Events in Contemporary Semantics

Friederike Moltmann

December 24, 2023

Events have played various roles in philosophy: some philosophers accept events as a genuine ontological category, others have tried to do away with events in favor of property instances, times or space-time regions; some philosophers deny an essential difference between objects and events, both being just four-dimensional 'worms' occupying space-time regions. In linguistics, events are largely taken for granted as a genuine ontological category, and that not only in semantics, but also in syntax. This is due the highly influential semantic proposal by Davidson (1967) on which verbs take events as implicit arguments and adverbials act as predicates of such event arguments, as well as its Neo-Davidsonian version on which verbs are one-place predicates of events and thematic relations connect noun phrases to events in a syntactic structures. The aim of this paper is two-fold. First, it will give an overview of the role of events in semantics against the background of Davidsonian even semantics and its Neo-Davidsonian variant. Second, it will discuss some serious issues for standard views of events in contemporary semantics and present novel proposals of how to address them. These are the semantic role of abstract (or Kimean) states, wide scope occurrences of adverbials, and the status of verbs as event predicates with respect to the mass-count distinction.

1. The semantic roles of events in natural language

1.1. The characteristic properties of events reflected in language

Events as an ontological category are well-reflected in natural language, most obviously in the applicability or understanding of predicates to event nouns. Natural language reflects events as entities that are generally located in space and time, that are fully specific, that are relata of causal relations, and that can be objects of perception. In these respects events sharply differ from facts, as denoted by noun phrases headed by *fact*. Facts are not located in a space and time, they fail to be objects of perception and they are not relata of causal relation. Below are

a range of contrasting examples, where '??' and '???' stand for (weaker and stronger) semantic unacceptability:[1]

(1) a. The meeting was in that room / was yesterday.

    b. ??? The fact that they met was in that room / was yesterday.

(2) a. John's jumping broke the table.

    b. The fact that John jumped broke the table.

(3) a. John observed Bill's jump.

    b. ??? John observed the fact that Bill jumped.

Events unlike facts moreover involve a concrete manifestation, permitting predicates of speed, movement, shape, manner, and intensity:

(4) a. John's speech was slow / strange / loud.

    b. ??? The fact that John spoke was slow / strange / loud.

(5) a. John's jump was high.

    b. ??? The fact that John jumped was high.

(6) a. John's laughter was intense.

    b. ??? The fact that John laughed was intense.

Another difference between events and facts concerns their relation to their descriptions. The nature of a fact is exhausted by the content of an explicit fact description of the sort *the fact that* S, whereas events are generally more specific than their description. The description dependence of facts manifests itself in the inapplicability of verbs of description:

(7) a. Mary described John laughter / John's jump.

    b. ?? John described the fact that John laughed / the fact that John jumped.

(8) a. John described the object: he said it was a book.

    b. ??? John described the book: he said it was a book.

Natural language also reflects a sharp distinction between events and material objects. Events may have temporal parts, but not so material objects, as seen in the understanding of *part of*,

---

[1] Linguistic data that reflect those differences have been pointed out by various philosophers and linguists, first and foremost Vendler (1967).

which can pick out temporal parts of an event in (9a), but only spatial parts of a material object in (9b):[2]

(9) a. Part of the walk was difficult.

   b. Part of the apple is red.

The distinction between material object and events is also reflected linguistically in the choices of existence predicates. Whereas material objects go with *exist,* events in the narrow sense go with *happen, occur*, and *take place* and processes go with *go on*:

(10) a. The house existed for years.

   b. ??? The accident existed yesterday.

(11) a. The accident occurred / happened yesterday.

   b. The strike went on yesterday.

Many semanticists take the category of events to include states (often using Bach's (1986) term 'eventualities' for the broader category). However, there are reasons to distinguish states from the category of events both ontologically and in their semantic role. Setting aside states of bodily positions such as sitting or standing, the notion of a state that natural language reflects is more fact-like than event-like. Thus, Maienborn (2007) argued that most stative verbs (*owe, own, resemble, know, believe*) describe states that fail to have a spatial location, a specific manifestation, and causal relations, and thus, apart from their temporal duration, are on a par with facts. I will return to this issue in Section 1.4.1.

Unlike in philosophy, in contemporary semantics, generally no distinction is made between events and actions. However, we will see that a distinction needs to be made not only for philosophical reasons, but also for semantic reasons (Section 1.4.2.).

1.2. The role events in the semantics of natural language

What roles do events play in natural language? Obviously we can talk about events using noun phases (NPs) referring explicitly to events, NPs with the sortal *event* itself (*the event of the break-in*), NPs with underived event nouns such as *fire*, *war*, and *fight*, and NPs headed by

---

[2] Events can also have spatial parts (e.g. wars and thunderstorms), and some events are able to change their location in space (*The meeting moved to another room, The hurricane moved to the south of the coast*).

deverbal nominalizations such as *walk, laughter, fall,* and *movement*. The importance of events in contemporary semantics, however, is not due to the possibility of referring to events with event nouns. In fact, nouns permit reference to entities of any ontological category and thus events are not particularly special in that respect.[3]

    The particular interest in events in contemporary semantics arises rather from the close connection between events and verbs. Verbs are restricted to describing events. All verbs in English describes events or states .The close connection between verbs and events is also apparent from the sort of meaning that verbs receive when they are derived from nouns. *To mother*, for example, describes an activity of acting like a mother towards someone; it cannot describe a relation between an individual and his or her mother; *to father a child* does not mean to just be a father but becoming a father, *parenting* does not describe the relation of being a parent, but the activity involved in being a parent. It is an interesting question why verbs are restricted to describing events (or states), whereas nouns as such are neutral as regards the ontological category of the entities they may describe.[4]

1.3. The Davidsonian semantics of events

Given that verbs describe events, how is the relation between events and verbs to be understood formally? The most influential formal view about that relation is certainly that of Davidson (1967) as well as its Neo-Davidsonian version.[5] Davidson took verbs to have an additional argument position for events. Thus, the denotation of *walk* is considered a two-

---

[3]   There are interesting issues concerning the distinction between the ordinary use of the noun *event* and technical uses of 'event' in linguistics and philosophy. An 'event' on the ordinary use of the noun seem to be restricted to achievements, that is, events perceived as punctual, as opposed to rain, laughter or a walk:

(i) a. the event of the outbreak of the war
    b.??? the event of the rain / of the laughter / the walk

[4] The apparent close connection between events and verbs seems to be challenged by recent theories of lexical decomposition in syntax. Hale/Kayser (2002) argue that a verb like *walk* is derived from a complex predicate *take a walk*, consisting of the light verb *take* and the event noun *walk*. What characterizes verbs then would not be the ability of describing events, but rather being derived from a complex predicate light verb – event noun. But then it is longer be obvious how to derive the restriction of verbs to events and how to prevent the verbs *to mother* and *to father* from meaning 'be a mother/father'.

