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EVENTS, TROPES, AND TRUTHMAKING

ABSTRACT. Nominalizations are expressions that are particularly challenging philosophically in that they help form singular terms that seem to refer to abstract or derived objects often considered controversial. The three standard views about the semantics of nominalizations are [1] that they map mere meanings onto objects, [2] that they refer to implicit arguments, and [3] that they introduce new objects, in virtue of their compositional semantics. In the second case, nominalizations do not add anything new but pick up objects that would be present anyway in the semantic structure of a corresponding sentence without a nominalization. In the first and third case, nominalizations in a sense ‘create’ new objects’, enriching the ontology on the basis of the meaning of expressions. I will argue that there is a fourth kind of nominalization which requires a quite different treatment. These are nominalizations that introduce ‘new’ objects, but only partially characterize them. Such nominalizations generally refer to events or tropes. I will explore an account according to which such nominalizations refer to truth makers.

While the view that (certain) sentences take concrete objects as truthmakers is not an uncontroversial philosophical view, I will argue that it does receive support from the semantics of certain nominalizations.

Nominalization, the linguistic process that turns expressions of various categories into nouns, allows for the formation of a referential term from predicative expressions, such as adjectives or verbs, leading to terms referring to what Montague would call ‘philosophical entities’ such as states, events, properties, or particularized, properties (tropes).¹ The question is, how are nominalizations able to refer to such entities on the basis of the meaning of the underlying adjective or verb – the base expression? Common views are that a nominalization is able to refer to an entity d because d acts as an implicit argument of the base expression or d is the mean-

ing or a reification of the meaning of the base expression, or else because *d* has been constructed from such a meaning, in one way or another. I will argue that there are nominalizations of yet another kind, nominalizations that refer to entities which are only partially characterized by the base expression (and thus could not possibly be ‘constructed’ from its meaning) and yet are better not considered implicit arguments of the base expression either. These are in particular nominalizations referring to events and to tropes (or trope-like entities). The way event and trope nominalizations find their referent, I will argue, is by referring to the truth maker of a corresponding proposition. If this account of event and trope nominalizations is right, then natural language gives particular evidence for the view that sentences take concrete objects, including events and tropes, as truth makers. The idea of truthmaking, which has not been made use of so far in formal semantics, can be further exploited for a new semantic analysis of adverbial modification.

In the case of events, I will provide a number of arguments both against the view of Kim (according to which event nominalizations refer to entities constructed from the meaning of the base expression, i.e., to property exemplifications) and against the Davidsonian view (according to which event nominalizations refer to implicit arguments of verbs, to primitive objects). The former view is equally problematic for trope nominalizations. The latter view moreover lacks independent motivations in the case of tropes.

1. KINDS OF NOMINALIZATIONS

First some terminological clarifications. I will call both nouns obtained from expressions of another category and NPs containing such nouns as head nouns (e.g. *John’s walk* or *Mary’s beauty*) ‘nominalizations’.² I will also call constructions like *the fact that S* nominalizations, as they make crucial use of a sentence (a nonreferential expression) as the base expression. For example, the base expression of *wisdom*

is *wise* and of *the fact that it is raining, it is raining*. Four views of nominalizations, or perhaps better four kinds of nominalizations, can be distinguished:

[1] nominalizations that refer to an argument of the base expression

Rather uncontroversial cases of this kind are agent and result nominalizations such as *producer* and *product*. But also event nominalizations such as *walk* or *laughter* belong here, given a Davidsonian view of events on which events act as implicit arguments of verbs (Davidson, 1967). Given that view, the noun *walk* would express the same relation between events and agents as the verb *walk*, so that *John's walk* would refer to a unique event (in the context) standing in the walking relation to John (cf. Higginbotham, 1985).

[2] nominalizations that refer to reifications of meanings

Nominalizations of this kind would refer to reifications of the meaning of the base expression. Commonly adjective nominalizations such as *wisdom*, *happiness*, *generosity*, *effectiveness* are taken to be of this type. Such nominalizations, when used without a determiner, are supposed to act as singular terms referring to the meaning of the adjectives from which they are derived, that is, to the properties such adjectives express (cf. Loux 1998). Also nominalizations in an extended sense such as *the thought that S* and *the claim that S* are often supposed to refer to objects which are meanings, namely the meanings of *that*-clauses (propositions).³

[3] nominalizations that introduce 'new objects'

These nominalizations refer to objects whose nature is entirely given by the meaning of the base expression, without, though, being identical to that meaning. This can mean either of two things: [1] the object is literally constructed from the meaning of the base expression or [2] the object as such is independent of the meaning of the base expression, but has an internal composition that corresponds to the compositional semantics of the base expression. Either way, the object that nominalizations of the third kind refer to would not be present in the semantic structure of the sentence in the absence of the nominalization.⁴

For the present discussion, the choice between these two options should not concern us; what is important is only that there would not be more to the internal nature of the referent than is, in some way, mirrored in the complexity of the meaning of the nominalization. There are three candidates for which such a nominalization process is extremely plausible: fact nominalizations such as *the fact that S*, closely related to that ‘possibility nominalizations’ such as *the possibility that S*, and finally state nominalizations such as *Mary’s being happy*.^{5,6}

That the nature of the objects such nominalizations refer to are entities whose nature is entirely reflected in the compositional meaning of the nominalization can be captured by identity and existence conditions which will involve just the semantic values involved in the nominalization as well their composition. Thus, a simple fact such as the fact that John is happy can be viewed as a function of John, the property of being happy and a time, with identity and existence conditions as follows:

- (1) a. A fact that is the object o having the property P at the time t $f(P, o, t)$ is identical to the fact that is the object o' having the property P' at the time t' $f(P', o', t')$ iff $o = o'$, $P = P'$, and $t = t'$.
- b. A fact that is the object o having the property P at time t $f(P, o, t)$ exists iff P holds of o at t .

[4] nominalizations that do not refer at all:

These would be a deflationist account of nominalizations such as that of Carnap (1956). On that view, there are no actual objects nominalizations of the relevant sort stand for, but rather the process of nominalization would go along with rules for forming true or false sentences with the nominalization on the basis of true or false sentences involving the relevant base expression, rules such as *the proposition that S* is true if and only if S is true.⁷

I will argue that there are nominalizations of yet another sort, nominalizations that introduce a ‘new object’ into the

semantic structure of a sentence (that is, an object that would not be present in the semantic structure in the absence of the nominalization), but at the same time only partially characterize that object. That is, the object of reference of such a nominalization owes its presence in the semantic structure of a sentence to the nominalization only, but it is not entirely identified by the semantic content of the nominalization. The two most important types of such nominalizations are first nominalizations of the sort *John's wisdom*, John's happiness, or John's generosity, which I will call (not entirely accurately) 'trope nominalizations', and second event nominalizations such as *John's walk* or John's laughter.

Of course, the case for event nominalizations hinges on a particular view about the role of events in the semantic structure of simple sentences (without event nominalization). On a Davidsonian view, event nominalizations simply pick up an implicit argument of the verb and thus event nominalizations could not but belong to the first kind of nominalization. I think there are strong arguments against the Davidsonian account. But before presenting them, I will address the less discussed case of trope nominalizations. I will introduce a number of criteria for a term referring to a concrete object, making use of the semantic acceptability and the understanding of certain sentences. Note that these criteria, even though they look 'linguistic' in nature, are just ways of clarifying our ontological intuitions concerning the nature of the objects those terms refer to

2. TROPE NOMINALIZATIONS

Whereas nominalizations such as *wisdom* or *happiness* refer to universals, nominalizations such as *John's wisdom* or *John's happiness* (generally) refer to particulars. What kinds of particulars are these? Obviously, they are instantiations of a static property, but as such they are of a certain kind. In the context of natural language ontology, two kinds of entities can be distinguished that are instantiations of a static property by an individual: [1] tropes (or particularized properties)

and [2] states or states of affairs. These two kinds of entities serve as referents of two different sorts of expressions: Adjective nominalizations like *wisdom* are best considered general terms for particularized properties or tropes (or at least entities closely related to them), whereas gerundive constructions like *John's being tired* describe entities quite different from tropes, namely what I will call states (given that they can be straightforwardly expanded into terms like *the state of John's being tired*).^{8,9} The difference between tropes and states essentially consists in that tropes are concrete, fully specific entities, whereas states are abstract in the sense that they may be based on determinable or unspecific properties, without having to be grounded in determinate or specific properties.¹⁰

This fundamental difference can be revealed through the application and the understanding of different classes of predicates:

[1] Tropes can act as arguments of predicates that care about the internal structure or complexity of an argument; states cannot. Thus, only tropes, not states, can be described:¹¹

- (2) a. John described Mary's beauty.
- b. ?? John described Mary's being beautiful.

