Aspect Variability and the Annotation of Aspect in the IMAGACT Ontology of Action

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Abstract

This paper highlights some theoretical and quantitative issues related to the representation and annotation of aspectual meaning in the IMAGACT corpus-based multimodal ontology of action. Given the multimodal nature of this ontology, in which actions are represented through both prototypical visual scenes and linguistic captions, the annotation of aspect in this resource allows us to draw some important considerations about the relation between aspectual meaning and eventualities. The annotation procedure is reported and quantitative data show that, both in the English and Italian corpora, many verbs present aspectual variation, and many eventualities can be represented by locally equivalent verbs with different aspect. The reason why verb aspectual class may vary is investigated. Our analysis makes once more evident that verbs may vary their aspectual properties with respect not only to their argument structure but, more precisely, to the inner qualities of the eventualities they express. Crucially, when eventualities are expressed by equivalent verbs with different aspectual properties, the verbs focus on different parts of the structure of the eventuality.

Keywords: action ontology, aspect, semantic variability

1. Introduction

Since Verkuyl (1972), the importance of considering argument structure in the analysis of verbal aspectual information has been frequently pointed out. Accounts that attribute unique aspectual classes to verb lexemes fail to capture the complexity of this semantic property. Verbs may show a unique aspectual class or vary with respect to their valency, different interpretations, and the properties of the eventualities they can denote.

This paper deals with the representation and annotation of verbal aspectual properties in the IMAGACT ontology (Moneglia et al., 2014), a multilingual and multimodal ontology of actions derived from English and Italian spoken corpora (Moneglia, 2014). This annotation lets us reconsider the nature of aspectual properties by deriving the aspectual class of each action verb in relation to the different actions it can extend, giving a measure of the quantitative relevance of aspect variability in language usage.

In particular, it becomes possible for English and Italian verbs to observe: a) variation of the aspectual class of a verb across the various action types it can extend; b) variation of the aspectual class in the same action type by *locally equivalent verbs*, which is the peculiar information provided by IMAGACT (Moneglia et al., 2018).

The paper is structured as follows: Section 2 introduces the IMAGACT ontology, describing the methodology used to annotate aspect (2.1) and reporting quantitative data on aspectual variations in two languages considered in the ontology, English and Italian (2.2). Section 3 analyses the cases in which a single verb shows variation in its aspectual class, together with a theoretical explanation of these cases. Section 4 addresses the aspectual variation observed on eventualities, i.e., cases where an action concept is expressed through locally equivalent verbs with different aspectual properties. In 3 and 4, we will go through the linguistic and cognitive factors that give rise to the two kinds of aspect variability. We will only consider emblematic cases taken from the English verbal lexicon, leaving Italian and complex crosslinguistic variability problems to other occasions. In section 5, we draw some conclusions and summarize our findings. Table 1 in the Appendix will list the verbal entries in the IMAGACT lexicon that record both event and process readings and the proportion between the two categories across the set of eventualities they can extend.

2. The IMAGACT ontology and the annotation of aspect

IMAGACT is a multilingual ontology of action that visually represents the meaning of verbs referring to physical actions through scenes rather than through linguistic definitions. Each scene represents the prototype of an action type in the form of a video or 3D animation.

Action concepts were identified by annotating Italian and English spontaneous speech corpora using a complex induction procedure (Moneglia et al., 2012). Starting from the contexts of occurrence of verbs related to physical actions, the different activities each verb can extend to were highlighted. Each considered action verb's occurrence was examined (around 600 action verbs per language that are high frequency in oral contexts). Occurrences referring to physical actions were selected and expressed in a *standardized sentence*, in which the verb is linked to the minimum number of arguments necessary to represent the action. Once all occurrences of the verb were processed, the meaning of each became clear in its standardization. The semantic variation of a verb is thus inducted from corpora.

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Reconciling the action concepts identified in the two corpora into a single ontology, a set of 1,010 scenes was generated, each representing a prototype of action. This set, being derived from corpora representative of oral use, ideally constitutes the universe of relevant actions in the current socio-cultural context and how languages refer to them.[1] For each prototypical scene, the set of verbs referring to the same action concept, which are called *locally equivalent verbs* (Moneglia et al., 2018), are then mapped.

In summary, the ontology provides two main pieces of information:

a) the variation of action verbs, often general, across different actions.
b) the set of verbs referring to the same action concept, which are *locally equivalent*.

