The role of plans for qua-events and their effects on part-structure

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Abstract. Davidsonian event semantics has become immensely influential in contemporary natural language semantics. On that view, all events (including acts and states) are considered the same ontologically, i.e., Davidsonian particulars, and they all serve as arguments of verbs and corresponding nominalizations. We argue that that view has to be rejected both ontologically and on the level of compositional semantics. We argue that natural language reflects two related ontological distinctions: first a distinction between base events (BE) and plan events (PE) (which are based on plans or procedures); second a distinction between acts and intentional acts. We propose an ontological account of PEs and intentional acts based on Fine's notion of a qua object: a PE is a BE qua realizing a plan and an intentional act is an act qua realizing an intention. The BE-PE distinction manifests itself in existence predicates for events and predicates of participation (*take part in*, *participate*, *be part of*). Unlike Fine, we allow properties of qua events to be inherited not only from their base (temporal part structure), but also from their gloss, namely as a 'slot mereology' consisting of plan-specific roles, which can be specified for particular individuals or be open. Whereas the ordinary noun *part* (as in the parts of) picks out parts of the former part structure, the light noun *part* in the predicates *take part in* and *be part of* picks out roles inherited from the plan. Whereas *take part in* can relate to both specified and open roles, *be part of* can only target specified roles. The distinction between BEs and PEs is encoded in lexical semantics only; the distinction between acts and intentional acts is also encoded in syntax, in the presence of a silent operator. This requires a more complex form of event semantics than standard Davidsonian semantics.

Keywords. ontology, events, plans, procedures, intentions, intentional actions, part-whole-structure, slots, event participants

1. Introduction

The standard view in semantics is that events are all of the same sort in that they are all Davidsonian particulars [1]. Indeed, different types of event nominals are all seemingly

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compatible with a particular type of existence construction, namely *there*-contructions in English, and incompatible with the other type, namely *exist* as reported in previous research [2,3,4]. In (1) and (2), we present the contrast between the two constructions.[2]

(1) a. There was a ritual/procession/wedding/ceremony yesterday.
b. There was no lightning/thunderstorm/accident/disaster yesterday.

(2) a. ??The ritual/procession/wedding/ceremony existed yesterday.
b. ??The lightning/thunderstorm/accident/disaster existed yesterday.

Exist can apply only to enduring objects and abstract objects [2,3,4]:

(3) a. The building existed here only last week.
b. The round circle does not exist.

Events instead are selected by other existence predicates: *occur*, *happen*, and *take place* are usually mentioned, without making much of a differentiation [2,3,4].

The goal of this paper is to enrich our ontology of events as reflected in natural language. The methodology used in this work is descriptive metaphysics and more specifically natural language ontology, the goal of which is to "uncover the ontological categories, notions, and structures that are implicit in the use of natural language, that is, the ontology that a speaker accepts when using a language" [5,6], as opposed to the more fundamental level of the ontology of the real [7].

Within this framework, we argue that natural language reflects an important, yet previously underexplored distinction between base events (BEs) and plan events (PEs).[3] We will give an ontological account of that distinction based on Kit Fine's notion of a qua object. Plan events involve a third event-related category, that of plans (or procedures), entities that can be realized by particular events. They are obviously part of our ordinary ontology, and they are well-reflected in natural language. For example, we talk about plans having been made and existing and having been implemented. Plans can exist even when they are not realized. Plans as entities have in fact received notable attention within applied ontology (e.g., [8]). While focusing on different aspects of event individuation, our distinction between base and plan events is in line with recent developments in formal ontology concerning the synchronic structuring of events [9].

The notion of a plan event is closely connected to the notion of an intentional act. Both plans and intentions involve intentional agency. Following Fine [10], we argue that the distinction between acts and intentional acts is also well-reflected in natural language, in a way that pertains to the compositional semantics of event predicates. We argue that the same ontological account is suited for plan events and intentional acts. But intentional acts in the contexts in question are encoded in the syntactic structure of sentences, by the silent presence of an intentional operator, whereas the distinction between BEs and PEs is a matter of lexical semantics only.

We present a critical development of Kit Fine's theory of qua objects, limiting qua object formation to intentional acts and plan events, rather than endorsing Fine's application of that operation to all acts ordered by the *by*-relation. We furthermore deviate from Fine by allowing qua objects to not only inherit properties from their base, but also

[2]Double question marks indicate the unacceptibility or infelicity of the sentences they occur with.

