/contrasting results, as in (20), where the obligatoriness/optionality of the directional phrase appears to reflect the animacy of the subject, rather than stemming from the predicate:

(20) 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'

- 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 (21a-b):

(21) a. ? *Marco parti* vs. a' *Marco è partito*
Mark left Mark is left
'Mark left' 'Mark has left'

b. *Marco parti improvvisamente*
Mark left suddenly
'Mark suddenly left'

- Even when the subject is inanimate the pattern without the path phrase is possible if there is an adverbial elaborator, e.g., a temporal adjunct (21c):

(21) c. *La scossa/il rumore arrivò/è arrivato improvvisamente*
the quake/the noise arrived/is arrived suddenly
'The earthquake/the noise arrived/has arrived suddenly'

- *Point*: this subclass of motion verbs comprises (inherently) telic and/or punctual verbs, i.e., *different types of accomplishments and achievements*. They lexicalize either bounded or unbounded path, 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 directional/result PPs is, however, obligatory (i.e., no null instantiation is possible) when the subject is inanimate, unless there occurs an adverbial elaborator, e.g., a temporal or manner adjunct.

4.2 Manner of motion verbs allowing aspectual reclassification (i.e., active accomplishments)

- This class comprises manner of motion verbs, taking the auxiliary *avere* 'HAVE' (with the past participle occurring in the unmarked masculine singular form) and allowing the overt expression of the path/result location (e.g., *ondeggiare* 'wave', *trotterellare* 'toddle', *saltare* 'jump', *rotolare* 'roll', *volteggiare* 'whirl, hover', *correre* 'run', *atterrare* 'land', *planare* 'glide', *decollare* 'take off', *fluttuare* 'fluctuate', *veleggiare* 'sail'). When a path PP is expressed, in compound tenses the auxiliary selected is BE, a reflex of the aspectual reclassification of the verb, from activity to accomplishment, as illustrated in (22):

(22) a. *Marco ha corso (nel parco)/*a casa (per un'ora)* (Free null instantiation)
Mark has run in-the park/*to home for an-hour
'Mark has run in the park/*home for an hour'

b. *Marco è corso (nel parco/a casa) (subito)* (Definite null instantiation)
Mark is run in-the park/to home (immediately)

c. *la palla ha rotolato (nel buco)* (location)
the ball has rolled in-the hole
'The ball rolled in the hole'

d. *la palla è rotolata nel buco* (result location)
the ball is rolled into-the hole
'The ball rolled into the hole'

e. *la palla è (ha rotolato?) rotolata lungo il pendio* (direction)
the ball is (has rolled?)/rolled along the slope
'The ball rolled along the slope'

- These verbs allow free omission of the locative/directional/result PP in simple tenses. In compound tenses when the auxiliary selected is BE and the subject is animate, the omitted path PP must be inferable/known to the hearer/interlocutor (definite null instantiation), as also illustrated in (22b) vs (22a).

4.3 Manner of motion verbs with no aspectual reclassification (activities)

- This class comprises activity verbs, with varying degrees of acceptability of PPs expressing the location/path/result location of the verbal, and always selecting the auxiliary *avere* 'HAVE' in compound tenses (23a-b):

(23) a. *Marco ha passeggiato nel bosco lungo il fiume* (location)

Mark has strolled in-the wood/along the river

'Mark strolled in the wood/along the river'

b. *??*Marco ha passeggiato verso il fiume* (direction)

Mark has strolled towards the river

'Mark strolled towards the river'

c. **Marco ha passeggiato fino a casa* (result location)

Mark has strolled as-far-as home

'Marked strolled home'

(24) a. *Marco ha nuotato nel lago* (location)

Mark has swum in-the lake

'Mark swam in the lake'

b. *Marco ha nuotato verso riva* (direction)

Mark has swum toward shore

'Mark swam toward the shore'

c. *Marco ha nuotato fino a riva* (result location)

Mark has swum as-far-as shore

'Mark swam ashore'

- The PPs, however, are not selected by the verb. They appear to be adjuncts: they modify the eventuality described by the verb, providing a spatial setting. They are headed by a wide range of prepositions, that have a very loose relation with the lexical head, the verb. Also for these verbs head-dependence seems to be the only syntactic test detecting the adjunct-like nature of the PP optionally co-occurring with them.