Figure 1 provides an example of the variation of the general verb *to push*.[2] As the figure shows, each prototype can also be identified by at least another verb (reported below the figure), which is equivalent in extension to the verb *to push* for that particular case.

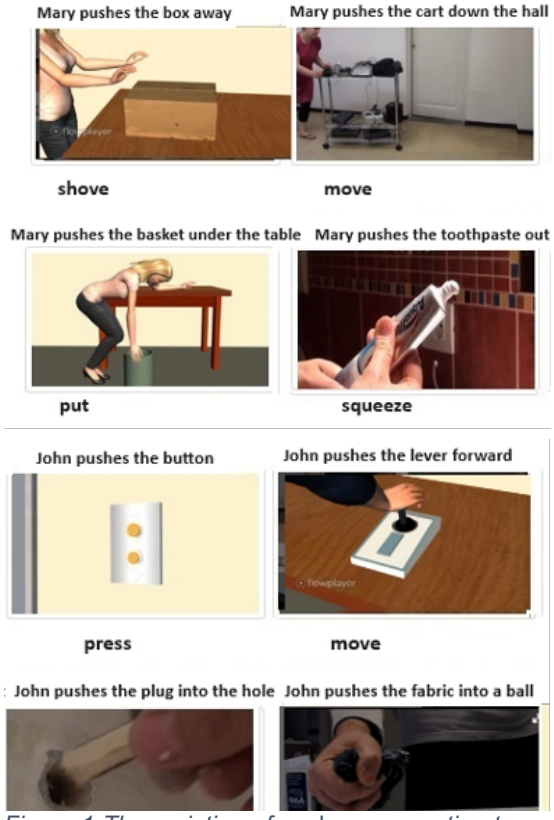


Figure 1 The variation of push *across action types and locally equivalent verbs*

Each prototype scene is described by the best example, i.e., a linguistic caption (reported in Figure 1 above the frames). The best examples were annotated with the thematic structure[3] and the aspectual class that the verb determines in that linguistic context, respectively process or event according to the traditional Vendler's typology (Vendler 1967).[4] This procedure is described in more detail in the next subsection.

The sentences were then grouped into types based on two criteria:

a) Similarity to the best example chosen to represent the class (cognitive constraint)

b) Substitutability with verbal occurrences with the same locally equivalent verbs (linguistic constraint)

For example, standardized occurrences of the verb *push* are grouped into action types, each headed by a best example, as shown in the left box in Figure 4.

We refer the reader to Gagliardi (2014) for the quality assurances on the IMAGACT creation and annotation process.

2.1 The annotation of aspect

The *imperfective paradox* test (Bach 1986; Dowty 1977; 1979; Pustejosky 1991; Bennet-Partee 2004) was used to assign the aspectual class. The test identifies as processes all sentences formed with a certain verb conjugated in the progressive (PROG) that logically implies the corresponding sentence in the present perfect (PP). On the contrary, sentences formed with verbs that, conjugated in the progressive, do not imply the corresponding sentence in the present perfect are identified as events[5]:

- Processes: Prog (p) > PP(p)
- Events: Prog (p) >/ PP(p)

For example, the verb *push* identifies a process in (ex. 1) because it implies the corresponding present perfect, while the verb *climb* results in an event in (ex. 2) because the sentence does not imply the corresponding one in the present perfect:

[1] The following languages have been further implemented in IMAGACT through competence-based judgments (Brown et al. 2014): French, Spanish, Portuguese, Greek, German, Danish, Swedish, Chinese, Japanese, Hindi-Urdu, Arabic, Serbian, and Polish.

[2] The figures included in the paper constitute frames of the video or animation provided in IMAGACT. The complete scenes can be seen on the web interface of the ontology at the following link: http://www.imagact.it/imagact/query/dictionary.seam

[3] Relying on a modified version of the semantic roles inventory proposed by Palmer et al. (2005). See Moneglia & Varvara (2020) for details.

[4] Focusing specifically on actions, states are not considered in the ontology. Moreover, no granular distinction is made among the various aspectual classes falling within the categories of process and event. For instance, events encompass both achievements and accomplishments (Vendler 1967). Processes gather continual and iterative interpretations.

[5] "If x is V-ing entails x has V-ed, then either the verb or the predicate is a process."(Pustejovsky, 1991: 36)

1) Fabio is pushing the cart > Fabio has pushed the cart
2) Fabio is climbing onto the chair >/ Fabio has climbed onto the chair.