[3]We use the term "plan events" to refer to events that come about *qua* realization of an event plan, in contrast to a "planning event", which would be an event in which a specific plan is made.

from their gloss. This will result in two part structures of plan events, one inherited from the base event and one inherited from the plan that figures in its gloss. The latter part structure is composed of roles or slots, like the structured universals of slot mereology. We argue that the two part structures play a role in two versions of the noun *part*. The ordinary noun *part* (as in *the part of that event*) picks out subevents of an event, that is, the parts of the first part structure; another uninflected light noun *part* picks out the parts that are the roles in the plan, the parts of the second part structure. The light noun occurs in the complex predicates *take part in* and *be part of*. We will give compositional semantic analyses of these predicates that explain their restrictions to particular plans and plan events. The role-based account of participation in plan events is conceptually related to the reification of relationships as ontological entities, as discussed by [11].

This study also has implications on the categories of formal ontology. In foundational ontologies like DOLCE [12], entities are broadly divided into *endurants* and *perdurants*. *Endurants*, also called *continuants*, are entities that are wholly present at any time they exist. Material objects, agents, mental objects or abstract artifacts like plans can be put under this group. *Perdurants* (also known as *occurents*), in contrast, are entities that unfold in time such as events or processes, and they are only partially present at any given moment of their existence. Under the plausible assumption that plans of an event are *endurants*, for "they are 'wholly' present (all their proper parts are present) at any time of their existence" [12], a new notion of an event as a perdurant is needed: an event that merges with its plan.

The structure of the paper is as follows. In Section 2, we lay out our empirical generalizations about the distinction between base events and plan events. Section 3 will first discuss the distinction between acts and intentional acts and present a critical development of Kit Fine's theory of qua objects applied to intentional acts. We will then apply the theory of qua objects to plan events and propose a compositional analysis of existence predicates of events and predicates of participation, based on two part structures of plan events, one inherited from the base event and one inherited from the plan event.

2. Empirical observations

2.1. Plan events and base events

Not all events are of the same sort. A closer look at existence predicates applying to events reveals a finer grained distinction between events. In particular, we observe that a subgroup of event nominals, which we label as *base events*, are compatible with *occur*-type existence predicates (5-b), whereas the other subset, which we label *plan events*, occur with *take place*-type predicates (4-a). Crucially, *take place* is incompatible with base events (5-a), whereas *occur* is incompatible with plan events (4-b).

(4) a. A ritual/procession/wedding/ceremony took place yesterday. (plan event)
b. ?? A ritual/wedding/procession occurred yesterday. (plan event)

(5) a. ?? A lightning/thunderstorm/accident/disaster took place yesterday. (base event)
b. A lightning/thunderstorm/accident/disaster occurred yesterday. (base event)

A look at a range of different languages indicates that this distinction between two sorts of existence predicates for events is universal, reflecting an underlying ontological distinction that is part of the ontology of natural language. For example, we observe in French that base events are incompatible with *se tenir* 'to stand/to hold oneself', as shown for accidents in (6-b), whereas *se tenir* can apply to plan events, as shown in (6-a).

(6) a. Une procession/marriage s'est tenu dans le village hier.
one procession/marriage itself.is held in the village yesterday
'A procession/marriage took place in the village yesterday.'

b. ??Un accident s'est tenu à Garibaldi hier.
one accident itself.is held in Garibaldi yesterday
'An accident took place yesterday.'

In contrast, *survenir* in French allows for base events (7-a), whereas it bars plan events (7-b).

(7) a. Un accident est survenu à Garibaldi hier.
one accident is occurred in Garibaldi yesterday.
'An accident occurred in Garibaldi yesterday.'

b. ??Une procession est survenue dans le village hier.
one procession is occurred in the village yesterday.
'A procession occurred in the village yesterday.'

Similarly, while German *stattfinden* occurs with plan events, (8-a), *passieren* and *geschehen* bar them, (8-b)-(8-c). Conversely, while *passieren* and *geschehen* freely occur with base events, *stattfinden* is incompatible with them, (9).

(8) German

a. Hier hat gestern eine Hochzeit stattgefunden. (plan event)
here have yesterday a wedding taken.place
'A wedding took place here yesterday.'

b. ??Hier ist gestern eine Hochzeit passiert. (plan event)
here is yesterday a wedding happened
Lit(eral): 'A wedding happened yesterday.'

c. ??Hier geschah gestern eine Hochzeit. (plan event)
here happened yesterday a wedding
'A wedding happened here yesterday.'

(9) German

a. ??Hier hat gestern ein Unfall stattgefunden.
here has yesterday a accident take.place
'An accident took place here yesterday.'

b. Hier ist gestern ein Unfall passiert.
here is yesterday a accident happened
'An accident happened here yesterday.'

c. Hier geschah gestern ein Unfall.
here happened yesterday a accident
'An accident occurred here yesterday.'