4.5 Interim summary

- With achievements and accomplishments (e.g., *partire, andare, salire*) PPs show argument-like properties, as revealed by the tests of head-dependence (and marginally) null instantiation. With active accomplishments the optional PPs seem to behave like argument-adjuncts, with the prepositional head being a predicate in its own right while sharing an argument with the verb, as with *correre* 'run' in *Marco corse/è corso a casa* 'Mark ran home'. 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 the notion of scalar change

- The relationship between the argument/adjunct-like nature of PPs and the degree of telicity of the verb/predicate with one-argument motion verbs can be insightfully accounted for within a scalar approach to the aspectual properties encoded in verb meaning, following recent work by Beavers 2008, Rappaport Hovv 2008, Rappaport Hovav & Levin 2010)

4.1. A scale-based classification of verbs

- Following a recent proposal concerning the classification of verbs on the basis of their aspectually relevant lexical properties (Beavers 2008, Rappaport Hovav 2008), 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 value of an attribute in a particular direction along the scale, with the direction specified by the ordering relation.
- The change lexicalized by activities such as *jog, run, waltz* is nonscalar (i.e., it involves a complex, unordered change) (Rappaport Hovav 2008).
- 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 of state verbs such as *warm and cool*, being at a location along a path, with respect to a reference object 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 2008)
- A scale is a set of ordered values for an attribute. Not all verbs lexicalize a scale.

Thus:

- *Nonscalar changes*: activities (i.e., manner verbs) (*play, jog, etc.*).
- *Scalar change verbs*:
 - *two-point scale verbs* (*die, break, arrive, enter*): telic and punctual (achievements)
 - *multi-point scale verbs*, different types of accomplishments (*widen, increase, ascend, come*)
- *Verb classification proposed* (Rappaport Hovav 2008):
- States (*resemble, have, know, stay, sit*) encode no change; achievements encode a two-point scalar change (e.g., *crack, arrive, exit*); accomplishments (e.g., *open, swell, rise, ascend, come*), encode a multi-point scalar change; activities encode a non-scalar change (Beavers 2008, Rappaport Hovav 2008).

4.2. Verbs of directed motion and lexicalization of the path scale

- Different subtypes, according to the degree of lexicalization of the scale of path which they encode 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 (Levin & Rappaport Hovav 2010). The direction of motion instead is not fully lexicalized with deictic verbs *come, go*, with which it is specified by 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 (see further discussion in Rappaport Hovav & Levin 2010, Levin & Rappaport Hovav 2011).

4.2. Relevance of a scale-based verb classification for Italian verbs of motion

- 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-like/argument-like status of locative/directional PPs with motion verbs in Italian.
- Adopting a scalar change perspective on the difference between manner and result verbs (Beavers 2008, Rappaport Hovav 2008, Rappaport Hovav & Levin 2009), we can argue that a major distinction exists in Italian verbs of motion between verbs lexicalizing a scalar change, i.e., an ordered change along 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) the optional PP is an argument. With 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., class 2 verbs (e.g., *saltare* 'jump', *saltellare* 'hop', *trotterellare* 'trot, toddle', *correre* 'run'), the optional PP is an argument-adjunct. With verbs which lexicalize a non-scalar change (e.g., *passeggiare* 'stroll', *camminare* 'walk', *nuotare* 'swim') the optional PP is an adjunct. Thus, in (24a) the PP is an adjunct, it contributes to the meaning of the whole predicate. In (24b) the PP is an argument-adjunct: the preposition *su* 'on(to)' is a predicate, but it is also related to the verb, sharing an argument with it, *Marco*. The presence of a path component in the accomplishment use of activity verbs is signalled by the selection of BE in compound tenses.