[5] There are also researchers that discuss events while remaining neutral how to understand the relation between events and the verbs of sentences that describe them, for example Williams and Bach (1986).

place relation between walking events and agents. (12a) will then have the logical form in (12b):[6]

(12) a. John walked slowly.

   b. ∃e(walk(e, John) & slowly(e))

That is, (12a) means 'there is an event that is a walking by John and *slowly* applies to that event'.

   The motivation for the Davidsonian view was the semantic behavior of adverbials. Before Davidson (1967), adverbials were generally taken to be predicate modifiers denoting (when applied to functions from sets of individuals to sets of individuals). Thus (12a) has the logical form in (13), where *slowly* denotes a function from sets to sets (or n-place relations to n-place relations

(13) [slowly(walk)](John)

If *slowly* in (12a) applies to a set, this would not be adequate, however. If the walkers are just the thinkers in the relevant contexts, then (12a) incorrectly implies that John thought slowly. Adverbials would have to apply to intensions rather than extensions. Davidson idea of using events was meant to avoid intensions for the semantics of adverbials.

   There are further motivations for the Davidsonian analysis. One of them is accounting for valid inferences with adverbials, such as the possibility of dropping adverbials ('Adverbial Drop'):

(14) John walked slowly.

      John walked.

Davidsonian semantics of adverbials validates another inference, Adverbial Permutation (Landman 2000):

(15) John walked slowly with a stick.

---

[6] Davidson's analysis originally was meant to an analysis of action sentences, but given its motivations, it generalizes to all verbs.

(?) John walked with a stick slowly.

While semanticists have taken Adverbial Permutation to be valid (e.g. Pietroski 2005), as a matter of fact, however, the inference of Adverbial Permutation does not generally go through. Adverbial permutation may lead to unacceptability (the lack of a reasonable interpretation), as in the conclusions of (16a) and (16b):

(16) a. <u>John suddenly walked slowly.</u>

      John slowly walked suddenly.

    b. <u>Yesterday John walked slowly on the street.</u>

      ?? Slowly John walked yesterday on the street.

In other cases, such as (15), Adverbial Permutation creates at least discourse-semantic differences between premise and conclusion. In fact, adverb permutation is excluded by recent cartographic theories of adverbials (Cinque 1999). On such theories, different syntactic positions in the syntactic structure of sentences reserved for different types of adverbials (temporal, manner, location adverbials etc.). The question that is then to be addressed is, how are cartographic structures of sentences with adverbials to be interpreted? Do they require a different semantics altogether than Davidsonian event semantics? This question is yet to be pursued.

One clear advantage of Davidsonian event semantics is that it gives a straightforward semantics of event nominalization. In event nominalizations, event adverbials are now adjectival modifiers, interpreted by predicate modification:

(17) a. [*John's slow walk*] = $\iota e[\text{walk}(e, \text{John}) \ \& \ \text{slow}(e)]$

    b. [*John's sudden death*] = $\iota e[\text{death}(e, \text{John}) \ \& \ \text{sudden}(e)]$

The formalization in (17a) might look inadequate, since *John's walk* can only refer to the unique a maximal temporally continuous event of walking. However, temporal maximality is already built into the lexical meaning of *walk*. For example, the sentence *John took two walks* quantifies over two maximally continuous events of walking. Nominalizations thus pick up the event argument of the verb, possibly imposing further lexical conditions on it.

Davidsonian event semantics thus explains another type of valid inference, which one may call 'Nominalization Introduction':

(18) <u>John died suddenly.</u>

    John's death was sudden.

Nominalization introduction, though, applies only to nominalizations that do not impose further lexical conditions that are not already part of the content of the verb.[7]

On the Neo-Davidsonian view (Parsons 1990), verbs are considered one-place predicates of events. Thematic relations connect event participants to events based on the syntactic position of the DPs referring to participants (subject, object and indirect object positions). Thus the logical form of (19a) is as in (19b):

(19) a. John saw Mary.

    b. $\exists e(see(e)\ \&\ agent(John, e)\ \&\ theme(Mary, e))$

An important advantage of the Neo-Davidsonian account is that it represents the alignment of syntactic positions with roles of participants in the event. For that reason the neo-Davidsonian account has become the preferred version of event semantics for syntacticians.[8]

A potential objection to the Neo-Davidsonian account is that there could not be a seeing event without an agent and a theme. The response to that, however, is that lexical argument structure need not reflect the ontological dependence of entities to others. For example, holes are ontologically dependent, but *hole* is not a relational noun.

The Davidsonian and Neo-Davidsonian account raises general questions. One of them concerns positing implicit arguments for events. The sentence *John kissed Mary*, so the objection of some philosophers, is just about John and Mary and the kissing relation. The semantics of adverbials and the possibility of nominalizing have convinced the majority of researchers of the involvement of events in the semantics of verbs. There is also the syntactician's concern about constraining implicit arguments in general. Davidsonian event semantics can respond to that concern with its Neo-Davidsonian version, where events are the only arguments of verbs and in that sense explicit arguments.

---

[7] A variant of Nominalization Introduction involves existence predicates for events:

(i) <u>The tree died slowly.</u>
    The tree's slow death occurred.

[8] See, for example, contributions in Truswell (2019).

A semantic issue that the Davidsonian and Neo-Davidsonian account raises concerns the status of the existential quantifier. A general observation is that the event quantifier does not behave like other quantifiers in a sentence in that it must take narrow scope with respect to negation and other quantifiers. Thus (20) cannot mean that there is a walking event, in which no woman participated:

(20) No woman walked.

A formal way of accounting for special behaviour of the event quantifier is to consider verbs themselves generalized quantifiers existentially quantifying over events and type-lifting adverbials and DPs correspondingly, so as to ensure automatic narrow scope for the event quantifier (Champollion 2015).