This distinction is not particular to Indo-European languages. For example, Turkish, a typologically distinct language, presents the same contrast. Turkish *meydana gel* 'occur' (lit: come to place) and *gerçekleş* 'materialize' (lit: become real) are incompatible with plan events (10-a), while it can occur with base events, (10-b).

(10) a. ??Dün Garibaldi-de bir düğün/tören meydan-a
yesterday Garibaldi-LOC one wedding/ceremony place-DAT
gel-di/gerçekleş-ti.
come-PST/materialize-PST
Lit: 'Yesterday a wedding came to place/materialized in Garibaldi.'
b. Dün bir kaza/felaket meydan-a gel-di/gerçekleş-ti.
yesterday one accident/disaster come-DAT come-PST/materialize-PST
'An accident/disaster occurred/materialized yesterday.'

For plan events, Turkish uses passivized sentences. They can be constructed with the verb *yap* 'do' (11). Even with inchoative verbs like *gerçekleş* 'materialize', Turkish speakers use the causative and then passive rather than the bare inchoative form with plan events as opposed to base events, cf. (12).

(11) a. Dün Garibaldi-de bir düğün yap-ıl-dı.
yesterday Garibaldi-PST one wedding do-PASS-PST
'A wedding took place in Garibaldi yesterday.'
Lit: 'A wedding was done in Garibaldi yesterday.'
b. ??Dün bir kaza/yangın/felaket yap-ıl-dı.
yesterday one accident/fire/disaster do-PASS-PST
'Yesterday an accident/fire/disaster was done.'

(12) a. Dün bir ritüel gerçekleş-tir-il-di.
yesterday one ritual materialize-CAUS-PASS-PST
'Yesterday a ritual was materialized.'
b. ??Dün bir ritüel/düğün/tören gerçekleş-ti.
yesterday one ritual/wedding/ceremony materialize-PST
'A ritual/wedding/ceremony materialized yesterday.'

Next, we find another type of predicates that are sensitive to the distinction between base and plan events. Strikingly, the very same events that resist the existence predicate *take place*, namely base events, also resist predicates of participation such as *take part in* or *participate*, (13).

(13) a. John took part / participated in a procession/wedding/ceremony. (PE)
b. ??John took part /participated in an accident/disaster/fire. (BE)

Again, the contrast seems to hold crosslinguistically, as shown for French, German and Turkish in (14), (15) and (16), respectively.

(14) a. John prenait part/participait à une procession.
John took part/participated in one procession.
'John took part in a procession.'
b. ??John prenait part/participait à un accident.
John took part in/participated in one accident
'John took part in an accident.'

(15) a. Johannes nahm an der Veranstaltung teil.
Johnannes took at the (organized)event part
'Johannes took part in the event.'
b. ??Johannes nahm an dem Unfall teil.
Johannes took at the accident part
'Johannes took part in the accident'

(16) a. Can bir geçit tören-in-e katıl-dı.
Can one procession ceremony-POSS-DAT participate-PST
'Can participated in a procession.'
b. ??Can bir kaza/felaket/yangın-a katıl-dı.
Can one accident/disaster/fire-DAT participate-PST
'Can participated in an accident.'

The empirical evidence suggests a general distinction between two types of events, which can be classified as *base events* and *plan events*, based on the predicates of realization and participation applied to event nominals. Hence, we can formulate our first generalization as in (17).

(17) **GENERALIZATION I:** Natural language distinguishes between base events and plan events. This distinction becomes visible in the following generalizations:
a. There are two different types of event realization predicates: 'occur' type predicates for base events and 'take place' type predicates for plan events.
b. Predicates of participation only apply to plan events.

2.2. Slots and plan events

An additional distinction must still be made between different types of plans, and consequently, between different types of plan events. Some plans assign roles to specific agents, while others involve open roles. Intuitively, a plan for a robbery or a baptism, for example, would not include a random list of orchestrators. Instead, specific agents would be assigned to designated roles. A robbery, for instance, would have defined roles for technical support and execution. Similarly, a baptism would involve a specific priest and a designated individual being baptized. Other plans, for example protests and elections, involve open roles, allowing individuals to participate or not.

This intuitive distinction is surprisingly well reflected in natural language. It manifests itself in the applicability of the complex predicate *be part of*, where, crucially, *part* occurs as an uninflected light noun in the sense of Kayne [15]. Crucially, it is to be sharply distinguished from the ordinary (count or mass) noun *part*, which can form the head of full noun phrases and always picks out 'ordinary' (generally temporal) parts of events, whether BEs or PEs.