The test allows expert mother tongue annotators to easily attribute the aspectual class to the best examples of action types extended by all verbs in IMAGACT face to each action prototype, which ensures its actual interpretation.

This approach has generated a substantial database of correlations between the two aspectual classes and verbs. It becomes possible to obtain relevant data regarding the many verbs (not all) that exhibit aspectual variation in the different action types they can predicate.[6] For example, the verb *push* exhibits aspectual variation in Figure 2 between action type A (a process, as demonstrated by the paradoxical inference reported in ex. 3) and action type B (an event, as demonstrated by the lack of inference in 4):

3) Maria is pushing the cart > Maria has pushed the cart.
4) Maria is pushing the box >/ Maria has pushed the box.

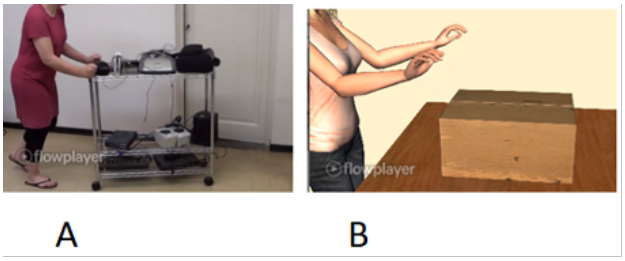


Figure 2 Two eventualities of the variation of to push.

However, in many cases, verbs with different aspectual qualities can identify the same action event. Considering the action in Figure 3 expressed by the verb *to push*, locally equivalent verbs can also be applied to that eventuality (*press*, *put*, *insert*), each one with different meanings and aspectual qualities, being either processive, like *push* and *press* in (5) or events, like *put*, *insert* and *place* in (6).

Figure 3 One of the eventualities ("John pushes the plug into the hole") expressed by to push*, locally equivalent to* press, put, insert.

5) Is pushing (pressing) the stick into the hole > has pushed (pressed) the stick into the hole.
6) Is putting (inserting) the stick into the hole >/ has put (inserted) the stick into the hole

Figure 4 illustrates how arguments are annotated, and the aspectual class is assigned to occurrences of Type 1 (in light blue on the left), where *push*, in the best example "*John pushed the stroller along the pavement,*" is locally equivalent to *move*, marking a process (in the central box). Similarly, in the annotation of Type 5, where *push* is equivalent to *shove*, the best example, "*Mary pushed the book away*" is marked as an event. The information concerning the possible aspectual class variation of a verb in the variety of actions is, therefore, a function of this level of annotation.

The actional concepts represented through visual prototypes must ensure that the ontological referring object for all locally equivalent verbs in that type is the same. For example, in the case of the verb *push*, the type corresponding to the *best example*, "*push the plug into the hole,*" must be mapped onto the same scene extended by the locally equivalent verb *insert*. This association provides information about actions that locally equivalent verbs can identify, getting, in some cases, different aspectual classes for the same scene.

2.2 Quantitative data

From this annotation, we can derive quantitative data from the IMAGACT database, which gives a measure of how aspectual variation impacts the interpretation of sentences referring to physical actions.

Considering the English lexical encoding, out of 543 verbs examined, 393 consistently remain in the same aspectual class (301 are always annotated as events and 92 as processes). In comparison, 150 verbs exhibit variation in the various types they are annotated with. Among the 943 actional types extended by these verbs, 640 are always identified by verbs conveying the same aspect: 478 are consistently extended by verbs annotated as events and 162 as processes. However, 303 action types can be identified by verbs with different aspects.

Similar results are observed when considering the annotation of Italian. Out of 501 annotated verbs, 401 never vary in aspectual class across the action types they extend to. Among these, 260 are marked as events and 141 as processes. The remaining 100 verbs exhibit aspectual variation in the different actions each can refer to. Considering the action types extended by the Italian verbs in question (920), 709 prototypes are identified by verbs that give rise to a single aspectual class (511 annotated as events and 197 as processes), while 211 action types can be extended by verbs that exhibit aspectual variation. The pie charts in Figures 5 and 6 illustrate the quantitative data.

In short, in English, one out of three action types in the ontology undergoes different aspectual categorization, and one out of four action verbs may change their aspect when applied to different action types. The slightly reduced proportions scored in

[6] English verbs that exhibit aspectual variation are reported in Table 1 in Appendix.