And only tropes, not states can be the objects of detailed examination:

- (3) a. John examined / investigated / took a closer look at Mary's illness.
- b. ?? John examined / investigated / took a closer look at Mary's being ill.

Also emotive attitudes that imply an internal complexity of their object, such as admiration, can target only tropes, not states:

- (4) a. John admired Mary's beauty.
- b. ?? John admired Mary's being beautiful.

Related to the distinction with emotive verbs is a difference in the readings of attitude verbs such as *remember* with the two sorts of terms:¹²

- (5) a. John remembered Mary's beauty.
- b. John remembered Mary's being beautiful.

(5a) implies that John remembered the particular way in which Mary was beautiful, whereas this is not required for (5b).

[2] Tropes can be measured with respect to the degree to which they instantiate the property expressed by the base predicate, whereas states cannot be measured at all:^{13,14}

- (6) a. John's tiredness was extreme.
- b. ?? John's being tired was extreme.
- (7) a. John's anger was mild.
- b. ?? John's being angry was mild.
- (8) a. John's handsomeness is greater than Bill's.
- b. ?? John's being handsome was greater than Bill's.

[3] Terms referring to states easily allow for negation, disjunction, and quantification (*John's not being ready*, *John's being either jealous or insecure*, *John's not being satisfied with anyone*), whereas trope nominalizations hardly allow for that, or only under limited circumstances.¹⁵

[4] Terms referring to tropes allow for a variety of determiners, thus allowing for demonstrative reference (*this tiredness*) and mass quantification (*more anger*).¹⁶ By contrast, state descriptions act like definite descriptions only (even without definite determiner), not displaying any capacity for quantification or demonstrative reference.

[5] Another difference between trope- and state-referring terms is that trope-referring terms have variants on which they refer to objects with variable concrete manifestations (concrete tropes), objects that can 'change' over time, whereas state-referring terms lack such variants. For example, what *John's wisdom* and *Mary's beauty* stand for may manifest

itself differently over time: John's wisdom and Mary's beauty may change, increase, or decrease, but not John's being wise or Mary's being beautiful. John's being wise and Mary's being beautiful stay unchanged even if John's wisdom or Mary's beauty changes.

These differences show the following: what is constitutive for a state is the mere holding of the entity in question of the property that the base predicate expresses (to a relevant positive degree), that is, the property and the entity together (in addition to perhaps a time) uniquely identify the state. By contrast, the property used to characterize a trope generally does not uniquely identify the trope, but rather tropes may differ from each other in the way in which and in the extents to which they exhibit the property expressed by the predicate, thus requiring for their identification more than the property and the entity in question. Tropes are concrete entities that overall instantiate the relevant property in one way or another; states, by contrast, are entities constituted just by the holding of the property (of some object); they do not involve more basic properties which may ground the holding of the property. For the purpose of referring to either kind of entity (states or tropes), nominalizations may be formed from predicates that express properties that are unspecific (*handsome, angry, aggressive*) or determinable (*red, round*), properties that have a wide range of different concrete manifestations. These concrete manifestations are constitutive of tropes (the referents of trope nominalizations), but not of states. Trope nominalizations such as *John's handsomeness, John's anger, the apple's redness, and the table's roundness* refer to such concrete manifestations, whereas *John's being handsome, John's being angry, the apple's being red, and the table's being round* refer to entities for which only the unspecific or determinable properties themselves are constitutive and not the particular ways in which they are manifested. It is then clear why tropes allow for demonstrative reference and quantification, whereas states don't: a state nominalization is always inherently a Russellian definite description, one whose semantics in fact fully displays the nature of its referent. It is then also clear

why tropes can have variants on which they are objects with variable manifestations, whereas the notion of a variable manifestation of a state would not make any sense at all: states are 'above' concrete manifestations (and thus as Steward (1997) points out, beyond any type-token distinction).

What I have called 'tropes' so far are not tropes as most commonly understood, that is, instantiations of 'natural' or 'sparse' properties (Armstrong 1978, 1997; Lewis 1983). Natural properties, for example, being a particular shade of red, having a particular temperature, or being a very specific shape, are supposed to play a role as relata of causal relations, as underlying similarity, and have been taken to be the only properties needed in a full description of the world.^{17, 18} Most adjectives in natural languages do not express natural properties, though. Instead they express determinable properties or other unspecific properties that can be fulfilled in virtue of an object exhibiting natural properties in various ways. The concrete manifestations of the properties expressed by natural language predicates, however, will in some way consist in instantiations of natural properties, or perhaps even just dispositions for manifesting such properties. Thus, *the redness of the apple* does not refer to an entity just dependent on the property of being red, the apple, and a time. Rather it refers to an instantiation of the particular shade of red that is exhibited by the apple. *John's aggressiveness* refers to the various dispositions (manifested by instantiations of natural properties, or rather changes in natural properties) that define John as aggressive; it does not refer to an entity composed just of the property of being aggressive and John. Mary's beauty involves specific property instantiations, those that together constitute Mary's beauty; it does not just involve the property of being beautiful and Mary. In short, adjectives generally do not express natural properties, but rather properties that can be fulfilled in possibly different ways by instantiations (often a number of them) of natural properties. For the sake of terminological simplicity, I will extend the term 'trope' to those complex property manifestations as well and

will continue calling nominalizations of adjectives of various sorts ‘trope nominalizations’.

The fact that trope nominalizations do not generally refer to instantiations of natural properties constitutes a serious problem for their semantic analysis: such nominalizations do not refer to entities obtainable simply on the basis of the content of the predicate, the object, and a time and thus cannot be nominalizations of the third kind. It is also quite implausible that trope nominalizations are implicit argument nominalizations, since there is little independent motivation that tropes should act as implicit arguments of adjectives (cf. Section 4). The problem then is, how do trope nominalizations refer to concrete manifestations of a property given that these are not obtainable in any way from the meaning of the underlying adjective? That is, how can the semantics of trope nominalizations be related to the semantics of the adjectives from which they are derived? Before proposing a solution to this problem, let me first generalize the points made in this section, namely to the semantics of event nominalizations.

3. EVENT NOMINALIZATIONS

Whereas trope nominalizations generally are derived from adjectives, event nominalizations are derived from verbs. The same criteria shows that the events that event nominalizations refer to are concrete entities, grounded in instantiations of natural properties, and thus contrast with, in this case, facts involving the same eventive property – in just the way tropes contrast with states involving the same static property.

[1] Only events, not facts are appropriate with predicates taking into account the internal structure of an argument:

- (9) a. John described/investigated Mary’s murder.
- b. ?? John described/investigated the fact that Mary was murdered.

[2] Only events, but not facts can be measured. This is particularly evident with predicates of spatial and temporal measurement:

- (10) a. John's jump was high/quick.
b. ?? The fact that John jumped was high/quick.
- (11) a. John's laughter was intense.
b. ?? The fact that John laughed was intense.

[3] Negation, disjunction and quantification can be fact-constitutive, but generally not event-constitutive.¹⁹ Take the property of inviting two children as it is involved in (12):

- (12) John invited two children.

Clearly, if John sent out two separate invitations to two children, then (12) describes two distinct events, but only one fact. Moreover, there will be two events describable as *John's inviting of a child*, but only one fact describable as *the fact that John invited a child*. Events, it appears, need to involve particular participants; a quantifier alone does not suffice.