(24) a. *Marco ha camminato fino a riva/ha saltato fino al fosso*

Mark has walked as-far-as shore/has jumped as-far-as-the ditch

'Marco walked to the shore/jumped as far as the ditch'

b. *Marco è saltato sul letto*

Mark is jumped onto-the bed

'Marked jumped onto the bed'

- *Point*:
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', ...) behave alike in relation to two syntactic tests, head-dependence and null instantiation. These 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.
- *Question*:
Is the label 'argument-adjunct' fully appropriate for denoting these types of dependents in the grey area between full-fledged arguments and true modifiers of the eventuality described by the verb?

5. Argumenthood and path PPs with Italian verbs of motion: a usage-based approach

- Investigation of the distributional correlates of the hypothesis we have put forward, whereby the argument-adjunct status of PPs with verbs of motion in Italian seems to correlate with the degree of aspectual specification of the verb, conceived in terms of a scalar approach.
- Focus on the verb – PPs co-occurrence statistics in order to achieve a quantitative characterization of the adjunct/argument distinction, viewed as a gradient notion, with opposite poles where the distinction is clear-cut and intermediate points where the distinction is blurred.
- Corpus-based analysis of a sample of 31 Italian verbs of motion, belonging to the three classes of motion verbs, identified on the basis of their morphosyntactic behaviour:
 - *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)
- Analysis of the co-occurrence of each verb with different types of path PPs in *La Repubblica Corpus*, one of the largest corpora available for Italian, consisting of about 331 million tokens and based entirely on newspaper texts.
 - As a quantitative measure of the *degree of head-dependence of path PPs*, apparently the only reliable criterion for distinguishing the optional path PPs with motion verbs in Italian, we used Local Mutual Information (LMI), a statistical association measure derived from verb-PP co-occurrence frequency (Evert 2008).
 - *Assumption*: Distributional correlation between the fixed/narrow range of prepositional heads for arguments and their stronger statistical association with verbal heads, which therefore 'measures' the degree of cohesion/togetherness between the verb and the preposition it co-occurs with.

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

Table 1 – The sample verbs, their classes, and their frequency in *La Repubblica*

5.1 Some distributional data

- Analysis of co-occurrence statistics verb-PPs with verbs of motion for two types of locative PPs, headed by the prepositions *a* 'to', *da* 'from', indicating the goal and source of motion, respectively, investigated according to auxiliary selection.
- *Results*: Strong tendency for verbs of class 1 and class 2 (selecting BE) to occur in the highest ranks, while verbs of class 3 occur in the lower ranks, showing a low degree of association with path PPs.

- The non-homogenous aspectual nature of verbs of class 2 is brought out by distributional data, which point to the existence of two subsets within this class of verbs (consisting of activity verbs allowing accomplishment uses and ensuing selection of auxiliary BE, *essere*):
 1. BE '(E)ssere' verbs: *rotolare* 'roll', *saltare* 'jump', *planare* 'glide', *decollare* 'take off', *atterrare* 'land', *correre* 'run' and *sgattaiolare* 'run away' mostly tend to occur with BE.
 2. HAVE '(A)vere' verbs (also when co-occurring with path PPs): *ondeggiare* 'wave', *fluttuare* 'fluctuate', *veleggiare* 'sail', *volteggiare* 'whirl (about), hover (round)', *trotterellare* 'toddle, trot', *galoppare* 'gallop'.