On standard Davidsonian event semantics, every verb takes implicit event arguments. It has been argued, however, that this does not hold for stative verbs (of a certain type), as will be discussed shortly.

Do other categories than verbs take implicit event arguments? States have been posited as implicit arguments of adjectives, though there is significant support for tropes (modes) playing that role instead (Moltmann 2015): the range of adjective modifiers appears to constitute just the range of properties tropes (*John is profoundly happy, Harry is strangely irritated, Mary skin is unusually white*). Adjectives show a parallel inferential semantic behaviour to verbs. They validate Modifier Drop, as in (21a) as well as Nominalization Introduction as in (21b) enabling explicit reference to tropes (Moltmann 2009):

(21) a. Mary is profoundly happy.

    b. Mary is happy.

(22) a. Mary is profoundly happy.

    b. Mary's happiness is profound.

Davidsonian event semantics straightforwardly generalizes to tropes or particularized properties as implicit arguments of adjectives (Moltmann 2009). A Neo-Davidonian account of the semantic of adjectives would consider adjectives one-place predicates and ensure the relation between tropes and their bearers through a syntactically established thematic relation of predication. The Neo-Davidsonian account of adjectives is yet to be pursued, though.

1.4. Limits of the Davidsonian view and possible alternatives

1.4.1. States

There are serious challenges to the Davidsonian and NeoDavidsonian account. One of them is stative verbs. The issue with most stative verbs is that they exhibit what is called the Stative Adverb Gap (Katz 2003), that is, they do not generally accept location adverbials, as in (23), manner adverbials, as in (24) or instrumentals or comitatives, as in (25):[9]

(23) a.. ?? Joe owes Bill a bottle of wine in Berlin.

　　 b. ?? Mary resembled Sue in Berlin.

　　 c. ?? John weighs 100 kilos in Germany.

　　 d. ?? John owns the horse in Germany.

　　 e. ?? John knows French in Munich.

(24) a. ?? John weighs 100 kilos with difficulty.

　　 b. ?? John owns the horse with effort.

(25) a ?? John knows French with Mary.

　　 b. ?? John owns the house with a pencil.

One response to the Stative Adverb Gap is to take it to be evidence that stative verbs lack an argument position for event arguments (Katz (2003). The challenge for that view is that stative verbs do take certain kinds of adverbials, for example temporal adverbials and adverbials of mental attitude and they support event anaphora:

(26) a. Now John owes Mary a bottle of wine.

　　 b. John unknowingly owns a bottle of wine.

(27) John owned a horse. But *that* was only for a few years.

---

[9] Another criterion distinguishing the two kinds of stative verbs is their ability to act as bare infinitives of perception verbs:

(i) a. * John saw Bill weigh 100 kilos.

　　 b. * John saw Bill own the house.

　　 c. Mary saw John sleep on the floor.

Another response given by Maienborn (2007) is to take the relevant class of stative verbs to describe states that simply lack the relevant properties, a spatial location, causal properties, a specific manifestation. Such states differ from the sorts of stative verbs that do accept the relevant sorts of adverbials, which include verbs of bodily positions:

(28) a. John is sleeping / standing / kneeling in the living room

b. John was sitting upright in the corner.

(29) a. John stood at the table with difficulty.

b. John was sitting with Mary.

c. John was lying uncomfortably on the couch.

Thus, two sorts of stative verbs to be distinguished: stative verbs: those that describe 'concrete states', as I call them (Moltmann 2013) (or what Maienborn 2007 calls 'Davidsonian states') and those that describe abstract states, as I call them (Moltmann (2013) (or what Maienborn calls 'Kimean states'). Maienborn argues that abstract states fall under what Kim (1976) proposed as a general ontological theory of events. Events on Kim's account are obtained from a property (or relation), subject to existence and identity conditions as below (for the simple case of a dependence on a one-place property):

(30) <u>Kim's theory of events</u>

For individuals d, d', properties P, P', and times t, t',

[1] [d, P, t] exists iff P holds of d at t.

[2] [d, P, t] = [d', P', t'] iff d = d', P = P', t = t'.

Kim's theory gives a highly fine-grained notion of an event, everything that is part of the property P will be event-constitutive or event-defining. Kim, though, does permit an event-characterizing function of adjectival modifiers of event nouns. Thus *John's slow walk* has two formalizations relative to a time t: $\iota e[e = [\lambda x[walk(x)], John, t] \& slow(e)]$ (*slow* is event-characterizing) and $\iota e[e = [\lambda x[slow\ walk(x)], John, t)]$ (*slow* is event-constitutive). [10]

---

[10] This is to account for the possible truth of identity statements with events as in (ia), which would not obtain for identity statements with facts:

(i) a. John's slow walk was John's walk.
   b. The fact that John walked slowly is the fact that John walked.

Kim's theory of events is one of an introduction of an entity by abstraction, which means it introduces an entity that has only those properties that come with its strategy of introduction. (30) does not come with an assignment of a location or a particular manifestation, which means that events can have only a temporal duration, and, of course, they be the objects of attitudes.

Kim's theory of events has been subject to the critique that it captures the notion of a fact', rather than that of an event. In fact, abstract states are on a par with facts; the only difference is that they do not depend on a particular time, but may obtain at different times:

(31) a. The state of war still obtains.
    b. ?? The fact still obtains.

This motivates the following Kimean account of states:

(32) <u>Kimian account of(abstract) states</u>
    a. For a property P, an object o, the state s(o, P) obtains at a time t iff P holds of o at t.
    b. For properties P and P' and objects o and o', s(o, P) = s(o', P) iff P = P' and o = o'.

Abstract states cannot have the same semantic role as events and concrete states, as implicit arguments of verbs. That is because an abstract state depends on the relation expressed by the verb itself, that is, the property (or relation) P in (30) is precisely the property expressed by the verb. If for the sake of a unified semantics abstract states are to be considered implicit arguments, they would have to be defined as arguments of a derivative meaning of the verb. Thus, based on the two-place relation expressed by *own*, a verb *own'* with a derivative meaning will have to be defined as below:

(33) If for objects a, b, *own*(a, b), then *own'*(e, a, b) iff e = s(own, a, b)

It is important to note that this move is not available for the Neo-Davidsonian account, on which verbs are one-place predicates of events (or states). This is a major issue for Davidsonian semantics on its Neo-Davidsonian version, since it would undermine the project of a unified syntactic representation of verbs and their associated thematic relations as well as a unified semantics of verbs.