The same problem arises for tensed predicates such as *read the book*:

- (13) John read the book.

(13) describes an event, John's reading of the book, which is either an event that occurs at a particular time or else an event type that can be instantiated at different times ('John's reading of the book took place several times'). By contrast, the fact that John read the book is temporally unspecific and not to be located in time.

[4] The fourth criterion I mentioned in regard to trope nominalizations does not apply well to events. Events are never conceived as entities with variable manifestations over time, a striking difference between events and tropes. However, another criterion can be given that distinguishes facts in particular from events. Fact and events differ in their dependence on a description. Whereas modifiers of event nominalizations may just be event-characterizing, all modifiers in a

fact description (of the sort *the fact that S*) are fact-constitutive, as is obvious from the contrast between (14a), which can be true, and (14b), which can't:

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

Tropes and events are relatively independent of the description used to refer to them, whereas facts are entirely reflected in the meaning of explicit fact-referring terms.²⁰

4. EVENTS AS DERIVED OBJECTS

The difference between events and fact poses a problem for one view of events, namely the view that events are derived objects, objects whose identity is strictly dependent on objects, a property, and a time, where the property is that expressed by the base predicate.

The view that events are derived objects is originally due to Kim (1976) and has been adopted and further developed by Bennett (1988), Lombard (1986), and others.²¹ The view can hardly be found among linguists, though, with the exception of Chierchia (1984). The view says that events are individuated entirely on the basis of individuals, properties, and times: they are property exemplifications. For example, the event of John's walking at midnight would be the exemplification of the property of walking by John at midnight.

A particular semantic view goes naturally along with the second metaphysical view of events, namely the view that events are introduced into the semantic structure of a sentence generally only by means of nominalizations. This is in fact what Bennett (1988) and Chierchia (1984) propose. Thus, if an event e depends on John, the walking property, and a time t , that is, if one can take e to be the value of a function f applied to the walking property, John, and t ($e=f([\textit{walk}], \textit{John}, t)$), then the denotation of *John's walk* would be as follows:²²

$$(15) \quad [John's walk] = f([walk], John, t)$$

The original account on which events are derived objects is the one of Kim (1976), who conceives of events as simple property instantiations. Kim gives existence and identity conditions for events dependent on objects, properties, and times as follows, where $[d, P, t]$ is the event dependent on an object d , a property P , and a time t :

- (16) 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 $d = d', P = P', t = t'$.

Obviously, the conditions in (16) are just the ones used earlier for the characterization of facts. Note that any property, however complex, can, for Kim, be event-constitutive: any explicitly or implicitly quantified predicate as well as any negated or disjunctive predicate can yield an event (together with an individual and a time).²³

Within the view of events as property exemplifications, one can account for the groundedness of events, namely by imposing the restriction that events can depend only on individuals, times, and properties of a certain *kind*, namely natural, fully determinate properties. Or rather, since events generally involve change, they should be conceived as transitions from an object having a particular property at a time t to the object's having a contrary property at a subsequent time t' . In fact, Lombard (1986) proposed a theory on which events are identified with such transitions. The grounding of each event must be based on transitions $[d, K, t, t']$ constituted by an individual d , a property space K (consisting of 'simple', natural properties), and subsequent times t and t' . 'Then a transition is of type $[d, K, t, t']$ iff for contrary properties P and P' in K , P holds of d at t and P' holds of d at t' . Clearly, Lombard's theory has to be extended in such a way that more complex events may be built from such transitions, either as collections of transitions or as transitions viewed

with a particular property as their gloss. Lombard's theory of events as such gives only an account of how events are grounded.

With this conception of events, obviously, the same problem arises for the semantics of event nominalizations as did with trope nominalizations. Many, in fact *most* verbs in English do not describe the kinds of transitions that could constitute or ground events. In fact, it is hard to find any reasonably simple predicates at all that do. Even such predicates as *become soft*, *turn red* expressing a simple property change still involve a nonnatural property.

Looking at the range of verbs that can describe events, one can distinguish at least five major classes of verbs whose content merely characterizes an event, but would not be fully constitutive of it:

- [1] verbs involving quantification over kinds of properties:
change
- [2] verbs expressing quantification over spatial positions:
move towards, *walk*
- [3] verbs expressing quantification over types of action,
expression of causal effect: *disturb*, *kill*
- [4] verbs expressing quantification over types of action
expressing a mode of action, namely the verbs Ryle calls
'adverbial verbs' such as *hurry*, *obey*, and *continue*.

If events are 'introduced' into the semantic structure of sentences only by means of nominalizations, then the descriptive content of a nominalization of any of the verbs just mentioned is not sufficient to act as a basis for the constitution of an event. That is, the descriptive content of a nominalization underspecifies the nature of the particular event it refers to. For example, *John's change* has a descriptive content that underspecifies the particular event of change that is being referred to. The same holds for *the object's becoming red* (leaving open the particular shade of red the object arrives at), *John's walk toward the house* (which leaves open what changes in spatial positions exactly took place), *John's disturbance of Mary* (which leaves open what exactly John did to cause

Mary's state of irritation), and *John's hurry* (which leaves out what exactly John did that was done in a hurried way).

Thus, the nominalization itself cannot introduce the event being referred to (in the sense of defining that event), but generally gives only a partial characterization of that event, a description that should just suffice to pick out one event rather than another. Event nominalizations in that respect differ from fact nominalizations – just like trope nominalizations differed from state nominalizations.

5. THE DAVIDSONIAN ACCOUNT OF EVENTS

Unlike in the case of tropes there is a well-established alternative view of events, though, on which events are not generally introduced by nominalizations, but rather act as implicit arguments of verbs, a view on which nominalizations referring to events would be implicit argument nominalizations. This is the Davidsonian view of events.

According to Davidson (1967), a sentence like (17a) is analysed as in (17b), with an event acting as an additional argument of the verb:²⁴

- (17) a. John walked slowly.
 b. $\exists e(\text{slowly}(e) \ \& \ \text{walk}(e, \text{John}))$

The crucial argument Davidson gives for this analysis is the possibility of adverb-dropping, that is, the validity of an inference such as from (17a) to (18):

- (18) John walked.

Landman (2000) adds another motivation for the Davidsonian account, namely the possibility of permuting adverbial modifiers, as in the valid inference below:

- (19) John walked slowly with a stick.
 John walked with a stick slowly.

This view about the status of events in the semantic structure of sentences naturally goes along with a particular view about the metaphysical status of events, namely on which events are primitive objects not to be defined in terms of objects, properties and times (cf. Davidson, 1969).²⁵ For Davidson, different properties can be used to describe one and the same event. Thus, one and the same event can be described as the rotation of the wheel or as the wheel getting hot, just as one and the same event can be described in physical terms and in mentalist terms.²⁶

Given the Davidsonian view, nominalizations such as *John's walk* will simply pick up the implicit event argument of the verb as their referent (cf. Higginbotham, 1985, 2000):

(20) [*John's walk*] = $\iota e[\text{walk}(e, \text{John})]$

The Davidsonian account is far from the only account of adverbials that is available, though.²⁷ Temporal and spatial adverbials in particular could be treated as operators whose semantics will involve quantification over spaces or times acting as indices of evaluation (cf. Cresswell, 1985). Thus, (21a) could be analysed as in (21b), where THEN is a suitable operator shifting the time of evaluation to the time *i*:

(21) a. John walked then.
b. THEN_{*i*}(walk(John))

Adverbs could also be treated as predicate modifiers (cf. Reichenbach, 1947). Then (17a) will be analysed as:

(22) (slowly(walk))(John)

The validity of inference from (17a) to (18) could then be guaranteed by imposing general conditions on at least certain kinds of predicate modifiers. The one disadvantage of this account is that it would not assign quite the same meaning to expressions when they act as adverbials and as adjectives (*slowly* – *slow*). But the account could assign related meanings to the two uses of *slow(ly)* roughly as follows: *slowly* holds of an event if the changes constitutive of the event have

a more than average distance from each other. And *slowly* V holds of an entity *d* iff the changes V attributes to *d* have a more than average distance from each other. More difficult to handle on this account would be the possibility of modifier permutation (as pointed out by Landman, 2000).