(18) a. Parts of the ceremony took place in the early morning.
b. John worked during part of the thunderstorm.
c. Parts of the accident were difficult to watch.

Be part of, in contrast, applies to individuals in terms of their planned or assigned participation in a PE, specifically in a PE with a set of specified roles. John could be part of the ritual or baptism only if he was assigned or expected to fulfill a relevant role in that

event (e.g., the preacher or priest). Hence, (19) is infelicitous in a scenario where John only watched the ceremony without any such role.

(19) John was part of the ritual/baptism.

This intuition becomes clearer in question–answer pairs. A positive answer to a question such as "Was John part of the baptism?" is infelicitous even if he participated but only incidentally. The negative answer, in contrast, feels more appropriate.

(20) A: Was John part of the baptism?
B: ??Yes, he just happened to be there and participated in the prayer at the end.
No, he just happened to be there and participated in the prayer at the end.

In contrast, *take part in* allows for incidental or minor forms of participation. Here, the positive answer is felicitous, while the negative answer contradicts the assertion that John participated in a prayer.

(21) A: Did John take part in the baptism?
B: Yes, he just happened to be there and participated in the prayer at the end.
??No, he just happened to be there and participated in the prayer at the end.

We take these contrasts to show that event plans come with either specified or open roles. Open roles could be filled in by any incidental participant, whereas specified roles are predetermined in the plan of an event.

Additionally, *be part of* sharply contrasts with *take part in*, which comes with the presupposition that the plan event is realized as opposed to *be part of*, which lacks this presupposition. It is therefore compatible with continuations that assert the non-actualization of the plan event as shown in (22).

(22) a. John took part in a research expedition (??that was never realized).
b. John was part of a research expedition (that was never realized).

Again, this contrast is robust crosslinguistically, as shown for German, French and Spanish in (23), (24) and (25), respectively.

(23) a. Johannes war Teil der Zeremonie.
Johannes was part the ceremony.
'Johannes was part of the ceremony.'
b. Johannes nahm an einer geplanten Expedition teil (??die nie
Johannes took at one planned expedition part that never
umgesetzt wurde.)
realized was
'Johannes took part in a planned expedition that was never realized.'
c. Johannes war Teil einer geplanten Expedition, die allerdings nie
Johannes was part one planned expedition that however never
umgesetzt wurde.
realized was
'Johannes was part of a planned expedition, which, however, was never realized.'

(24) a. John prenait part dans une expédition scientifique (??qui ne se réalisa jamais).
b. John faisait partie d'une expédition scientifique (qui ne se réalisa jamais).

(25) a. ??John tomó parte en una expedición de investigación que nunca llegó a realizarse.
b. John formaba parte de una expedición de investigación que nunca llegó a realizarse.
c. John era parte de una expedición de investigación (que nunca se realizó).

We can sum up our results from this section in another generalization:

(26) **GENERALIZATION II:** Natural language distinguishes between open roles and specified roles for plan events. This distinction becomes visible for different types of participation predicates (26-a)-(26-b). Additionally, *take part in* presupposes the partial realization of an event whereas *be part of* does not, (26-c).
a. 'Be part of' type predicates relate to specified roles in plan events.
b. 'Take part in' type predicates relate to open roles in plan events.
c. *Take part in* presupposes that the event is realized.

3. An ontological account of intended acts and plan events

3.1. Intentional acts as qua objects

Plan events bear a close connection to intentional acts. Intentional acts require a similar distinction to that of base events and plan events, namely between base acts and intentional acts. This difference manifests itself linguistically when different expressions are used for describing what may seem to be the same act, leading to different truth conditions of the following example:

(27) a. The act of killing Peter was intentional.
b. The act of killing the mayor was intentional.

(28) a. The act of insulting Mary was intentional.
b. The act of insulting a German was intentional.

Such examples can hardly be dealt with on a monist account [13], on which the a- and b-examples describe the same act, as Fine [14] has convincingly argued.

The examples in (27) and (28), in which *intentional* as a predicate applies to an explicit act description, are exactly parallel to those in which the adverbial *intentionally* applies to a verb phrase (VP):

(29) a. They intentionally killed Peter.
b. They intentionally killed the mayor.

(30) a. He intentionally insulted Mary.
b. He intentionally insulted a woman.

The semantics of *intentionally* presents a serious problem for Davidsonian [16] event semantics: for Davidson, *intentionally* in (29-a)-(29-b) and in (30-a)-(30-b) should apply to the very same event argument of the verb.