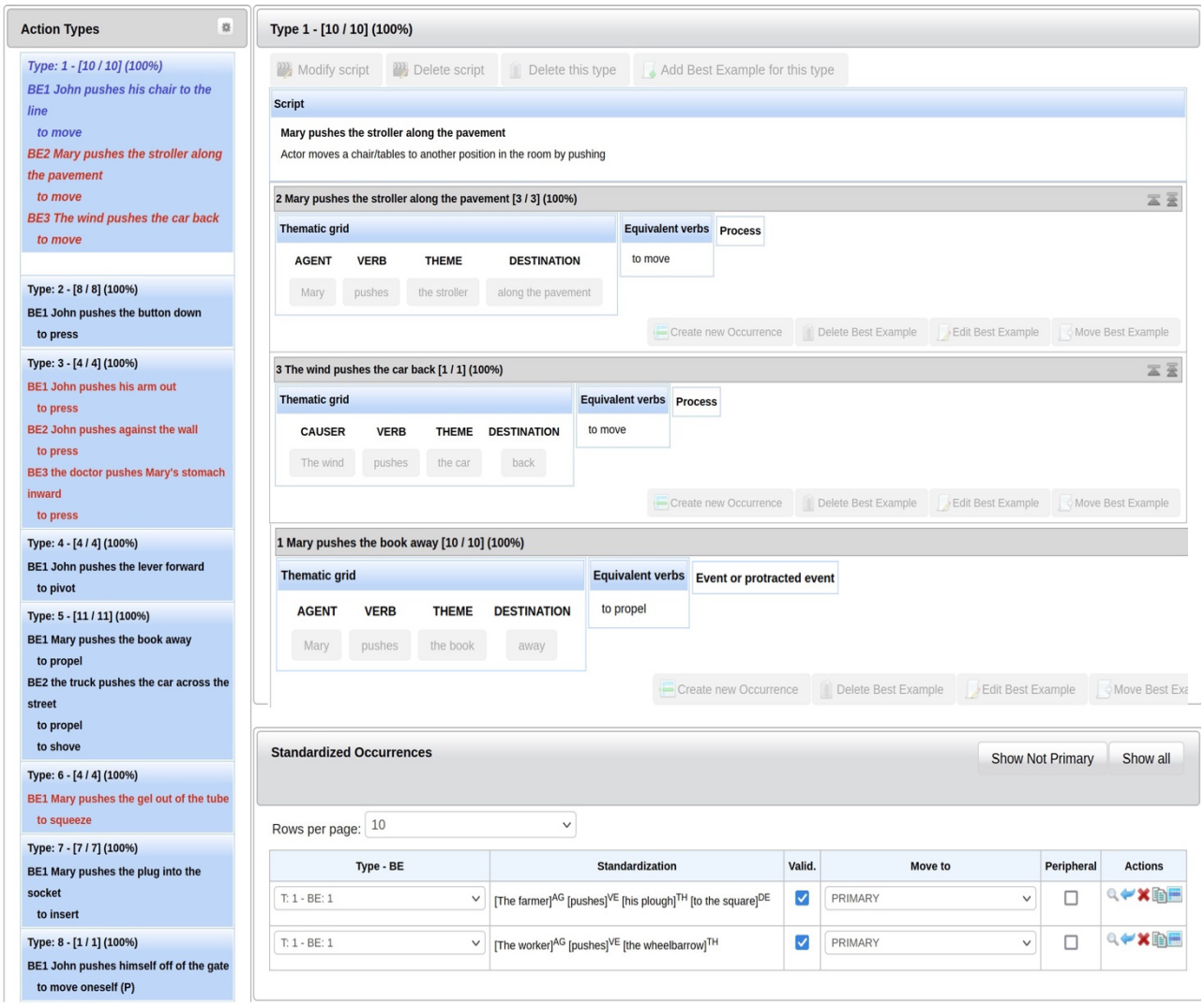


Figure 4 Interface for the Annotation of Thematic structure and Aspectual class of the best example of each Action Type

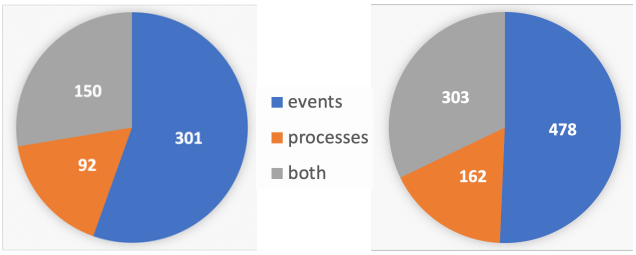


Figure 5 Aspect variability among English verbs (left) and types (right).