There are certain adverbials, however, that pose a serious problem for the Davidsonian account. These are adverbials that do not act as predicates of the Davidsonian event argument, but rather of a more complex event, an event incorporating the contribution of another adverbial:

- (23) a. The ball suddenly rolled very quickly.
 b. John spoke very slowly with patience.
 c. Mary danced slowly very elegantly.

What is sudden according to (23a) is the quick rolling event, not the rolling event. What was done with patience in (23b) is John's speaking slowly, not just John's speaking, and what was done elegantly according to (23c) was Mary's dancing slowly, not just Mary's dancing. Examples such as those in (23) also do not allow for modifier permutation.²⁸

A Davidsonian has to assume that *suddenly* in (23a) acts as a predicate of the event argument of the verb. But the event here is not an event of rolling of the ball, but of rolling quickly, and such an event could only be an event argument of *quickly*, not of *roll*. Thus the Davidsonian needs to postulate additional event argument places for adverbs as well. As a matter of fact, this is precisely what Peterson (1997) proposes. Peterson analyses (23a) as in (24):²⁹

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

In (24), *quickly* expresses a two-place relation between two kinds of arguments. The second arguments would be the familiar Davidsonian events, events that are said to be quick – in (24a) a simple event of the ball's rolling. The first arguments, however, would be events of the 'quickness' or better the 'quick occurrence' of events acting as the second arguments – in (24a) an event of the quickness of a rolling. The first events

are in fact best viewed as tropes: they are instantiations of properties by events. (23a) thus states that there is an event e that is a rolling of the ball and is quick and moreover that there is an event that is e 's quickness and is sudden.

This analysis obviously leads to a rather unpleasant proliferation of event arguments. Note that then even *the ball rolled suddenly* would have to be about two events, rather than only one.

An even more serious problem for the Davidsonian account is the possibility for an adverb to modify a quantified predicate:

- (25) a. John carefully eliminated every mistake.
b. John gracefully ate all the crisps.

In (25a), what is said to be careful is John's doing away with the entirety of the mistakes, and similarly for the better known (25b). (25a) and (25b) thus differ from (26a) and (26b):

- (26) a. John eliminated every mistake carefully.
b. John ate all the crisps gracefully.

A Davidsonian would have to treat *carefully* and *gracefully* here as predicates of events too (as they also show the possibility of adverb dropping).

Taylor (1985) argues that a Davidsonian could account for such a case in terms of wide scope of the event quantifier over the quantifier *every mistake*, as in (27):

- (27) $\exists e(\text{careful}(e) \ \& \ \forall x(\text{mistake}(x) \rightarrow \text{eliminate}(e, \text{John}, x)))$

However, this requires assuming that the relation expressed by *eliminate* could hold between an event e , and objects d and d' as well as e and other objects d'' and d''' . But this cannot be: any event modifier of *John eliminated that mistake* can only concern the elimination of that one mistake, not the elimination of another mistake. (Thus, *John eliminated that mistake in two seconds* could not possibly mean that John quickly eliminated in fact several mistakes in two seconds.) Similarly *the elimination of that mistake* can refer to only the

elimination of a single mistake, not a collection of events of mistake elimination.

The only alternative for a Davidsonian for dealing with (25a) would again be to posit additional event argument places. This time, however, the additional argument place would have to be posited for quantifiers like *every*, since it is the *exhaustion* of a set of entities in certain types of events that is partly constitutive of the event that *carefully* in (25a) and *gracefully* in (25b) are predicated of (e.g. in (25a) John was careful in that the mistakes he eliminated constitute all the mistakes). If an event were to be made an additional argument of *every*, then *every* would express a three-place relation between events, sets, and sets. (25a) would then have to be analysed as in (28):

$$(28) \quad \exists e' (\text{carefully}(e') \ \& \ \text{every}(e', [\text{mistake}], \{x \mid \exists e \text{ eliminate}(e, \text{John}, x)\}))$$

It would have to be a matter of the meaning of *every* to tell us how the event e' relates to the event argument of *eliminate*: e' must be an event of John's exhausting the mistakes in his eliminations. But it would be extremely strange if that should be part of the meaning of *every*. Note that a sentence like *all the girls kissed all the boys* would have to be about two additional states, constituted by the exhaustion of the girls and the exhaustion of the boys respectively, not just about the individual events of a girl kissing a boy.

Yet another problem for the Davidsonian arises with quantified adverbials such as *frequently* in (29):

$$(29) \quad \text{John worked out frequently.}$$

In Davidsonian event semantics, frequency adverbials are generally considered quantifiers ranging over events. But as quantifiers, they would not introduce events themselves. Given a Davidsonian view of adverbials, this conflicts with the observation that adverbials can act as modifiers of predicates already modified by frequency adverbials. Even frequency ad-

verbials themselves can act as such modifiers, allowing for the possibility of stacking frequency adverbials, as in (30):

- (30) a. Last year John worked out only rarely.
 b. Sometimes John works out only rarely.

If *last year* in (30a) acts as an event predicate, then the event it is predicated of is an event of John's working out only rarely. But then *rarely* cannot, or cannot just, act as a quantifier; it also will have to introduce a new event, an event composed of single events of John's working out. In (30b) *sometimes* even *quantifies* over events that are events of John's working out rarely, that is, events composed of the kind of events that a Davidsonian takes the arguments of *work out* to be.

The use of adverbials in fact indicates that there is in principle no limit as to the 'generation' of 'higher-order events'. That is, adverbials that should act as predicates of events can easily modify a complex predicate involving another event modifier or a quantifier ranging over individuals or events. Obviously, the Davidsonian account needs to be extended in such a way that it also admits collective events, events composed of events that could act as arguments of predicates. Moreover, a Davidsonian has to assume that those collective events act as additional arguments of frequency adverbials. But this again leads to a proliferation of event argument places, this time for event quantifiers.

Event nominalizations easily allow reference to kinds of events. Kinds of events is what event nominalizations without a determiner refer to as in (31a), but it is also possible with event nominalizations that specify a particular agent, as in (31b):³⁰

- (31) a. Laughter is rare.
 b. John's laughter is not very loud.

But the Davidsonian account makes sense only if events are particulars, not types. Not only is Davidson a particularist, accepting only concrete particulars as entities and thus

rejecting abstract objects such as event types. It also does not make sense to take event types to be the arguments of verbs for the following reason: Event types strictly depend on the property expressed by the predicate, unlike Davidson's concrete particulars. Any event modifier can help define an event type. Thus *walking with a stick at noon* can refer to an event type for which the properties of being with a stick and at noon are constitutive (even though they would not be constitutive of a particular instance, a particular walking event). But this means that event types as arguments of verbs will have to anticipate not only the content of the verb, but also that of modifiers and complements.

We can conclude that even though Davidson would provide an easy way of dealing with event nominalizations, there are some serious difficulties the account faces with the postulation of events as arguments of verbs. Also, the motivations for the Davidsonian account are not in themselves sufficiently strong to discourage an alternative account on which events do not act as implicit arguments of verbs. The account of events as truthmakers that I will propose next provides a way of accounting for adverbial modifiers and their crucial properties without positing events as implicit arguments of verbs.