verb	class	COMP-A:LOC	verb	class	COMP-A:LOC
<i>andare</i> 'go' (E)	1	3338.0674	<i>sciare</i> 'ski' (A)	3	5.7714
<i>earrivare</i> 'arrive' (E)	1	3022.3284	<i>fluttuare</i> 'fluctuate' (A)	2	3.8581
<i>esalire</i> 'rise, go up' (E)	1	852.1909	<i>marciare</i> 'march' (A)	3	3.6746
<i>evenire</i> 'come' (E)	1	419.7810	<i>camminare</i> 'walk' (A)	3	3.5549
<i>eatterrare</i> 'land' (E)	2	381.5261	<i>volteggiare</i> 'whirl, hover' (A)	2	2.0877
<i>ecorrere</i> 'run' (E)	2	285.7445	<i>passaggiare</i> 'stroll' (A)	3	0.3671
<i>escendere</i> 'go down' (E)	1	182.5477	<i>strisciare</i> 'crawl, creep'	3	0.2545
<i>efuggire</i> 'run away' (E)	1	121.8868	<i>decollare</i> 'take off' (E)	2	0.0492
<i>escivolare</i> 'slip' (E)	1	39.3902	<i>saltare</i> 'jump' (A)	2	-4.0390
<i>aatterrare</i> 'land' (A)	2	22.7494	<i>saltare</i> 'jump' (E)	2	-9.4520
<i>erotolare</i> 'roll' (E)	2	11.5659	<i>correre</i> 'run' (A)	2	-11.0088
<i>adanzare</i> 'dance' (A)	3	6.4727	<i>partire</i> 'leave' (E)	1	-32.5532

Table 2 – Ranking of motion verbs by auxiliary selection with *a*-PPs. (A): *Avere* 'have', (E): *Essere* 'be'

verb	class	COMP-D4:LOC	verb	class	COMP-D4:LOC
<i>partire</i> 'leave' (E)	1	881.7227	<i>rotolare</i> 'roll' (E)	2	6.5709
<i>scendere</i> 'go down, descend' (E)	1	625.5224	<i>correre</i> 'run' (E)	2	6.4485
<i>fuggire</i> 'run away' (E)	1	270.5975	<i>marciare</i> 'march' (A)	3	0.8337
<i>decollare</i> 'take off' (E)	2	183.8506	<i>camminare</i> 'walk' (A)	3	0.7349
<i>arrivare</i> 'arrive' (E)	1	84.8914	<i>passaggiare</i> 'stroll' (A)	3	0.0066
<i>venire</i> 'come' (E)	1	68.6658	<i>correre</i> 'run' (A)	2	-2.3264
<i>saltare</i> 'jump' (E)	2	42.1079	<i>andare</i> 'go' (E)	1	-5.2180
<i>decollare</i> 'take off' (A)	2	31.7269	<i>salire</i> 'rise, go up' (E)	1	-18.0559
<i>scivolare</i> 'slip' (E)	1	28.6881			

Table 3- Ranking of Motion verbs by auxiliary selection with *da*-PPs.

verb	E	A	COMP-A/D4:LOC
<i>rotolare</i> 'roll'	138	5	140.5679
<i>saltare</i> 'jump'	4274	903	582.3553
<i>planare</i> 'glide'	48	8	6.7338
<i>decollare</i> 'take off'	657	77	476.5333
<i>atterrare</i> 'land'	960	61	876.6593
<i>correre</i> 'run'	2296	1379	461.7559
<i>sgattaiolare</i> 'run away'	4	0	15.8863
<i>ondeggiare</i> 'wave'	1	38	6.8453
<i>fluttuare</i> 'fluctuate'	2	8	9.066
<i>veleggiare</i> 'sail'	0	30	29.9933
<i>volteggiare</i> 'whirl, hover'	2	46	16.2084
<i>trotterellare</i> 'toddle, trot'	1	9	2.2906
<i>galoppare</i> 'gallop'	1	51	7.4326

Table 4 – Distribution of auxiliaries (A) *Avere* 'have' (col. 2) and (E) *Essere* 'be' (col. 3) with class 2 verbs. Col. 4: overall association scores (LMI) between these verbs and PPs headed by *a* 'to', *da* 'from'.

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, as well as 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 neatly accounted for within a scale-based classification of the inherent temporal properties of verbs.
- The data also point to the need to rethink 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 notions of argument-adjunct/subcategorized adjunct, usually recognized in the literature to account for dependents that appear to be predicates in their own right while at the same time related to the verbal head.
- The co-occurrence statistics of verbs with directional/locative phrases (from a large corpus of written Italian) hints at interesting distributional correlates (to be further investigated) of the proposed analysis.

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