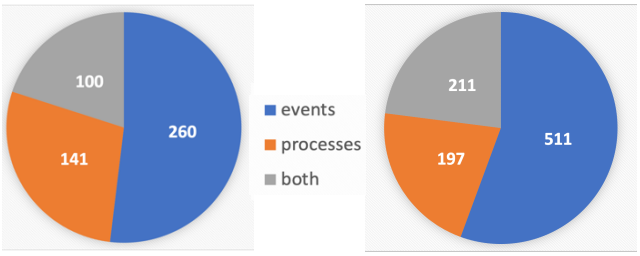


Figure 6 Aspect variability among Italian verbs (left) and types (right).

Italian do not change the overall picture.[7] Aspectual variation is, therefore, a quantitatively significant phenomenon when referring to actions. The definition of criteria by which a verb can give rise to an event or a process, or the same action can be seen as both a process and an event, is necessary to ensure natural language interpretation. In the following paragraphs, we will consider the factors influencing aspect variability.

[7] The reason for this variation raises complex questions concerning the cross-linguistic categorization of action concepts, but is not an object for this paper.

3. Aspect Variation of Verbs

3.1 Aspect Variation and Thematic Structure

In some well-known cases, thematic structure changes correlate with aspect changes. For instance, activity verbs (Dowty 1979), in their absolute structure, get an event interpretation when taking a thematic argument. For example, *to paint* in (7) and (8) respectively correspond to a process and to an event in prototypes A and B of Figure 7:

7) Mario paints > PROC[8]
8) Mario paints the hood TH > EVENT

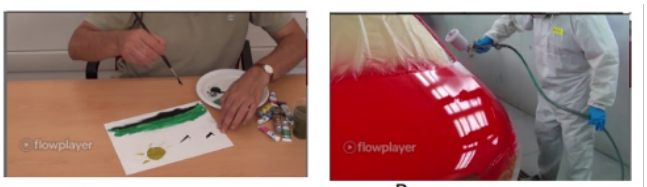


Figure 7: Aspectual variation of the activity verb to paint *(absolute vs non-absolute reading)*

Similarly, motion verbs, which are processes in their absolute structure, can exhibit aspectual variation when selecting an internal argument. For instance, the verb *to climb*, if it selects an internal argument with the role PATH (9), required when applied to prototype A of Figure 8, determines the processual interpretation. In contrast, the semantic role DESTINATION, required by prototype B, determines the event interpretation (10).

9) Fabio climbs the stairs PATH > PROC
10) Fabio climbs onto the chair DES > EVENT

Figure 8: Aspect variation among two eventualities in the variation of to climb.

These cases are, therefore, predictable based on the minimal argument structure of the verb necessary for the projection of a specific action.

3.2 Aspect Variation of General Verbs across action types

IMAGACT demonstrates that the aspectual variation of a verb is not determined solely in relation to its argument / thematic structure but can also be due to the verb variation across action typologies. We have observed significant changes in the aspectual class of the clause in two paradigmatic cases:

a) Variations in the typology of the action extended by the same verb

b) Variations due to the pragmatic relevance of the resulting state

The first case is well identified in IMAGACT by those motion verbs that, in their proper meaning, can extend to both motion eventualities and eventualities in which the verb predicates of object relations.

Examples (11) and (12), depicted in Figure 9, illustrate the change in thematic structure (REFERENCE vs LOCATION) recorded by the verb *to pass*. The change occurs specifically when the verb predicates about a *motion in space* or, on the contrary, about *object relations*. In the first case, the truth of "*the guy is passing the light*" does not imply that he passed through, and the verb is an event in that eventuality. In the second case, the inference "*Mario passed the paint on the shelf*" holds, and nothing ensures the work is over.