In the semantic literature, it has never actually been argued that tropes form implicit arguments of adjectives. For positing tropes as implicit arguments of adjectives, there would be much less of a motivation from modifiers: modifiers of adjectives do not systematically alternate with adjectival modifiers of the corresponding nominalization (consider *John is highly talented* – *John's talent is high*, *John's talent is great* – *John is greatly talented*). That tropes act as implicit arguments of adjectives is problematic also in that trope nominalizations can alternatively refer to *kinds* of tropes of a sort, as in *John had the wisdom of Socrates*, where *the wisdom of Socrates* refers to a sort of wisdom, the one that Socrates had. This poses the same problem as nominalizations referring to event types.³¹

6. NOMINALIZATIONS AND TRUTH-MAKING

Event and trope nominalizations, we have seen, refer to concrete objects that, as I argued, are not present in the semantic structure of a sentence in the absence of the nominalization, but could not be considered as constructed from the meaning of the nominalization either. This constitutes a serious difficulty for a semantic account of such nominalizations: event and trope nominalizations will refer to objects that neither are implicit arguments of the base expression nor match with the content of the base expression. How then – especially in view of the productivity of nominalizations – can the referent of the nominalization be obtained given the meaning of the base expression?

I see only one way of connecting the semantics of event or trope nominalizations to that of the base expressions and that is on the basis of the notion of a *truth maker*. The entities that play the role of truth makers are precisely the sorts of things that are needed for the purpose at hand: truth makers are supposed to be entities that are *in* the world. Some philosophers such as Russell and Armstrong take truthmakers to be states of affairs; others such as Mulligan et al. (1984), whom I will follow, take them to be events as well as tropes. According to the latter, the truth maker that makes the sentence *John is walking* true is an event of walking by John, and the truth maker that makes the sentence *John is happy* true is a trope that instantiates happiness in John. The nominalizations *John's walk* and *John's happiness* then would be terms referring to precisely the entities that make the corresponding simple sentences true.³²

The truthmaking idea is also suited for the analysis of adverbial modification: Adverbials (of the relevant sort) can now be taken as predicates of events that make the modified verb (with its arguments) true. That is, the truth-making of sentences with adverbial modifiers will be as in (32):

- (32) $e \models \textit{John walked slowly}$ iff there is an event e' ,
 $e' \models \langle [\textit{walk}], \textit{John} \rangle$ & $e \models \langle [\textit{slow}], e' \rangle$

On this account, sentences with an adverbial modifier involve two truth makers: one making the unmodified verb true and another making the predication of the adverbial of the first truth maker true.

The idea of truth makers, while hardly uncontroversial, is at the center of many contemporary metaphysical discussions.³³ However, it has rarely been explored from the point of view of a systematic, compositional account of the truth conditions of sentences of more complex sorts.

The motivation for the truthmaking idea is the fundamental intuition that the truth of sentences should be grounded in reality. Roughly, given that grounding is a relation between a sentence and something else, there needs to be an entity which grounds the truth of a sentence, that is, in virtue of which a given a sentence is true (Rodriguez-Pereyra, to appear). The strong version of the truthmaker theory says that every true sentence needs to have a truthmaker (Restall, 1996; Armstrong, 1997; Rodriguez-Pereyra, to appear). A weaker version does not require this for all sentences, for example not for negative sentences (Mulligan et al., 1984). Given that all sentences, including negative ones, as it appears, can be modified by adverbial modifiers, I will adopt the strong version of the truthmaker theory.

A truthmaker is generally characterized formally (even sometimes defined) in terms of entailment: the existence of the truthmaker necessarily entails the truth of the sentence. This is the so-called *Truthmaker Principle*:

(33) The Truthmaker Principle

An entity e makes a sentence S true iff: necessarily, if e exists \rightarrow then S is true.

As Armstrong makes clear, this principle is important for characterizing truthmaking as an internal, necessary relation, not as an external, contingent one. While the Truthmaker Principle as a merely necessary, not sufficient condition seems unproblematic, it leads to serious difficulties when taken as a definition of truthmaking. I will therefore adopt (33) only on

the left-to-right direction, as merely characterizing the truth-making relation.³⁴

There are two different views about how ‘big’ the truth maker for a sentence may be. While many assume truth making to satisfy Monotonicity (if $e < e'$ and $e \vDash S$, then $e' \vDash S$), Rodriguez-Pereyra (2000, to appear) argues that a truthmaker should strictly consist only of features in virtue of which a sentence is true.³⁵ Thus, for example, the sentence *John walks* is made true by a walking event of John, but not by an event that is a walking and yawning of John or an event that is a walking of John and Mary.

This notion of a truth maker is also what is needed for the semantics of nominalizations as well as adverbial modification. For example, *John's walk* or *John's happiness* could not possibly refer to an event or trope involving any properties on the part of John not constitutive of John's walking or John's being happy, and it could not possibly refer to John and Mary's walk or John and Mary's happiness. Similarly, *John walked quickly* could not possibly be understood as ‘John walked and John and Mary's walk was quick’. I will therefore understand the relation \vDash as one that holds between an entity e and a sentence S iff S is true in virtue of all the features of e .³⁶

There are different views on what conditions the relation of truthmaking should meet and on what the conditions are for the truthmaking of complex sentences. In this paper I will adopt, besides the Truthmaker Principle itself (as a necessary, not sufficient condition on truthmaking), the following rather uncontroversial condition on the truthmaking of disjunctions and existential sentences (formulated with substitutional quantification):³⁷

- (34) a. $e \vDash A \vee B$ iff $e \vDash A$ or $e \vDash B$
 b. $e \vDash \exists x S$ iff for some substitution instance S' of S with respect to ‘ x ’, $e \vDash S'$.

More controversial are the ways the truthmaking of conjunctive and especially universally quantified and negative sentences should be treated. In the present context, the main

criterion for an adequate account will of course be the behaviour of adverbial modification.

Conjunctions require a possibly different truth maker for each conjunct. Thus, one might take the truthmaking of conjunctions to involve a set of events or tropes, as in (35) (cf. Mulligan et al., 1984):

- (35) ‘ $S \ \& \ S'$ ’ is true if there is a set of entities G such that for some $e \in G$, $e \vDash S$ and for some $e' \in G$, $e' \vDash S'$.

However, it suits the present purposes better to have a single truth maker for conjunctions (as conjunctions can be modified by a single adverbial, as in *Slowly John came in and Mary went out*), and thus to analyse conjunctions as involving, as truthmaker, the sum of events or tropes making the conjuncts true:

- (36) ‘ $S \ \& \ S'$ ’ is true if there are entities e , e' , and e'' such that $e = \text{sum}(\{e', e''\})$, and $e' \vDash S$ and $e'' \vDash S'$.

This, of course, requires unrestricted composition for events (that is, any two events have a sum).

While existential sentences involve truth-making just like disjunctions, for universally quantified sentences, the corresponding account is not unproblematic. Mulligan et al. (1984) propose (37) (again formulated with substitutional quantification):

- (37) $e \vDash \forall x S$ iff for all substitution instances S' of S (with respect to ‘ x ’), $e \vDash S'$.

However, as Russell (1918/19) and more recently Armstrong (1997, 2004) have argued, universal quantification involves an irreducibly general fact for its truth-making, the fact that a set of entities is exhaustively included in another or that a set of entities exhausts a given property, which are facts not reducible to a set of truth makers of the corresponding atomic sentences. This follows from the Truthmaker

Principle: a mere sum of truthmakers for the instances does not strictly entail the truth of the universal quantification, but only the conjunction of the instances. This is also what we need to account appropriately for adverbial modification of universally quantified sentences such as in (25a, b). Thus, I will assume that universal quantification involves an event genuinely supporting the generalization as truth maker. This sort of truth maker is also needed for sentences with proportional quantifiers (*most people left, John frequently failed*).