There may be a way of maintaining the Neo-Davidsonian account while recognizing abstract states. This is by decomposing abstract state verbs in syntax and limiting abstract states to light verbs like *have* and *be*, which are part of the functional, not the lexical part of grammar. Thus *resemble* would be *have resemblance* (or rather *have* + abstract nominal root). *Have* is an abstract state verb, regardless of the kind of adjectival or nominal phrase that it goes with. *Have* then will have a derivative meaning *have'* defined as: if for a and b, *have*(a, b), then *have'*(e, a, b) for some state e such that e = s(HAVE, a, b).[11]

Entities like resemblances (which are relational tropes) from abstract states in ways similar to the difference between events and abstract states. Resemblances, for example, take predicates evaluating manifestations, as in (34a), but not so abstract states, as in (34b):

(34) a. John's resemblance to Bill is striking / unusual.

    b. ??? John's resembling Bill is striking / unusual.

Abstract state verbs like *resemble* thus come with nominalizations, one describing relational tropes or one describing abstract states.

1.4.2. Wide-scope adverbials

Another major issue for Davidsonian event semantics is sentences with wide-scope adverbials. One such case is an adverbial like *suddenly* taking scope over *quickly* below

(35) The ball suddenly rolled quickly.

In (35), *suddenly* evaluates a quick rolling event, not just a rolling event. Peterson's (1997) proposed as a solution positing additional event arguments for adverbs, as in the logical form of (35) in (36):

(36) $\exists e' \exists e (\text{suddenly}(e') \, \& \, \text{quickly}(e', e) \, \& \, \text{roll}(e, \text{the ball}))$

That is, adverbials denote two-place relations between events and events.

---

[11] In fact, if *have* is *be* + preposition (e.g. *with*) underlyingly, as Kayne (2005) and others have argued, then one may limit the relational meaning to the preposition *with*, the abstract state being of the form e = s(WITH, a, b).

The additional argument position for adverbs has already been motivated from the semantics of adjectives, which should take tropes as implicit arguments. Adjectives can generally be turned into adverbs, while preserving the same argument structure. With tropes as implicit arguments of adjectives, *suddenly* in (35) would apply to a trope with an event as bearer: the quickness of the ball's rolling. This is reflected in the result of applying Nominalization Introduction to the two adverbials:

(37) The quickness of the ball's rolling was sudden.

However, this won't account for all readings wide-scope adverbials. Suddenly in (38) may target not just the quickness of Mary's, but Mary's quick walking into the room:

(38) Mary suddenly walked quickly into the room

There are other cases of wide-scope adverbials that cannot be accounted in terms of implicit arguments of adjectives/adverbs. One of them is adverbials taking scope over negation:

(39) John intentionally did not get up before 8am.

Another is adverbials taking scope over quantified NPs:[12]

(40) a. John within minutes eliminated every mistake.
     b. John intentionally mentioned every participant.

(40a) and (40b) differ in meaning from (41a) and (41b), with the universally quantified NP taking scope over the adverbial, on the more natural reading:

(41) a. John eliminated every mistake within minutes.
     b. John mentioned every participant intentionally.

---

[12] An account on which negation and quantifiers have an additional event/trope argument position seems highly implausible.

One proposal of dealing with wide-scope adverbials as in (45a, b) is in terms of truthmaking (Moltmann 2007, 2021). The truthmaking relation obtains between a situation (or event) e and a sentence S (e ⊩ S) iff S is true in virtue of S and e is wholly relevant for the truth of S (Fine 2017). Standard conditions on the truthmaking of dsijunctions existential quatification and conjunction are given in (41): The condition on the truthmaking of a negated sentence below is adopted from Fine (2017) and involves the relation of falsity making , a relation that holds between a situation and a sentence just in case s makes S false and is wholly relevant to the falsity of S. situation that is a falsity maker of the corepsodningthe condition on the truthmaking of universally quantified sentences in (43), adopted from Armstrong (1997, 2004) captures a condition on exhaustiveness conveyed by the universal quantifier.

(41) a. e ⊩ A ∨ B iff e ⊩ A or e ⊩ B

b. e ⊩ ∃x S iff for some substitution instance S' of S with respect to 'x', e ⊩ S'.

c. e ⊩ S & S' iff there are entities e, e', and e'' such that e = sum({e', e''}), and

e' ⊩ S and e'' ⊩ S'.

(42) a. e ⊩ ¬S iff e ⊫ S

b. e ⊩ *Every* A *is* B iff there are events e' and e'' such that e = sum({e', e''}) and for any substitution instance S of *every* A *is* B, there is an event e''' such that e''' < e'' and e''' ⊩ S and e' = ALL(e'', sum({e | e ⊩ S', for some substitution instance S' of *every* A *is* B})).

The idea is that in (39) *intentionally* applies to a truth maker of *John did not get up before 8am*, and in (40a) *within minutes* applies to a truthmaker of *John eliminated every mistake*. Thus, (39) and (40a) has the truthmaking conditions below, where truthmaking is also applied to pairs<*P*, *d*> consisting of a property *P* and an object *d*:

 (44) a. e ⊩ John intentionally did not get up before 8 am iff there is a situation e' such that

e ⊩ <[*intentionally*], e'> & e' ⊩ *John did get not up before 8am* iff there is a situation e' such that e ⊩ <[*intentionally*], e'> & e' ⊫ *John did get up before 8am.*

b. e ⊩ *John eliminated every mistake within minutes* iff there is a situation e'

such that: e $\Vdash$ <[*within minutes*], e'> & e' $\Vdash$ *John eliminated every mistake*

However, using truthmaking is insufficient for adverbials such as *intentionally*, which apply to actions and not just events.[13] Unlike events, actions are individuated by intentions, whose content is propositional and may, for example, be existentially quantified. Actions are not just truthmakers of bearers of propositional content. Take a situation in which Joe implements his intention of killing a woman, whoever she may turn out to be. Then (45a) is true, but not (45b):

(45) a. John intentionally killed a woman.

    b. John intentionally killed Sue.

Given standard truthmaking conditions as in (46), if John killed Sue, then *John killed a woman* shares a truthmaker with *John killed Sue*, and thus *intentionally* will apply to the same entity in (49a) and (49b). This is inadequate: *intentionally* in (49a) applies to an action for which an existentially quantified intention is constitutive.