Davidson [16] was aware of the problem that *intentionally* raises for his semantics of adverbials and suggested that *intentionally* is in fact a sentence adverbial, applying like an operator to a sentential content, rather than as a predicate to an event. This cannot be right, however, as the examples in (27) and (28) make clear: *intentional* here is a predicate that applies to intentional acts and not propositional contents, and these acts cannot just be identified with Davidsonian events, that is, basic acts in our terms.

Fine [10] argued that making *intentional* sensitive to the description used will not help [17]. Instead, the data support a fine-grained, pluralist ontology on which an act of killing Peter is a distinct act from the act of killing the mayor, and an act of insulting Mary distinct from an act of insulting a woman.

Fine [10] gives an analysis based on the notion of a qua object, which is designed to account for *intentional* applying to distinct acts in (27)-(30). The analysis, however, is also meant to apply more generally to spatio-temporally coincident acts ordered by the *by*-relation (or Goldmann's [18] relation of level generation), that is, the difference, for example, between moving a finger, pulling the trigger, firing the shot and killing the mayor.

While we make use of Fine's ([10], [14]) notion of a qua object, we do not adopt Fine's own application of the notion of a qua object to a pluralist ontology of acts ordered by the by-relation. Instead, we take the formation of qua objects to have a much more limited application, namely to acts realizing an intention (intentional acts) and to plan events.

Here is briefly the theory of qua objects as proposed by Fine ([10] and [14]) for acts. For Fine, acts ordered by the by-relation are distinguished in terms of an ontological operation of qua object formation. Acts that are qua objects are entities d/P (reads as the object d qua the property P) that are composed of a (lower-level) act d and a property P such that P holds of d subject to the following conditions:

(31) **Conditions of qua objects**

a. **Existence**: For an object d and a property P, d/P exists (at a time t) iff P holds of d (at t).
b. **Identity**: Two qua objects d/P and d'/P' are identical iff d = d' and P = P'.
c. **Inheritance**: For an ordinary property A, a qua object d/P has A if d has A during the time d/P exists.

Fine permits two ways of composing qua objects from a given qua object d/P and a property P', by horizontal glossing, as in (32-a), and by vertical glossing, as in (32-b).

(32) a. d qua (P & P')
b. (d qua P) qua P'

The two forms of glossing can account for the two readings of *suddenly* in (33-a), given in (33-b) and (33-c):

(33) a. The ball suddenly rolled quickly
b. The quick rolling of the ball was sudden.
c. The quickness of the rolling of the ball was sudden.

(33-b) would involve horizontal glossing and (33-c) vertical glossing. The theory of qua objects applied to acts furthermore permits two semantic functions that an event modifier

may have: as an act-describing (event-characterizing) modifier, as possibly in (34-a), and as an act-definitive (event-constitutive) modifier, as in (34-b):

(34) a. the quick act of walking
b. the act of walking quickly

In the latter case, the modifier contributes to the gloss of the act; in the former case, it acts as a predicate of the base act. *Quick* in (34-a) can have both functions, *quickly* in (34-b) can only have an act-definitive function, that is, it can only contribute to the very definition of the intentional act itself.

Fine [10] proposes that the difference between acts like moving a finger, triggering a shot, and killing the mayor be construed in terms of qua object formation; triggering a shot is moving a finger qua triggering a shot, killing the mayor is triggering a shot qua causing the mayor's death.

There is a serious problem, however, with such a use of qua object formation for intentional acts: for a qua object d/P to exist, d needs to have P. However, given Fine's own pluralist view of actions, the movement of the finger should not have the property of being a triggering of a shot, and the triggering of the shot should not have the property of being a killing of the mayor, given that the movement of the finger, the triggering of the shot and the killing of the mayor are meant to be distinct entities. This means that the theory of qua objects cannot give an account of the by-relation or level-generation among acts (given pluralism about actions). We therefore assume that some other form of act composition will be responsible for those ontological distinctions (see also Moltmann [19]).

The only thing that qua object formation applied to events can really do is to render certain features of events event-constitutive (essential) features (and perhaps 'foregrounding' those features, in the sense that an object d qua P has just those properties of d that are relevant for P).

We propose that intentional acts be conceived as qua objects in that sense. Thus, the ontological difference between (27-a) and (27-b) will be as follows:

(35) a. e qua being a killing Peter
b. e qua being a killing the mayor

Here e is a base event, an event in the Davidsonian sense.

For the compositional analysis of such qua events, we posit an intentional operator A(ct). In fact, the noun *act* in English in (27-a)-(27-b) (as suggested by Fine [10]) can be viewed as requiring such an operator to apply to the VP in its complement. Thus, we have the structure in (36-a) for (27-b), which in turn will have the interpretation in (36-b).