For the kind of truthmaker involved in universal quantification I will take up a proposal of Armstrong (1997, 2004) for the representation of ‘all states of affairs’, which, so the proposal, is the sum of all the states of affairs together with a second-order state of affairs which is the state of affairs of that sum exhausting the property of being a state of affairs. Following Armstrong, I will take T to be the relation that holds between a sum of entities and a property S in case the parts of the sum exhaust the extension of S . Now the truth maker of the statement ‘All P are Q ’ can be taken to be the sum of the sum of the ‘singular’ states of affairs of the sort ‘ d ’s being P and Q ’ and the state of affairs that consists in that sum constituting all states of affairs of that sort. Thus, the following condition would hold for the truth-making of universally quantified sentences, where t is the function that maps an n -place property or relation and n arguments to the trope that is the instantiation of that relation in the arguments:

- (38) $e \vDash \text{Every } x P \text{ is } Q$ iff there are events e' and e'' such that $e = \text{sum}(\{e', e''\})$ and $e' = \text{sum}(\{e''' \mid \text{for some substitution instances } P' \text{ of } P \text{ and } Q' \text{ of } Q, e''' \vDash P' \ \& \ Q'\})$ and $e'' = t(T, e', \{e''' \mid \text{for some substitution instance } P' \text{ of } P \text{ and some substitutions instance } Q' \text{ of } Q, e''' \vDash P' \ \& \ Q'\})$

In the case of proportional quantifiers as in *most men are happy*, the truth maker would be the aggregate of the sum of tropes of the sort ‘the happiness of d ’, for, lets say, more than half of the men d , and the relational trope that consists in the

instantiation of the making-up-half-of-relation by this aggregate and the property of being a truthmaker of ‘*t* is happy’ for any man *t*.

Conjunction and negation involve complex truthmakers built from truthmakers of component sentences. Complex truthmakers are needed also for negation, but here the truthmaker is not built from the truthmakers of component sentences.

Negation itself is a difficult and controversial case for the truth-making idea:³⁸

(39) John is not happy.

Should negative sentences even have a truth maker at all? This is indeed not only required by the general truthmaking idea, but also, in the present context, by the fact that certain adverbials may apply to a negative context, as in (40), with the frequency adverbial now naturally viewed as a quantifier ranging over truth makers:

(40) John frequently does not get up before 8 am

Rather than going at length into a discussion of truthmaking of negative sentences, it appears that again a proposal of Armstrong can be adopted for negative sentence. Armstrong (1997) proposes that the truth maker of a negative sentence *not S* is the state of affairs consisting of the aggregate of all the states of affairs (where none of them makes *S* true), the property of being a state of affairs, and the ‘totalling’ relation ALL, that is, the truth maker of a negative sentence is the states of affairs that the aggregate of all the states of affairs exhausts all the states of affairs there are. Cast within present terms, the truth making of a negative sentence would look as follows, for *E* the set of tropes or events, ε the properties of being a trope or an event *t*, *sum* the sum operation, and *t* the function mapping a relation and two arguments to the corresponding relational trope (‘the totalling of the property of being an event by the sum of all the events):

(41) $e \vDash \neg S$ iff $e = t(T, \text{sum}(E), \varepsilon)$ and for no $e' < \text{sum}(E)$, $e' \vDash S$.

This proposal is suited for the semantics of adverbial modification if the totalling relation need not generally involve all states of affairs (or tropes or events), but rather may involve a contextual restriction to certain tropes or events, for example in (40) a contextual restriction to situations involving John in the morning. Then in (40) *frequently* ranges over situations that are incompatible with John's getting up before 8 am, i.e. events in which John gets up after 8 am. *Frequently* in (40) thus ranges over sums of events that together make up the contextually given restriction to a certain situation, entities of the sort $t(T, \text{sum}(E), E_C)$, for some contextual restriction on events C .

Let us now elaborate the view that event and trope nominalizations stand for the truth makers of the sentences that correspond to them. For simple nominalizations, the following would be the semantic analysis that comes to mind first:

- (42) a. [*John's walk*] = $\lambda e[e \models \textit{John walks}]$
 b. [*John's happiness*] = $\lambda e[e \models \textit{John is happy}]$

That is, *John walks* and *John's happiness* refer to the truth makers of the corresponding sentences *John walks* (or rather *John is walking*) and *John is happy*, that is, to the event and the trope respectively making those sentences true.

This is not satisfying, however, in that it is not a compositional account: it makes the semantics of a noun dependent on the syntactic context in which the noun occurs (that is, dependent on which complements it takes). It is also unable to account for quantificational nominalizations as in (43):

- (43) Every walk John (ever) took was long.

(43) requires a set of truth makers just for the extension of *walk that John took*, leaving out the determiner.

A better approach to the semantics of nominalizations is taking truth-making not only to be a relation between an object and a sentence, but also a relation between an object and a structured proposition, in the simpler cases a sequence of an n -place property and n objects, as in (44):

- (44) a. $[walk] = \{ \langle e, d \rangle \mid e \vDash \langle [walk], d \rangle \}$
 b. $[happiness] = \{ \langle e, d \rangle \mid e \vDash \langle [happy], d \rangle \}$

The denotation of a nominalization now depends only on the relation expressed by the verb or adjective from which the nominalization is derived and thus can proceed in an entirely compositional way, yielding (45):

- (45) $[John's walk] = \iota e[\langle e, [John] \rangle \in [walk]]$

However, this account is still not adequate. There are many events that are qualitatively minimal truth makers of *John walked*. Any temporal part of an event that is John's walk would still make *John walked* true. Obviously *John's walk* refers to the maximal temporally continuous event that makes *John walked* true.

Where does this temporal maximality condition come from? The condition could not be a matter of the definiteness of *John's walk* because it also is associated with quantificational NPs as in (43). Note also that the condition is not associated with the NP *John's walking*: *John's walking* does not necessarily refer to the temporally maximal event (as one can say 'John's walking from 9 to 10 am was the reason that he missed the meeting – in fact John walked from 10 to 11'). This means that it could not be a condition on the individuation of events in general or a condition on referring to truth makers. Crucially, *walking* is a mass noun (*too much walking*, not *too many walkings*), whereas *walk* is a count noun (*many walks*), which indicates that the condition is a matter of the mass-count distinction. Count nouns generally describe countable events, events that are clearly individuated as single events. Achievements and accomplishments such as John's jump and the destruction of the palace are inherently countable. But with activity and stative verbs, the events referred to are not inherently delimited, which is why the nominalization, if it is a count noun, will impose the condition that the event be a maximal temporally continuous event.³⁹ The semantics of activity and state nominalizations thus would

look as in (46) (with $<_t$ being the temporal part relation among events):

$$(46) \quad [walk] = \{ \langle e, d \rangle \mid e = \max_{<_t} (\{ e' \mid e' \models \langle [walk], d \rangle \}) \}$$

The maximality condition is also associated with nominalizations of tropes: *John's happiness* refers to the trope that is maximal with respect to occupying a continuous stretch of time. Here, however, because *happiness* is a mass, not a count noun, the condition is associated with the definiteness of a mass NP. Definite mass NPs referring to states generally refer to the maximal state that is temporally continuous, just as the mass NPs *the water in the room* refers to the maximal quantity of water that is in the room (cf. Sharvy 1980).

Let us turn to the formal analysis of adverbial modification. Recall the basic analysis in (47):

$$(47) \quad e \models \textit{John walks slowly} \text{ iff there is an event } e', e' \models \langle [walk], \textit{John} \rangle \ \& \ e \models \langle [slow], e' \rangle$$

Generally, the event e that makes a sentence with an adverbial modifier true includes the event e' that makes a sentence without the adverbial modifier true (i.e. $e' \leq e$). However, this follows from the truth-making of 'adverbial propositions' such as $\langle [slow], e' \rangle$, and hence need not be included in the semantics of adverbially modified sentences.

This account predicts modifier drop and permutation, at least if adverbial modifiers allowing for permutation are analysed as in (48b):

- (48) a. John walked slowly with a stick.
 b. $e \models \textit{John walked slowly with a stick}$ iff there is an event e' , $e' \models \langle [walk], \textit{John} \rangle \ \& \ e \models \langle [slow], e' \rangle \ \& \ e \models \langle [\textit{with a stick}], e' \rangle$

By contrast, adverbials that can also act as predicates of an event that includes the contribution of another modifier will

be analysed as predicates of the truth maker of an adverbially modified sentence, as in (49b) for (49a):

- (49) a. The ball suddenly rolled very quickly.
 b. $e \vDash$ *The ball suddenly rolled very quickly* iff
 $\exists e' \exists e''(e \vDash \langle [suddenly], e' \rangle \ \& \ e' \vDash \langle [quickly], e'' \rangle \ \& \ e'' \vDash \langle [roll], \text{the ball} \rangle$

(49a) involves three truth makers: the event of the ball's rolling (the truthmaker of the proposition that the ball rolled), the event of the ball's very quick rolling (the truth maker of the proposition that the ball rolled quickly), and the suddenness of the ball's very quick rolling (which is the truthmaker for the entire sentence). *Suddenly* itself will be predicated of a second-order trope (a trope of an event): the quickness of the ball's rolling.