Fine's (1982, 2022) theory of acts is designed to account for such differences. For Fine acts are qua objects, that is, they are objects *d/P* are composed of a (lower-level) act *d* and a property *P* such that *P* holds of *P*. Qua objects are subject to the following conditions:

(45) a. Existence: For an object *d* and a property *P*, *d/P* exists (at *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.[14]

There are two ways of composing qua objects from a given qua object d/P and a property P' and P', by horizontal glossing, as in (46a), and by vertical glossing, as in (46b):

(46) a. d qua (P & P')

---

[13] A number of philosophers (von Wright 1963, Chisholm 1964, Bach 1980) have argued for an ontological distinction between actions, taking actions to the bringing about of an event. Linguists generally do not distinguish between actions and events for semantic purposes.

[14] Inheritance actually holds only for few properties, basically spatio-temporal location. John qua teacher inherits his spatio-temporal location from John while he is a teacher. The act of killing of Sue inherits its spatial location from the triggering of the shot by which it was performed, Sue's death being just part of the property P (and thus an aspectual part of the act).

b. (d qua P) qua P'

The two forms of glossing would account for the two readings of *suddenly* in (35) and (38): (35) would involve vertical glossing and (38) horizontal glossing.

As to the linguistic data the theory of acts as qua objects is applied to, Fine focuses on act description of the form in (47a) and (47b):

(47) a. the quick act of walking

b. the act of walking quickly

Like Kim (1976), Fine distinguishes an act-describing (event-characterizing) and an act-definitive (event-constitutive) function of modifiers: *quick* in (47a) can have both functions, *quickly* in (47b) can only have an act-definitive function, that is, it can only contribute to the very definition of the act itself.

The theory applies to the two acts described in (45a, b) as follows. Suppose John killed Sue by firing a shot; then John's act of killing a woman in (49a) will be the act of firing a shot qua being a killing of a woman, and John's act of killing Sue in (49b) will be John's firing a shot qua killing Sue. The two acts thus are distinguished by being composed from distinct glosses.

There is a problem with Fine's theory of acts as qua objects. For an act *d* qua *P*, P must hold of *d*, and thus for the act that is John's firing a short qua being a killing of a woman, the property 'being a killing of a woman' must also hold of the firing of the shot. But the theory was meant to distinguish the two acts ontologically. The theory of qua objects in fact requires P to be possibly accidental property of acts (for example the property of causing Sue's death) , but verbs generally do not describe accidental properties of events and the theory would thus be inapplicable to ordinary act descriptions or adverbial modification.

Another difficulty arises with the treatment of adverbials that goes along with the Finean theory of acts, and that concerns its integration into a compositional semantics. Given how the theory of acts as qua objects is set up, the logical form of (44a) would be:

(48) ∃d(intentional(d qua being a killing a woman by John))

This is of course a completely different semantic treatment of adverbials than Davidsonian event semantics.

A simple way of addressing both the ontological and the semantic concern is the following. Acts have a double nature: they are concrete events and they come with a gloss, which is propositional. The gloss consists just in how the concrete event was described. Semantically, this means that Davidsonian event semantics will be combined with complex event predicates as glosses of acts as qua objects. The logical form of (45a) then will be:

(49) ∃e(kill(e, John, Sue) & intentional(e qua being a killing a woman))

Such an interpretation will have to be based *intentional* taking a scope that will be interpreted as a property of events. Subsequently qua object formation will apply to the Davidsonian event argument and that event property. Fine considers the noun *act* as an operator, ensuring the interpretation of its scope an event property. Making use of that suggestion, one may posit a silent functional element *ACT*, heading an *ACT*-phrase, to be interpreted as an event property that provides the gloss for the Davidsonian event argument of the verb.

(50) John intentionally [$_{ActP}$ ACT killed a woman].

Given this proposal, the theory of qua objects would no longer account for the by-relation among acts (one act being grounded in another); it would only serve to distinguish acts from events.

The proposal will need to be combined with the introduction of events as truthmakers when adverbials (like *intentionally*) take scope over other adverbials, universally quantified NPs, or negation as in (38, (39), and (40b). In such cases, it would be the truthmaker of a larger sentential unit that will combine with a gloss as a qua object.

1.5. Event Types and the Mass-Count Distinction in the Verbal Domain of Events

Natural language semantics has long concerned itself with certain distinctions among types of events or event predicates, that is, aktionsarten or aspectual classes. The distinction among aktionsarten reflects the applicability or reading of adverbials and verbal aspect such as the progressive. Following Vendler (1957), Mourelatos (1978) and others, verbs are standardly classified into activities (*walk, talk*), accomplishments (*build a box*), achievements (*reach the summit, jump*), and statives (*sit, lie, sleep, own a house*). Activities and statives also form the class of atelic verbs and accomplishments and achievements the class of telic verbs. Events

described by achievement verbs are perceived as punctual, not permitting *in*-adverbials. As such, they are either culminations of actions (*reach the summit, arrive at the station*) or 'lucky achievements' or 'happenings' (*win the lottery, miss the bus, recognize a friend*). Activities and statives take *for*-adverbials, but not so achievements and accomplishments:[15]

(51) a. John walked / stood / was satisfied for a while.

   b. ??? John built the box / fell down for a while.

A less used criterion for the same distinction is the applicability of the verb phrases *spend an hour* and *take an hour*:

(52) a. John spent an hour walking / talking / standing / ??? building the box / ???
      recognizing Mary.

   b. John took an hour building the box / ??? walking / ??? talking./ recognizing Mary.

There is a general issue of what is being distinguished by such criteria – types of events, types of verbs, VPs, or sentences. Examples such as those below show that the form of the complement matters, which means that the classification concerns VPs or even sentences, rather than verbs or events themselves:

(53) a. John walked for an hour / ??? in an hour..

   b. John walked to the house in an hour / ??? for an hour..

(54) a. Suddenly / ??? For an hour, a cloud appeared

   b. For an hour new clouds appeared.

   It is a common view that distinction telic – atelic corresponds to mass-singular distinction in the nominal domain (Bach 1986). That is, the content of the mass-count distinction among nouns is the very same distinction as that between telic and atelic event predicates.