(36) a. The act (of) A killing the mayor was intentional.
b. the act [A killing the mayor] = ιe'[ACT(e') & $\exists$e(kill(e) & theme(e, [the mayor]) & e' = e qua [killing the mayor])]
c. [A killing the mayor] = λe'[$\exists$e(kill(e) & theme(e, the mayor) & e' = e qua [killing the mayor])]

The scope of the operator 'A' in "act [A killing the mayor]" is interpreted as the property of being an event e' that is the event e qua having the property expressed by the VP killing the mayor, for some event e that is a killing of the individual that is the mayor.

The noun *act* applied to this property generates a predicate of entities that are acts with the property described by the complement of *act*. Then, the iota operator (ι) enables reference to that individual with those properties.[4]

The intentional operator A will also be present in the adverbial construction in (28), which thus has the structure in (37-a), with the interpretation (11b):

(37) a. John intentionally [A killed the mayor].
b. ∃e'(intentional(e') & ∃e(agent(John, e) & theme(e, [the mayor]) & e' = e qua [killed the mayor]))

There are independent motivations for the syntactic presence of a silent intentional operator. For example, Piñón [21] has argued for the need of such an operator in sentences with *for-adverbials* applying to the intended duration of a result state in sentences like (37). The evidence that the duration is intended is the observation that a continuation asserting the cessation of the state does not lead to a contradiction, as shown in (38).

(38) Thomas put the bread in the oven for thirty minutes but someone took it out after ten minutes [21].
⊨ The bread was in the oven.
⊨ Thomas intended the bread to stay in the oven for thirty minutes.
⊭ The bread stayed in the oven for thirty minutes.

Piñón observes that this phenomenon is widespread crosslinguistically as well. Indeed, German, Hungarian and Turkish, unlike English, has distinct lexicalizations for such result state modifiers as opposed to regular durative modifiers for activities (see [21] for German and Hungarian, and see [22] for Turkish). We illustrate the structure of such examples with the simpler example in (39), based on a decomposition in syntax of *open* as *made to be open*:

(39) a. John make A [the door open for two hours].
b. ∃e"e'e(make(e", e') & open(e, [the door]) & e' = e qua [the door open for two hours])

Here, *make* is to be taken to be a light verb that applies to an act and an intended result state of that act. On our view, the semantics of natural language thus involves intentional acts as qua objects that are compositionally obtained from event predicates in the presence of a silent intentional operator.

Plan events and intentional acts bear a close connection. Both are reflected in specific ways in the semantics of natural language. Plan events may also be involved in the construction of the result state modifier *for* in English (and in other languages mentioned above). This modifier allows for the intended duration reading only when the event is associated with a plan. In (39), the plan is for the relevant state to hold for two hours, but of course things might turn out to be different, as has been shown in (37). By contrast, events that are not associated with any plan, i.e., those on a par with base events, cannot be modified for the intended duration. In those cases, only the actual duration reading must be available. This prediction is indeed borne out. In (40-a), the intended duration reading is no longer available unless a plan is involved within the attack software such

[4]Here, we make use of Neo-Davidsonian event semantics [20], but not much depends on that.

that it only blocks YouTube for a certain amount of time. Similarly, in (40-b), the result state has to have lasted ten minutes, and this inference is not defeasible.

(40) a. John crashed YouTube for 10 minutes, ??but it got fixed after 5 minutes.
b. YouTube crashed for 10 minutes, ??but it got fixed after 5 minutes.

3.2. Plan events as qua objects

Plan events are closely related to intentional acts, but there are differences. Intentional acts relate to the intention of a particular agent or group of agents. Plan events involve a plan, an abstract artifact. Like intentions, a plan depends on intentional agency, but such agency may be collective and somewhat indeterminate agency, as well as 'historic' agency, as is the case for recurrent plan events, such as religious ceremonies, elections, regular competitions, and rituals.

What are plans ontologically? We will leave it open for now how plans are to be conceived exactly in a formal ontology. What is important is that plans are created and may disappear (and thus have a limited lifespan), that they can exist without being realized, and that they come with realization conditions. Plans are thus not just properties of events (which do not come with those features). We will say, though, that a plan p is associated with a property of events P(p) so that (41) holds.

(41) For a plan p, the property P(p) holds of an event e just in case e realizes p.

We will adopt a structured conception of properties on which properties (like structured propositions) are composed of relations and their arguments as well as connectives. Thus, 'the property of meeting Mary' will be represented as: λex(AND, ⟨MEET, e⟩, ⟨THEME, e, Mary⟩, ⟨AGENT, e, x⟩). This will allow us to distinguish different roles within a plan: Mary occupies a different role than the agent in a plan of meeting Mary.