On the present account, adverbs do not have to be treated as predicates of truthmakers. They could alternatively be treated as predicate modifiers, as seems adequate for adjectival modifiers like *highly*, which lack a variant as a predicate of tropes (cf. Section 5).

Adverbials modified by a universal quantifier, as in (50a), also receive a straightforward treatment as in (50b):

- (50) a. *John quickly eliminated every mistake.*
 b. $e \vDash$ *John quickly eliminated every mistake* iff
 there is an event e' , $e \vDash \langle [quickly], e' \rangle \ \& \ e' \vDash \langle [eliminate], \text{John}, [every\ mistake] \rangle$

Here e' will be the sum $\text{sum}(\{e \mid \text{for some mistake } d, e \vDash \langle [eliminate], \text{John}, d \rangle\})$ and $t(T, \text{sum}(\{e \mid \text{for some mistake } d, e \vDash \langle [eliminate], \text{John}, d \rangle\}), \{e \mid \text{for some entity } d \text{ and some entity } e'', e'' \leq e \text{ and } e'' \vDash \langle [mistake], d \rangle\})$.

Let us turn to adverbial quantifiers, as in (51):

- (51) John frequently walks home.

Here the adverbial can be treated as a quantifier ranging over truth makers, as in (52):

(52) frequently e , $e \models \langle [\textit{walk home}], \textit{John} \rangle$

But adverbial quantifiers require a complex treatment in view of cases like (53):

(53) Sometimes John works out frequently.

In (53) *frequently* involves a single truth maker, the kind of truth maker *sometimes* ranges over, which in turn would require a single truth maker itself. Note that *frequent* can occur as a predicate of single collections of events (the frequent workouts). We can then say that *frequent* acts both as a predicate of such events and as a quantifier ranging over the parts of such an event, and thus analyse (53) as in (54):

(54) sometimes e $e \models \textit{John works out frequently}$ iff
 sometimes $e \exists e' e \models \langle [\textit{frequently}], e' \rangle$
 & $\forall e'' (e'' < e' \rightarrow e'' \models \langle [\textit{work out}], \textit{John} \rangle)$

Given that (54) itself needs a truthmaker, the complete analysis of the truthmaking conditions of (54) would be as in (55), where *sometimes* is now treated, like *frequently* in (54), as a predicate of collections of events (which is true of collections of events with at least two members):

(55) $e_1 \models \textit{sometimes John works out frequently}$ iff
 $\exists e_1' e_1 \models \langle [\textit{sometimes}], e_1' \rangle$ & $\forall e < e_1' e \models \textit{John works out frequently}$ iff
 $\exists e_1' e_1 \models \langle [\textit{sometimes}], e_1' \rangle$ & $\forall e < e_1' e \models \textit{John works out frequently} \exists e' e \models \langle [\textit{frequently}], e' \rangle$
 & $\forall e'' (e'' < e' \rightarrow e'' \models \langle [\textit{work out}], \textit{John} \rangle)$

7. CONCLUSION

Trope and event nominalizations pose particular challenges for natural language semantics in that they appear to refer to concrete, fully specific entities which are generally only partially described by the nominalization and yet, as I argued,

do not act as implicit arguments of the base expression. This puzzle can be solved if such nominalizations are taken to involve reference to the truth maker of the corresponding proposition. Using the truth-making idea also opens up a new way of accounting for adverbial modification. By incorporating truth makers into semantic structure, this paper just started exploring the possibilities of a compositional semantic analysis of sentences involving truth makers.

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NOTES

¹ Philosophical entities (Montague, 1960) are, in Higginbotham's apt phrasing, entities 'routine in language, but routinely suspect in metaphysics' (Higginbotham, 2000, p. 50). For the notion of a trope see Williams (1953), Woltersdorff (1960, 1970), Simons (1994), Lowe (1998) among others.

² That nominalizations act a singular term and thus stands for an object can easily be verified by applying the various criteria for singular termhood proposed by Frege (1884, 1892), Dummett (1973), Wright (1983), and Hale (1987).

³ It is an issue, though, whether there really are such nominalizations. In Moltmann (2004), argued that *wisdom* does not stand for a property, but rather for a kind of trope, that is, a kind of concrete object, and in Moltmann (2003), that *that*-clauses do not act as referential terms at all.

⁴ Nominalizations of this sort have already played a central role in the thinking of some medieval philosophers of language, especially Gregory of Rimini who calls them 'complexe significabilia' (cf. Nuchelmans, 1973).

⁵ The view that *Mary's being happy* refers to a state is motivated by the observation that it can be expanded to an explicit state-referring term such as *the state of Mary's being happy* (cf. Woltersdorff 1970, Chapt. 3).

⁶ Another case would be nominalizations referring to propositions such as *the proposition that S* or simply *that S* (but see Note 3).

⁷ This is to be distinguished from terms that introduce objects by abstraction such as Frege (1884) proposed for ‘the direction of d' in (1)

- (1) The direction of d is the same as the direction d' iff d is parallel to d' .

Generally, abstraction is not particularly suited for dealing with nominalizations (note that *direction* does not involve a morphological nominalization process).

⁸ As particulars they can stand in causal relations and can act as the objects of perception:

- (1) a. John’s tiredness was the cause of the accident.
b. Mary noticed John’s tiredness.

⁹ See also Woltersdorff (1970, Chapt. 3) for the distinction between state and trope nominalizations. Woltersdorff notes that only the former can be expanded to an explicit state description such as *the state of being honest* and are impossible after the verb *possess* (?? *John possesses being honest*, as opposed to *John possesses honesty*). Woltersdorff, though, does not exclude that such distinctions are due just to the use of terms, rather than the nature of the entities that are denoted.

¹⁰ Being grounded in specific properties does not necessarily mean consisting of entities that are nothing but instantiations of determinate properties. Steward (1997, chap. 1), in the context of a discussion of the mind–body problem, gives another criterion for an entity to be a particular, and that is the possibility of having a ‘secret life’, roughly, of being identifiable in various ways, one identification available to an agent not necessarily constituting all there is to the entity. This notion of particularity, she argues, is needed for the token–token identity theory of the mind to be intelligible. For an event to possibly be a mental *and* a physical event, it should not be identified strictly with an instantiation of a property.

¹¹ Steward (1997) argues for another difference between abstract entities such as states and particulars such as, for her, events: only events stand in causal relations; states can only enter relations of causal explanation.

¹² This distinction recalls the distinction between propositional and eventive remembering illustrated in (1):

- (1) a. John remembered being in pain.
b. John remembered that he was in pain.

In (1a) John remembers an event (in some detail, and from the inside), in (1b) John remembers a fact (perhaps without detail and only by inference or otherwise indirectly).

¹³ See also Woltersdorff (1970) for that observation.

¹⁴ The measurement criterion shows also an interesting difference between entities like John's believing that *S* and entities like John's belief that *S*:

- (1) a. # John's believing that *S* was not very strong.
- b. John's belief that *S* was not very strong.

This indicates that John's belief that *S* is not a state, but a particular, pace Steward (1997).

¹⁵ There are trope nominalizations, though, formed from predicates expressing the absence of a property or trope in any part of an object, such as *spotlessness* or *cleanliness*. I take these to refer to a complex higher-order trope consisting in the exhaustion of all the parts of an object with respect to the property of not carrying spots or dirt. See Section 6.

¹⁶ See also Steward (1997) (chap. 4) concerning the observation about demonstrative reference.

¹⁷ This is the view of tropes of Williams (1953), Campbell (1990), Bacon (1995), Maurin (2002) among others, where tropes are considered the ultimate constituents of the world from which all other entities are to be construed.