   The syntactic mass-count distinction is generally taken to have as its content differences in extensional mereological properties of noun extensions, in the tradition of Link (1983). According to that view, the extension N of a singular count nouns N is *atomic*, that is, for any *d* in the extension of *d*, no proper part of d is in the extension of N. The extension of a plural

---

[15] For a more complete list see Dowty (1979)

noun *N* consists of the sum of all non-empty subsets of the extension of N, which means that the extension of plural nouns is *cumulative* (the sum of any two elements in a set is again in that set). The extension of a mass noun *N*, on that view, is taken to be *homogenous*, that is, the extension of *N* is cumulative and, more problematically, *divisive*, that is, for any *d* in the extension of a mass noun *N*, a proper part of *d* is again in the extension of *N*.

The view advanced by Bach (1967) and others following him then is that the distinction between telic and atelic event predicates consists in the same semantic distinction as that between mass nouns and count nouns: telic event predicates have atomic and cumulative extensions, atelic event predicates have cumulative and (generally) divisive extensions.

Cumulativity for telic event predicates is motivated not only from the possibility of repetitive readings, but also the possibility of plural arguments of distributive predicates like *sleep* or *walk* :

(55) a. John and Mary slept.

    b. The students walked to school.

The standard view in contemporary semantics is that plurals like *John and Mary* and *the students* stand for sums of individuals, and that requires the corresponding Davidsonian event argument to be a sum event as well (Moltmann 1997):

(56) For an intransitive verb V, if for events e and e' and individuals d and d',

    V(e, d) and (V(e', d'), then V(d $\oplus$ d', e $\oplus$ e).

Here '$\oplus$' is the sum formation operation. Thus, the predicate *sleep* in (55a) will take as Davidsonian argument the sum event consisting of the sleeping John and the sleeping of Mary.

Despite shared extensional mereological properties of extensions, there are reasons not to take the verbal domain to divide into the same mass-count distinction as the nominal domain. This has to do with the nature of the mass-count distinction as such. The mass-count distinction is first of all a morpho-syntactic distinction among nouns. Count nouns come with the plural, mass nouns do not. Count nouns syntactically permit the application of numerals (*two trees, one boat*), mass nouns don't (*two wood, three gold*); they require a classifier that enables the application of numerals (*two pieces of cake, two portions of rice*). Singular count NPs go with the indefinite anaphor *one* (*one of them*); mass NPs do not.

There are notorious problems for the extensional mereological view of the content of the mass-count distinction. Furniture-type nouns (*furniture, jewelry, law enforcement*) are mass, yet they have an atomic extension. Sequence-type nouns (*sequence, line, fence, surface*) are count, but they fail to have atomic extensions. Extensional mereological properties do not obviously capture what distinguishes mass nouns from count nouns. What is clear, however, is that the application of singular count nouns, intuitively, ensures countability , that is, the applicability of numerals and count quantifiers and anaphora. There are recent alternative approaches to the mass-count distinction on which the use of a singular count category is, in some way, constitutive of the content of count nouns as opposed to mass nouns that is, on which the use of singular count is unity-constitutive and the use of non-count category is not. Thus, Borer (2005) posits different syntactic structures for count NPs and mass NPs, the former involving a classifier category, but not the latter. Rothstein (2017) takes count nouns to have a different semantic type than mass nouns, and Moltmann (2021) makes use of a primitive notion of unity associated with the use of count nouns but not mass nouns.

Verbs in English and other European languages do not come with a singular-plural distinction. They side with mass nouns with respect to other criteria as well. Across languages, simple adverbial quantifiers are formed from nominal mass quantifiers such as *little, much, a little bit*, *a great deal*. For count quantifiers to range over the event arguments of verbs, they require the noun *time,* Count quantifiers such as *a large number* and *a couple* require the addition of *times*:[16]

(57) a. John jumped too much / * too many / too many times.

    b. John slept / worked too little / * too few / too few times.

    c. John stumbled many / * a few / a few times.

    d. John slept / worked little / * too many / too many times.

    e. John was inattentive too little / * too many / too many times.

(58) a. John slept a little bit / * a couple / a couple of times.

    b. Last week, Mary worked out a great deal / too much / * a great number / a great number of times.[17]

---

[16] This holds not just for English, but crosslinguistically for corresponding nouns such as German *Mal*, French *fois*, Italian *volta*, Spanish *vez,* and Mandarin Chinese *ci*. etc. (Moltmann 1997, chap. 7.2., Doetjes 2008).

[17] *A great deal* sounds better with verbs than *a great amount*; the latter is fine with event nouns though:

(i) a. ? John worked a great amount

    b. great deal / amount of work

c. John and Mary argued a good deal / * a great number / a great number of times.

d. John jumped a bit / * a couple / a couple of times.

e. John worked out a little bit / a great number / a great number of times this year.

A little bit, a great/good deal, can act as adverbial modifiers whether the verb describes bounded events (*jump*) or unbounded ones (*sleep, work, work out, argue*).[18] *A little bit* and *a great deal* are mass quantifiers; *a great / large number* and *a couple* are count NPs of the very same syntactic structure, but for them to act as adverbial quantifiers ranging over events requires the addition of *times*.

Cardinal and ordinal numerals behave just like count quantifiers, not being able to act adverbially without the addition of the event classifier *times*, and that regardless of the Aktionsart of the verb, that is, even with achievements and accomplishments:[19]

(59) a. * John died only one.

   b. John died only one time / once.

(60) a. * John jumped three.

   b. John jumped three times.

(61) a. * John ran to the house four.

   b. John ran to the house four times.

---

  c. a good deal / amount of arguing

[18] There are some restrictions as to what verbs *much* and *little* can apply, depending on the nature and the structure of the events described. For example, *much* and *little* are rather bad with stative verbs (as opposed to adverbials like *strongly* or *well*):

(i) a. ??? Mary believes little / too much that it will rain tomorrow.
   b.??? John knows French too much.

They are also bad when applied to verbs describing single events:

(ii) ??? The bird died little.

But if the verb is sufficiently neutral, *little* can also apply when a single achievement is described:

(iii) Little happened, only the bird died.

The fact that there are constraints on the domain to which event mass quantifiers can apply does not go against the generalization that verbs go with mass quantifiers rather than count quantifiers.

[19] *Once* and *twice* have been analysed by Kayne (2015) as containing silent *time*, as *on-time-ce* and *tw-time-ce*. In French (*une fois, deux fois*) and Italian (*una volta, due volte*), the numeral classifier is explicit.