11) Mario passes the light REF > EVENT
12) Mario passes the paint TH on the shelf LOC > PROC

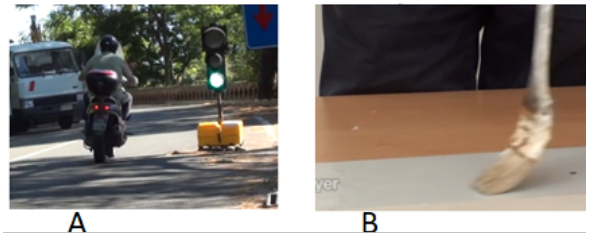


Figure 9: Aspect variation of to pass *in two eventualities*

Action verbs can undergo aspectual class variation depending on the greater or lesser relevance of the modification of the world achieved by the action. Consider, for example, the verb *tightens*. The sentences in (13) and (14), represented in the two prototypes of Figure 10, show that if the activity does not determine a relevant change of state, as in model A, the predicate has a processual interpretation, while it is interpreted as an event as soon as the activity is aimed at achieving functionally relevant goals, as in model B.

13) Fabio tightens the bottle > PROC
14) Fabio tightens the rope around Maria's neck > EVENT

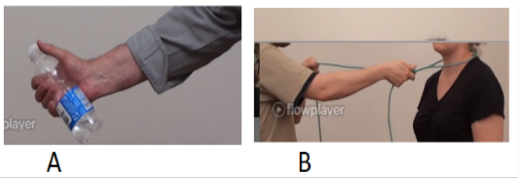


Figure 10: Two eventualities of the verb to tighten.

[8] For brevity, we leave it to the reader to replicate the assignment to the aspectual class through the test of the imperfective paradox.

Semantic correlations justify this variation. *Tighten* is a predicate that, when referring to scalar variations, has a processual interpretation as in (13), as pressure is exerted more or less without determining a final result. In fact, when "*Mario is tightening the bottle*", this implies that he has already tightened it a little bit.

However, the same verb takes an event reading when referring to events where a result emerges prominently, as in (14). "*Mario is tightening the rope around Maria's neck*" does not imply that he has tightened the rope around Maria's neck, which is true only in a state where the rope can be said to be tight.

We can replicate the phenomenon with other action verbs with a scalar application. For example, *to raise* can have a scalar reading or can apply to events in which the achievement of a relevant resulting state is predicated.

If I am raising the microphone, it can be inferred that it is already more or less raised (as in A of Figure 11), and the verb is a process. This is not the case in B, where it cannot be said that *Maria has raised the paddle* until the paddle is visible over her head, that is, until the state of functional relevance of the movement is reached, and the sentence refers to an event.

15) Maria raises the microphone > PROC
16) Maria raises the paddle> EVENT

A B

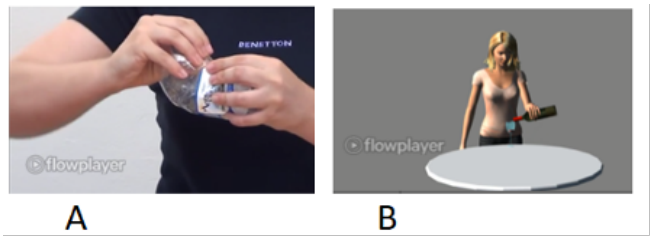
Figure 11: Aspect variation among two eventualities in the variation of to raise.

4. Aspect variation of equivalent verbs in the same eventuality

When considering that the same verb can vary its aspectual class in different eventualities, it seems straightforward the conclusion that aspect depends on the nature of the eventuality, which should be an entity within the natural language metaphysics, with the inner properties of a process or an event (Bach 1986). However, this conclusion cannot explain why the same eventuality can be interpreted as an event or a process when referred to by two locally equivalent verbs.

The phenomenon is relevant since, in English, it concerns one out of three of the eventualities represented in the ontology, as we observed above. For instance, consider the local equivalence between *to compress* and *to mash* (17 and 18, represented in the eventuality A in Figure 12) and between *to pour* and *to put* (19 and 20, represented in the eventuality B in Figure 12). *Compress* and *pour* lead to processive interpretations, while *mash* and *put* give rise to event interpretations of the same eventuality.

17) Fabio compresses the bottle > PROC;
18) Fabio mashes the bottle > EVENT
19) Maria pours the wine into the glass > PROC
20) Maria puts the wine into the glass > EVENT



A B

Figure 12: Two eventualities with equivalent verbs with different aspects

Given that the eventuality is one and only one, the explanation of this phenomenon can only be a function of the conditions of application of the verbs in question, i.e., the different semantics of these verbs. Therefore, we must consider both the semantic properties expressed by the verbs and how these relate to the properties characterizing the eventuality.