The roles in a plan may be occupied by particular individuals or may just serve as placeholders for individuals, filled in a particular realization of the plan. Following Situation Semantics [23], we will take roles that serve that purpose to be filled in by parametric objects. We will call roles in plans filled in by a particular individual specified roles, and those filled in by parametric objects open roles. We can then define a plan event as in (42).

(42) An event e' is a plan event iff for some plan p, for an event e, e' = e qua P(p) (e' = e/P(p)).

The difference between plans with specified roles and plans with open roles matters for the application conditions of *be part of* and *take part in*. If for the sake of simplicity we make use only of plans with single roles, this can be stated as follows:

(43) For a plan event e/P(p, r) for a plan p with a single role r and an individual d,
i. take-part-in(d, e/P(p)) iff r is open and P(p(x/d))(e), where the parametric object x that occupies r is replaced by d.
ii. be-part-of(d, e/P(p, r)) iff r is specified for d and P(p)(e).

We furthermore propose a compositional analysis of *take part in* and *be part of*. That is, the meaning of *take part in* is composed of the contributions of the light verb *take* and

of the light noun *part* (which we will now distinguish as 'PART'). This requires a few remarks about the part structure of plan events.

A qua object e/P will inherit certain properties from e, in particular properties pertaining to e's spatio-temporal location and e's part structure. We have seen that the ordinary noun *part* picks out e's parts when applied to a plan event e/P(p) (*the parts of the ceremony/expedition*). We take that to be the primary part structure of e/P(p).

We deviate from Fine's condition of property-inheritance in (31-c) by also allowing inheritance from a structured gloss P. A so inherited part structure will consist of the specified and open roles in P – just like the slots that compose structural universals in slot mereology [24], [8].

Thus, a plan event e/P(p) has another part structure, inherited from the structured property P, consisting of the specified or open roles of p. These are the parts of e/P(p) that are picked out by the light noun PART. We take that to be the secondary part structure of e qua P. That is, if p involves a role r that is open or specified for an individual d, then r will count as PART of e/P(p). This accounts for examples such as (22) repeated below.

(22) John was part of the ritual/baptism.

Those roles, of course, also belong to the part structure of the plan p as well as plan events that fail to be realized, as in (22-b) repeated below.

(22) John was part of a research expedition (that was never realized).

(44) a. For a plan p, the specified or open roles in P(p) belong to the parts of p.
b. For a plan event e qua P(p), the part structure of p is the secondary part structure of e/P(p).

(45) For any entities d and e, PART(d, e) if d occupies a role r $\in$ D, for the slot-mereological part structure (D, $<$) of e, provided e has such a part structure.

We take the light noun PART itself not to be existence-entailing in the sense of Priest [25], thus accounting for (22-b).

The same light noun *part*, with the same meaning, occurs in *take part in*: *part* again picks out a role in a plan. *Take part in* applied to an individual d and a plan event e/P(p) allows for d to fill in an open role in P(p). *Take part in* requires the plan event to have been realized. We attribute that to the status of light verb *take* as actuality-implying; that is, *take* can be true of entities a and b only if it conveys an actual relation between a and b. *Take* then relates an individual d to a role r in the plan under the condition that d actually occupies r. Thus, we have:

(46) a. take-part-in(d, a) iff for some PART r of a, take(d, r).
b. take(d, r) iff in d actually occupies r.

Unlike *take*, the copula *be* is not associated with an actuality condition, hence the acceptability of (22-b).

Finally, we account for the compositional semantics of *take place*, which as an existence predicate is not existence-presupposing, but just existence-entailing. *Take place* applies to an (existing or non-existing) plan event e/P(p) and requires that there be a place l such that e/P(p) 'takes' l, which means p is actually realized in e at l, which entails that l is actual as in (47).

(47) For a plan event e/P(p), take-place(e/P(p)) iff for an actual place l, take(e/P(p), l).

4. Conclusion

In this paper, we showed two important distinctions among events that are well-reflected in natural language but have largely been ignored, in particular in the context of Davidsonian event semantics. The first distinction is that between base events and plan events, which is reflected crosslinguistically in different existence predicates for events (*occur*, *happen* vs. *take place*) as well as in constraints on predicates of participation like *be part of* and *take part in*. We have shown this with data from English, French, German, and Turkish. Only plan events can come with a slot mereology where roles count as parts, whereas base events only have temporal parts (or other subevent parts). The second distinction is that between open and specified roles in plans and plan events, which we showed to be reflected crosslinguistically in the semantic difference between predicates like *take part in* and *be part of* when applied to individuals and plan events. We have shown this with English, German, French, and Spanish data. Plan events bear a close connection to intentional acts, which motivated a unified ontological account in terms of qua object formation, making use of a highly restricted version of Fine's notion of qua objects applied to acts.