Ordinals like *first, second*, *third* etc. *can* act as adverbials in sentence-initial position when ranking the proposition asserted in a list of others (*Third, John stumbled*). But ordinal numerals cannot act as adverbials ranking the described event in a list of events of the same type - unless they combine with *time(s)*:[20]

(62) a. ??? Mary stumbled third(ly).

    b. Mary stumbled a third time.

(63) a. ??? John married second(ly).

    b. John married a second time.

By specifying countability and thus making count quantifier and numerals applicable, *time* has the semantic function of a numeral classifier. In fact, *times* has the syntactic properties and the semantic function of a numeral classifier (Doetjes 1997, Landman 2006).[21] *Times* ensures the countability of event units on the basis of three conditions obtaining, illustrated in (65):

(64) <u>The meaning of the event classifier *time*</u>

    For an event e, *time*(e) iff either (i), (ii) or (iii):

    (i) e has an inherent boundary (is an essential integrated whole)

    (ii) e is maximally continuous in time

    (iii) e occurs at a particular contextually given occasion.

(65) a. John fell three times.

    b. John slept three times today.

    c. John was attentive three times.

---

[20] In English, ordinals can occur adverbially ranking an even participant with respect to other individuals playing the same thematic role with respect to the same type of event:

(i) John entered first.

However here *first* is a subject-oriented secondary predicates, not as an event predicate, just like *fully dressed* below:

(ii) John entered fully dressed.

[21] *Time(s)* exhibits other properties characteristic of individuating classifiers, such as not allowing adjectival modifiers (Cheng/Sybesma 1999):

(i) a. ??? John stumbled three unusual times.
   b. ??? We met three beautiful times.

Condition (64i) obtains in the case of (65a), (64ii) in the case of (65b), and (64iii) in the case of (65c). *Time(s)* fails to apply when no event-individuating conditions obtain, for example, under ordinary circumstances, below:

(66) ??? John knew Bill a few times.

The countability imposed by *-times* thus does not come for free, but needs to be grounded in conditions to be fulfilled by the described events in the context of use.[22]

Frequency adverbials may seem to pose a challenge to the generalization that count quantifiers do not apply to verbs. Frequency adverbials appear to be count quantifiers able to modify verbs without the presence of *time(s):*

(67) a. John stumbled frequently.
     b. John slept frequently.

However, frequency adverbials do not presuppose countability, but rather they introduce it, just like *times*. Thus, the adjective *frequent*, from which *frequently* is derived, can modify event mass nouns as in (68a, b) and not just event plural nouns as in (68c):[23]

(68) a. the frequent rain
     b. the frequent fog in this region
     c. the frequent rainfalls

---

[22] Lack of support of plural anaphora might be considered further evidence for the mass status of events, as argued in Moltmann (1997, Chap. 5). Thus, Geis (1975) noted that conjunctions of VPs do not support plural anaphora, unlike conjunctions of NPs

(i) a. Mary greeted Bill and ignored Sue. * They (ok This) happened this morning.
    b. I noticed Mary's greeting of Bill and ignoring of Sue. Bob noticed them too.

Plural anaphora in English, however, are supported also by conjoined mass NPs

(ii) a. John bought rice and milk. He forgot to bring them home.
     b. John tried the wine and the juice. Mary tried them too.

The generalization is rather that *they* requires a nominal antecedent in English.

[23] See Moltmann (1997, Chap. 5.1., p. 142ff).

Frequent(ly) introduces countability on the basis of the same conditions as the unity-introducing classifier *times*: inherent boundedness of events, maximal continuity, and connectedness to occasions. Semantically, *frequent* thus decomposes into what is conveyed by *times* and a count or metrical quantifier, that is, roughly, as 'many times'.

By requiring a numeral classifier for a count quantifier or numeral to apply, verbs pattern just like nouns in languages without a morpho-syntactic mass-count distinction such as Chinese (on the standard view). This is entirely expected given that verbs, at leastin European languages, do not participate in a syntactic mass-count distinction and given that the mere use of the singular count category is itself tied to countability, as the basis for the applicability of numerals and count quantifiers.[24]

Note also that event quantifiers range over event either counting or measuring events:

(69) a. It rained a lot.

   b. Joe misspoke a lot.

   c. John has negotiated a lot.

(70) a. John walked more than Mary.

   b. John fell more than Mary.

A lot in (69a) and *more* in (70a) have measuring reading and in (69b) and (70b) a count reading, (69c displays both readings). The same holds for quantifiers applied *to* mass nouns: *a lot of* in *a lot of water* measures, *a lot* in *a lot of furniture* counts. Quantity estimation are based on measuring or counting, and involve a notion of counting that is cognitively relevant, but not linguistically marked as such.

Nominalizations of events are nouns and as such do participate in the mass-count distinction. For the choice of a mass noun or count noun telicity may matter, as in (71a). However, nominalization may also impose new lexical conditions on an event being temporally maximal, as is the case for the count nominalization *walk* as in (71b):

(71) a. two deaths, the first death

   b. The two walks John took today where both an hour long.

---

[24] There are languages in which verbs mark event plurality (pluractionality) (Henderson 2019). In those languages, verbs do seem to mark a mass-count distinction,though it has also been argued that pluractionality is a marker of amount rather than of true plurality (Doetjes 2008s).

Thus, even though verbs as event predicates classify as mass with respect to the applicability of quantifiers and numerals, the individuation of events (having a boundary or not) plays a role for the choice of mass or count for event nominalizations (in addition to how quantifiers like *a lot* or *more* are understood).[25]

5. Summary

Davidsonian (or Neo-Davidsonian) event semantics has enjoyed enormous popularity both in semantics and in research in the syntax-semantics interface within generative grammar. Yet, Davidsonian event semantics faces important challenges that have received little attention. One of them is the notion of an abstract state as the sort of entity associated with (most) stative verbs, a particularly serious issue for the Neodavisonian version of event semantics. ; Another important challenge to Davidsonian event semantics is wide scope uses of adverbials. In part the challenge can be addressed by making use of additional trope arguments of adjectives (and thus adverbials), in part they may be accounted for by introducing events or situation through truthmaking, in part they require distinguishing actions from events and possibly construing actions as events accompanied by an additional propositional gloss. Events, being tied to the category of verbs, do not enjoy the same grammar-based individuation as referents of noun phrases. Verbs do not come with a mass-count distinction in English and related languages and thus are formally classified as mass, rather than dividing into mass and count, even for verbs whose event argument position shares the same mereological properties as plural nouns.