The structure of an event can be encoded as a transition between two states (von Wright 1963). In short, the event is a logical entity with two *foci*: '¬pTp', where T is the temporal transition of the state (*and then*) that produces the result (*the truth of p*) from a state in which *p* is not true. Reasoning in a pragmatic form, we can say that, in the domain of natural action, when ¬p is true, a set of acts (more or less prolonged in the sense of Vendler, 1967) occurs that lead to the result. ¬p and p are nothing but "entities of different kinds" in the sense of Bach 1986.

Considering the properties signified by the predicates, we identify the event's structure with the notation 'informative focus1 T informative focus2', to indicate that where ¬p is true, a set of positive pragmatic acts occur. The properties characterizing the semantics of the verb can, in principle, refer to the focus in 1, the focus in 2, or both foci of the event structure.

In other words, the existence of a positive focus on the resulting state, necessary to be an event, can not only be determined by what happens, as the impulse in Figure 2B or the pragmatic relevance depicted in Figure 9B. The emergence of an event reading can also depend on how a verb predicates an eventuality.

Considering the different semantics of the verbs applied to the eventuality in B of Figure 11, we can hypothesize that *put* is inherently resultative, as its information focus, i.e., the quality characterizing its meaning, is 'inserting an entity into a background' (Moneglia 2005). In other words, the meaning of the verb emphasizes the information focus 2 of the event structure, while it does not specify information about how this result is achieved (part 1 of the event structure). On the contrary, *pour* has an informational focus on the qualities of the object (liquids or mass entities) and the manner of the activity (*controlled*). Therefore, *pour* has an information focus in the first part of the event structure.

The same happens in the pair *compress/mash* in the prototype of Figure 12 A. As the variation of *mash* derived from IMAGACT in Figure 13 shows, this verb does not specify any information in the first focus of the eventuality. Indeed, forces that produce the result can be of whatever kind. *Mash* focuses on the information characterizing the result achieved, leading to the event interpretation of the eventuality.

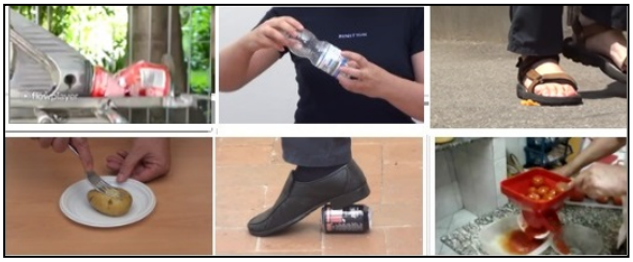


Figure 13: the variation of to mash *across action types.*

On the contrary, *compress* would indicate that the qualities of the forces exerted on the object are 'aimed at its reduction'. The object can result in being more or less compressed without necessarily reaching a final 'compressed' state.

This is clear from the comparison *of compress vs. mash* given by IMAGACT. *Compress*, but not *mash,* can be applied to elastic objects that cannot reach a permanently deformed state, as can be seen from Figure 13, where the actions denoted by *compress* and *mash* are compared (the first column comprehends actions denoted only by *compress*, the third column actions denoted only by *mash*, and the column in the middle shows actions that both verbs can denote).

Therefore, the verb meaning characterizes the information focus 1 of the event structure, resulting in a process interpretation.

5. Conclusions

The annotation of Aspect in IMAGACT is achieved in connection to the referential variability of action verbs, which can be synthesized as: "one verb many actions / one action many verbs". The resulting database sheds light on aspect phenomena, showing that aspect variability is a quantitatively relevant phenomenon impacting the interpretation of a good number of sentences referring to physical activities.

Variability regards the aspect of the same verb across different action types and the same action when referred to by different verbs.

The first phenomenon depends on the inner qualities of the various eventualities in the extension of one verb. When the relevance of a change of state emerges in activities showing continuity, such as movement and scalar forces, a granular distinction among action types is required, and the corresponding activity verb gets the event interpretation accordingly.

The second phenomenon involves lexical semantics. The different aspects conveyed by two locally equivalent verbs in the same eventuality tell us that their meaning picks up different properties of the same ontological entity. A verb can identify an eventuality indicating what happens in the process that leads to a result (information focus in the first part of the event structure) or, vice versa, the properties characterizing the result (information focus in the second part of the event structure). These are different ways to refer to an object (Frege 1892).