Qua object formation applied to events may not be limited to events that have been planned, plan events. Events may be individuated as qua objects in other ways in particular contexts. One example would be a legal context, in which an accident is not simply an event that occurs but one that comes with a particular legal role, relating to notions of victim, perpetrator, damage, and punishment. Another example is a scientific context, in which an event of lightning is part of a controlled experiment or demonstration and thus is individuated in view of its causal role. In these contexts, *take place* becomes acceptable as an existence predicate; talking about an accident or a lighting taking place appears rather well attested in such context as a quick google search informs us.

References

[1] Davidson D. Events and particulars. Noûs. 1970 Feb 1:25-32.

[2] Hacker PM. Events and objects in space and time. Mind. 1982 Jan 1;91(361):1-9.

[3] Cresswell MJ. Why objects exist but events occur. Studia Logica. 1986 Dec;45:371-5.

[4] Moltmann F. Existence predicates. Synthese. 2020 Jan;197(1):311-35.

[5] Moltmann F. Natural language ontology. In The Routledge Handbook of Metametaphysics 2020 Jul 14 (pp. 325-338). Routledge.

[6] Moltmann F. Natural Language Ontology. In: Zalta EN, Nodelman U, editors. The Stanford Encyclopedia of Philosophy. Winter 2022 ed. Stanford (CA): Metaphysics Research Lab, Stanford University; 2022. Available from: https://plato.stanford.edu/archives/win2022/entries/natural-language-ontology/

[7] Fine K. Naïve metaphysics. Philosophical issues. 2017 Jan 1;27:98-113.

[8] Tarbouriech C, Vieu L, Barton A, Éthier JF. From slot mereology to a mereology of slots. Applied Ontology. 2024 Jun 13;19(2):181-230.

[9] Guarino N, Baratella R, Guizzardi G. Events, their names, and their synchronic structure. Applied Ontology. 2022 May 4;17(2):249-83.

[10] Fine K. Acts, events and things. In Sixth International Wittgenstein Symposium, Kirchberg-Wechsel (Austria) 1982 (pp. 97-105).

[11] Guarino N, Guizzardi G. Relationships and events: towards a general theory of reification and truthmaking. In AI*IA 2016 Advances in Artificial Intelligence: XVth International Conference of the Italian Association for Artificial Intelligence, Genova, Italy, November 29–December 1, 2016, Proceedings XV 2016 (pp. 237-249). Springer International Publishing.
[12] Masolo C, Borgo S, Gangemi A, Guarino N, Oltramari A. Wonderweb deliverable D18-ontology library (final report). National Research Council-Institute of Cognitive Science and Technology. 2003.
[13] Anscombe GE. Intention. Harvard University Press; 2000 Oct 16.
[14] Fine K. Acts and Embodiment. Metaphysics. 2022;5(1):14–28. DOI: https://doi.org/10.5334/met.98
[15] Kayne R. Some notes on comparative syntax with special reference to English and French. In: Cinque G, Kayne R, editors. *The Oxford handbook of comparative syntax*. Oxford: Oxford University Press; 2005. p. 3-69.
[16] Davidson D. The logical form of action sentences. Essays on actions and events. 2001 Sep 27:105-48.
[17] Chisholm RM. The descriptive element in the concept of action. The Journal of Philosophy. 1964 Oct 29;61(20):613-25.
[18] Goldman AI. Theory of human action. Princeton University Press; 2015 Mar 8.
[19] Moltmann F. Events in Contemporary Semantics. In: Bahoh J, Cassina M, Genovesi S, editors. 21st-Century Philosophy of Events: Beyond the Analytic/Continental Divide. Edinburgh: Edinburgh University Press; 2025.
[20] Parsons T. Events in the semantics of English: A study in subatomic semantics.
[21] Piñón C. Durative adverbials for result states. InProceedings of the 18th West Coast Conference on Formal Linguistics 1999 Jun 26 (Vol. 420433). Somerville, Mass.: Cascadilla Press.
[22] Dikmen F, Demirok Ö. Modifying result states in Turkish. In Semantics and Linguistic Theory 2021 Dec 31 (pp. 042-060).
[23] Barwise J, Perry J. Situations and attitudes. The Journal of Philosophy. 1981 Nov 1;78(11):668-91.
[24] Bennett K. Having a part twice over. Australasian Journal of Philosophy. 2013 Mar 1;91(1):83-103.
[25] Priest G. Towards non-being. Oxford University Press; 2016 Sep 22.