¹⁸ I follow a common view according to which the actual properties of things and thus the natural properties are absolutely determinate, a view held by Armstrong among others. But see Sanford (2002) for a critical discussion.

¹⁹ The literature is divided as to the possibility of negative events. Their existence is denied in Asher (1993, 2000), but asserted and analysed in Higginbotham (2000).

²⁰ Facts are abstract in that they are generally not fully specific entities; they are abstract also in not being in space and time. The latter is a property of less interest in the present context, where facts and states are contrasted with tropes and events. Note that states, even though not necessarily fully specific, can be measured in time (*John's being ill lasted two weeks*).

²¹ Montague (1960) presents a somewhat different version of that view, taking events to be generic objects, i.e. properties of time (and as such the entities event nominalizations refer to).

²² Of course, proponents of the second view of events are generally aware of the fact that there are many event-denoting nouns that are not nominalizations, such as *fire*, *catastrophe*, or *storm*. But this simply means that events are derived objects whose composition does not *have* to go along with the compositional semantics of an event-referring term. Events, on the second view, are not conceived as objects that can *only* be introduced by a linguistic construction.

²³ Kim himself offered an account for the fourth difference between events and facts, that all of a fact description needs to be fact-constitutive,

but not all of an event description event-constitutive. Kim proposed that not all predicates that occur in an event description need to be part of the existence and identity conditions of events. Rather a distinction needs to be made between event-characterising and event-constitutive roles of modifiers. Thus, *slow* in (1a) may act as an event-characterizing modifier, whereas in (1b) it acts as an event-constitutive modifier:

- (1) a. John's slow walk took an hour.
 b. John's slow walk to the house was the cause of the delay.

In (1a) the slowness of the walk is causally relevant. By contrast, in (1b) it lacks any relevance for the application of the predicate. With *slow* acting as an event-characterizing modifier, (1a) will be analysed as in (2b), rather than as in (2a):

- (2) a. [*John's slow walk*]^t = [John, [*slow walk*], t]
 b. [*John's slow walk*]^t = ιe [*slow*(e) & e = [John, [*walk*], t]]

In (2a), *slow* acts as a predicate modifier, whereas in (2b), it acts as a predicate of an event. Thus one difference between events and facts consists in that whereas events allow for event-characterizing modifiers, facts allow only for fact-constitutive ones.

²⁴ Another development of the Davidsonian idea, the Neodavidsonian account, says that verbs take only events as arguments, with the other arguments now being linked to the event by separate thematic relations, as below (cf. Parsons, 1990; Landman, 2000 among others):

- (1) $\exists e$ (*walk*(e) & *slowly*(e) & AGENT(e) = John)

²⁵ It does not necessarily go along with that view, though, as pointed out by Landman (2000, Chap. 1).

²⁶ Davidson proposes that event identity depends on the causes and effects of events ('Events are identical just in case they share the same causes and effects') and, in later writings, following Quine, on the space-time region an event occupies ('Events are identical just in case they occupy the same space-time region'). A more plausible view allows two qualitatively different events to occupy the same space-time without being strictly correlated with the description used to refer to them (cf. Bennett, 1988; Taylor, 1985).

²⁷ For a fuller discussion see Landman (2000, chap. 1).

²⁸ This phenomenon should not be confused with the possibility of intensional adverbial modifiers such as *reluctantly* in (1):

- (1) John reluctantly walked slowly.

Reluctantly is not just a predicate of events, but also takes a property as one of its arguments. This is needed to account for the failure of substitution as in (2) (cf. Landman, 2000):

- (2) John reluctantly insulted the queen.
John reluctantly insulted the head of the state council.

²⁹ Additional event arguments for certain adverbs are also posited by Higginbotham (2000), but for somewhat different explicitly given reasons, one of them being the two readings of (1):

- (1) John quickly objected.

On one reading the objection of John was done in a quick manner. On another reading John was quick to object, a reading involving an additional event argument besides the event of objecting.

While Higginbotham does not tell us what that event is, I would, within the proposal in Section 6, account for the second reading by having *quickly* be predicated of a second truth maker, making the not entirely explicit proposition ‘John brought it about to object’ true, where the bring-about-part may be grounded in features of the syntactic structure, rather than lexical material.

³⁰ This of course recalls Chisholm’s (1970) and Montague’s (1960) view according to which events are types that can recur.

³¹ In medieval semantics, tropes are induced also for the simple subject-predicate sentence *John is white*, which is analysed as ‘There is a whiteness that is present in John’, using a nominalization in the paraphrase. Thus, Ockham (Loux, 1974, p. 69–71) takes *whiteness*, as in *John’s whiteness*, to have a simple (or ‘absolute’) meaning, whereas the meaning of *white* is taken to be ‘connotative’, or complex, to be defined in terms of particular whitenesses. *White* thus is true of an object *d* just in case some particular whiteness is present in *d*.

Also Aristotle in the *Categories* takes an adjective such as *white* to have a more complex semantics than its nominalization. Aristotle seems to even think the adjective is morphologically derived from the nominalization: ‘In most, indeed in almost all cases, the name of that which is qualified is derived from that of the quality. Thus, the terms ‘whiteness’, ‘grammar’, ‘justice’, give us the adjectives ‘white’, ‘grammatical’, ‘just’, and so on’ (*Categories* (10a, 29–31). This is obviously not what we find in the morphology of English. But as a general claim, Aristotle’s remark is perhaps to be understood in a purely semantic way.

³² There are also sentences that could not involve events or tropes for their truth-making, for example existential sentences as in (1) (cf. Mulligan et al., 1984):

(1) There are two books about this author.

(1) clearly is not made true by a trope or an event, but rather by an object, in fact by two objects.

A sentences like (2) can't have a trope or an event as a truth maker either:

(2) John is a man.

(2) arguably is also made true by an object, an object whose essence grounds the truth of the sentence.

As Helen Steward pointed out to me, it is not clear what the truthmaker of a sentence like (3) should be:

(3) The cat is on the mat.

The truthmaker is neither the cat nor the instantiation of a particular property in the cat. But perhaps it is the relational trope that is the containment of the cat in the spatial location 'on' the mat, at a particular time.

³³ See for example, Bigelow (1988), Fox (1987), Armstrong (1997, 2004), Restall (1996), Read (2000). For a critical view see Lewis (2001).

³⁴ The principle, as a definition of truthmakers, together with less problematic conditions such as the account of disjunction in (34a), entails that every true sentence is made true by every truthmaker. See Restall (1996) and Read (2000) for discussion and different proposed solutions.

³⁵ Monotonicity makes use of the relation $<$ as the most general part relation among events. It holds between an event e and an event e' if e is a temporal part of e' , if e is a spatial part of e' , and if e is a qualitatively simpler event than e' (as a walking event is simpler than a strolling event). It is thus a part relation that should cover both the zonal part relation and the nonzonal part relation, in the sense of the notions of zonal and nonzonal fission and fusion of Bennett (1988).

³⁶ One might try to define the notion of truthmaker that I am adopting in terms of the first notion of a truthmaker, namely as a qualitatively and spatially minimal truthmaker in the first sense of truthmaking. There is an issue though with the condition of spatial minimality. As noted by Levinson (1980), the knife's sharpness and the knife's blade's sharpness are the same trope, an entity that blurs, in this case, the distinction between the knife and the blade of the knife. Thus the truthmaker of *the knife's blade is sharp* is not more minimal spatially than the truthmaker of *the knife is sharp*.

³⁷ Read (2000) actually argues against (33a), for reasons indicated in Note 34.

³⁸ See for example the discussion in Armstrong (1997, 2004) and Mulligan et al. (1984).

³⁹ The maximality condition, it appears, is enforced by the count noun status of state and activity nominalizations because count nouns generally are associated with the condition that the entity they refer to be an integrated whole (cf. Simons, 1987; Moltmann, 1997). Integrity is not given by the inherent nature of states and thus needs to be imposed by the maximality condition.

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