Figure 14: Comparison of the variation of to mash *and* to compress.

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Appendix

Table 1 List of English verbs with aspectual variation, with proportion of aspectual classes among the action concepts in the IMAGACT ontology.

Verbs	Event	Process
swing	0.09	0.91
smooth	0.10	0.90
brush	0.14	0.86
play	0.17	0.83
raise	0.17	0.83
draw2	0.19	0.81
rub	0.19	0.81
march	0.20	0.80
scatter	0.20	0.80
shorten	0.20	0.80
warm	0.20	0.80
smoke	0.22	0.78
dangle	0.25	0.50
paddle	0.25	0.75
pin	0.25	0.25
shine	0.25	0.75
trail	0.25	0.75
travel	0.29	0.71
chase	0.33	0.67
compress	0.33	0.67
dance	0.33	0.67
eat	0.33	0.67
follow	0.33	0.67
gallop	0.33	0.67
guide	0.33	0.67
lap	0.33	0.67
lean	0.33	0.67
lengthen	0.33	0.67

obstruct	0.33	0.33
scream	0.33	0.67
sew	0.33	0.67
shout	0.33	0.67
sleep	0.33	0.67
spin	0.33	0.67
squirt	0.33	0.67
stand	0.33	0.67
stroll	0.33	0.67
support	0.33	0.67
tow	0.33	0.67
water	0.33	0.67
block	0.36	0.27
gather	0.36	0.64
drag	0.38	0.62
feed	0.38	0.62
rotate	0.38	0.62
bend	0.40	0.60
boil	0.40	0.60
extract	0.40	0.60
ride	0.40	0.60
collect	0.44	0.56
rip	0.45	0.55
rest	0.46	0.15
roll	0.47	0.53
accompany	0.50	0.50
bear-2	0.50	0.50
circle	0.50	0.50
climb	0.50	0.50
cough	0.50	0.50
draw	0.50	0.50
extend	0.50	0.50
fry	0.50	0.50
hang	0.50	0.14
iron	0.50	0.50
knit	0.50	0.50
lash	0.50	0.50
light	0.50	0.50
pick	0.50	0.50
pound	0.50	0.50
puff	0.50	0.50
read	0.50	0.50
row	0.50	0.50
salt	0.50	0.50
surround	0.50	0.17
swim	0.50	0.50
tip	0.50	0.50
track	0.50	0.50
trot	0.50	0.50
whistle	0.50	0.50
widen	0.50	0.50
wind up	0.50	0.50
wrestle	0.50	0.50
yell	0.50	0.50
push	0.51	0.49
join	0.58	0.00
paint	0.60	0.40
squeeze	0.60	0.40
strain	0.60	0.40
weave	0.60	0.40
wind	0.60	0.10
wipe	0.60	0.40
tear	0.64	0.36
move	0.66	0.34
walk	0.66	0.34
connect	0.67	0.00
cry	0.67	0.33
drive	0.67	0.33
enclose	0.67	0.00
filter	0.67	0.33
hammer	0.67	0.33
knock	0.67	0.33
load	0.67	0.33
press	0.67	0.33
rise	0.67	0.33
scrub	0.67	0.33
seal	0.67	0.00
sing	0.67	0.33
sit	0.67	0.33
stride	0.67	0.33
sweep	0.67	0.33
type	0.67	0.33
wash	0.67	0.33
bring	0.70	0.30
crack	0.70	0.30
lay	0.70	0.00
spread	0.70	0.30
carry	0.71	0.29
ring	0.73	0.27
pour	0.75	0.25
stick	0.75	0.00
suck	0.75	0.25
tap	0.75	0.25
transport	0.75	0.25
tumble	0.75	0.25
pull	0.77	0.23
dust	0.80	0.20
lead	0.80	0.20
link	0.80	0.00
reach	0.80	0.20
restrain	0.80	0.20
run	0.80	0.20
write	0.80	0.20
toss	0.81	0.19
lower	0.83	0.17
connect up	0.85	0.00
copy	0.86	0.14
leave	0.86	0.14
open	0.86	0.07
fly	0.87	0.13
fall	0.88	0.12
remove	0.88	0.12
squash	0.88	0.12
crush	0.89	0.11
kick	0.89	0.11
throw	0.90	0.10
break	0.92	0.00
turn	0.92	0.08
hit	0.93	0.07
lift	0.93	0.07
put	0.94	0.06
give	0.95	0.05