References

Armstrong, D. (2004): *Truth and Truthmakers*. Cambridge UP, Cambridge.

Austin, J. L. (1979): 'Unfair to Facts'. *Philosophical Papers*. Oxford University Press, New York.

Bach, E. (1986): 'The Algebra of Events', *Linguistics and Philosophy* 9, 5-16.

Bach, K. (1980): 'Actions are not Events'. Mind 89, 114-120.

Barner, D., L. Wagner and J. Snedeker (2008): 'Events and the ontology of individuals: Verbs as a source of individuating mass and count nouns.' *Cognition* 106.2, 805-832.

---

[25] See also Barner, Wagner and Snedeker (2008).

Barner, D. and J. Snedeker (2005): 'Quantity judgments and individuation: Evidence that mass nouns count.' *Cognition* 97, 41–66

Borer, H. (2005): *In Name only (Structuring Sense I).* Oxford UP, Oxford

Champollion, L. (2015): 'The Interaction of Compositional Semantics and Event Semantics'. *Linguistics and Philosophy* 8.1, 31-66.

Chisholm, R. (1964):'The Descriptive Element in the Theory of Action'..*Journal of Philosophy* 60, 613-625.

Cinque, G. (1999): *Adverbs and Functional Heads*. Oxford Studies in Comparative Syntax. Oxford University Press, New York.

Doetjes J. (1997): *Quantifiers and Selection: The Distribution of Quantifying Expressions in French, Dutch and English*. Ph.D. Dissertation. University of Leiden

------------- (2008): 'Counting and Degree Modification'. *Recherches Linguistiques de Vincennes* 37,139-161

Davidson, D. (1967): 'The Logical Form of Action sentences'. In N. Rescher (ed.): *The Logic of Decision and Action*. Pittsburgh University Press, Pittsburgh, 81–95. Reprinted in D. Davidson: *Essays on Actions and Events.*

Fine, K. (1982): 'Acts, Events and Things", in Leinfellner, W., Kraemer, E., and Schank, J. (eds): *Proceedings of the 6th International Wittgenstein Symposium* 8, 97–105, ¨ Wien, Austria: Holder-Pichler-Tempsky.

--------- (2017): 'Truthmaker Semantics'. In Bob Hale / Crispin Wright /Alex Miller (eds.): *A Companion to the Philosophy of Language*, John Wiley & Sons, Ltd, Chichester, UK (online).

------------ (2022): 'Acts and Embodiment'. *Metaphysics* 5 (1):,14–28.

Hale, K. and S. J. Kayser (2002): *Prolegomenon to a Theory of Argument Structure*. MIT Press, Cambridge (UMass.).

Hendersen, R. (2019): 'Pluractionality and distributivity'. *Handbook of North American Languages*, de Gruyter, Berlin.

Higginbotham, J. (2000): 'On Events in Linguistic Semantics'. In Higginbotham et al. (2000): *Speaking of Events*. Oxford UP, Oxford.

Katz, G. (2003): 'Events as Arguments, Adverb Selection, and the Stative Adverb Gap'. In E. Lang eds. (eds.): *Modifying Adjuncts*, de Gruyter.

Kim, J. (1976): 'Events as property exemplifications'. In M. Brand / D. Walton (eds.): *Action Theory*. Dordrecht: Reidel.

Landman, F. (2000): *Events and Plurality*. Kluwer, Dordrecht.

Link, G. (1983): 'The Logical Alllllnalysis of Plurals and Mass Terms: A Lattice-theoretical approach'. In R. Bäuerle et al. (eds): *Meaning, Use and Interpretation of Language*. De Gruyter, Berlin, 303–323.

Maienborn, C. (2007): 'On Davidsonian and Kimian States'. In: I. Comorovski & K. von Heusinger (eds.). *Existence: Semantics and Syntax*. Dordrecht: Springer, 107–130.

Moltmann, F. (1997): *Parts and Wholes in Semantics*. Oxford UP, New York.

---------------- (2007): 'Events, Tropes and Truthmaking'. *Philosophical Studies* 134, 2007, 363-403.

---------------- (2009): 'Degree Structure as Trope Structure. A Trope-Based Analysis of Positive and Comparative Adjectives. *Linguistics and Philosophy* 32.1., 51-94.

---------------- (2013): 'On the Distinction between Abstract States, Concrete States, and Tropes'. A. Mari / C. Beyssade / F. Del Prete (eds.): *Genericity*, Oxford UP, Oxford, 292-311.

----------------- (2019): Nominals and Event Structure. In R. Truswell (ed.): *Oxford Hanbook of Event Structure*. Oxford UP, Oxford.

---------------- (2021): 'Levels of Ontology and Natural Language: The Case of the Ontology of Parts and Wholes'. In J. Miller (ed.): *The Language of Ontology*. Oxford University Press, Oxford.

Mourelatos, A. (1978): 'Events, Processes, and States', *Linguistics and Philosophy* 2, 415–434.

Parsons, T. (1990): *Events in the Semantics of English*. MIT Press, Cambridge (Mass.).

Peterson, P. (1997): *Fact, Proposition, Event*. Kluwer, Dordrecht.

Rothstein, S. (2017): *Semantics for Counting and Measuring*. Cambridge, Cambridge UP, Cambridge.

Truswell, R. (ed.) (2019): *Oxford Handbook of Event Structure*. Oxford UP, Oxford.

Vendler, Z. (1957): 'Verbs and times'. *The Philosophical Review* 66, 143–160.

------------- (1967): 'Facts and Events'. In Z. Vendler: *Linguistics in Philosophy*, Cornell UP, Ithaca.

Wellwood, A., V. Hacquard, and R. Pancheva (2012): 'Measuring and comparing individuals and events'. *Journal of Semantics* 29.2, 207-228.

Williams, A. (2021): 'Events in Semantics'. In P. Stalmaszscuk (ed.): *Cambridge Handbook of the Philosophy of Language*. Cambridge UP, Cambridge.

Von Wright, G. H. (1963): *Norm and Action: A Logical Inquiry*. Humanities Press, New York.

Williams, D. C. (1953): 'On the Elements of Being'. *Review of Metaphysics* 7, 3-18.