

A SHORT VINDICATION OF REICHENBACH'S "EVENT-SPLITTING"

Karl PFEIFER

I. Introduction

Donald Davidson's early paper ([2]) on the logical form of action sentences is now a landmark in action theory and philosophy of language. Davidson's paper provoked much debate and research on the topic, so naturally enough his account was soon improved upon by subsequent writers (e.g., [1], [4]). Nonetheless, certain aspects of this important paper are worth reconsidering, if only to set the historical record straight.

In the prelude to his account proper, Davidson considers, amongst others, the treatment accorded to action and event sentences by Hans Reichenbach ([5], sec. 48) and dismisses it as "radically defective". In what follows, I first recapitulate Reichenbach's approach to action and event sentences, correcting a minor *Schönheitsfehler* along the way. Then, I take up what Davidson considers to be the most serious objection to Reichenbach and demonstrate that Reichenbach has available a rather pedestrian way of avoiding Davidson's objection. Finally, I close with a few remarks suggestive of how the accounts of Davidson and Reichenbach compare.

II. Reichenbach, more or less

On Reichenbach's account, the denotata of sentences are "situations". When a situation is denoted by a sentence composed of function and argument, the sentence "splits" the situation into argument-object and predicate-object (or property). Argument-objects may be "thing type" (e.g., tables, chairs, humans) or "event type" (e.g., coronations, earthquakes, assassinations). Some sentences with thing type argument-objects are closely related to other sentences with event type argument-objects:

- (1) The coronation of George VI took place.
- (2) George VI was crowned.

Reichenbach claims that (1) and (2) are equivalent, but split the situation they denote in two different ways, "event-splitting" and "thing-splitting", respectively. This equivalence, he claims, can be represented as having the form of the "tautological equivalence",

$$(3) f(x_1) \equiv g(v_1)$$

where " x_1 " is the name of a thing (subscripts distinguish names from their corresponding variables), " v_1 " is the name of an event, " f " is a one-place thing predicate, and " g " is a one-place event predicate.

Reichenbach now goes on to claim the following:

This equivalence may be used to define an event and its property in terms of a thing and its property. It is more convenient to express this idea in the metalanguage, as a relation between terms. We then say that an event-argument and its predicate can be defined as a function of a thing-argument and its predicate. Thus, if " $f(x_1)$ " means "George VI is crowned", " g " is the predicate "coronation of George VI", which is a function of both the predicate "is crowned" and the argument "George VI". We shall use an asterisk for the indication of the transition to event-splitting and write the function " g " in the form " $[f(x_1)]^*$ ". Then the expression " $g(v_1)$ " can be replaced by " $[f(x_1)]^*(v_1)$ ". The argument " v_1 " used here is the name of the event which has the property $[f(x_1)]^*$ and which is determined if both the predicate "is crowned" and the argument "George VI" are given. Usually v_1 is denoted, not by a proper name, but by a description using the function " $[f(x_1)]^*$ "; therefore the event-argument sign " v_1 " can be written in the form

$$(t v)[f(x_1)]^*(v)$$

The event is here indicated by a bound variable " v ". This mode of expression, prevalent in conversational language, leads to the use of such predicates as "takes place" and "occurs", which merely express existence. Thus we say "the coronation of George VI took place". In symbolic language the last sentence is represented by a bound variable and an existential operator, in the form

$$(\exists v)[f(x_1)]^*(v)$$

([5], pp. 268-269)

I have quoted rather than paraphrased this passage in order to raise a minor quibble. There is a certain sloppiness in Reichenbach's presentation which can lead to confusion and needs to be cleared up. Fortunately, the problem is easily remedied.

If we follow Reichenbach's suggestion on defining an event and its property in terms of a thing and its property, and make the appropriate substitution into (3), we get

$$(4) f(x_1) \equiv [f(x_1)]^*(v_1)$$

But is (4) correct? I would suggest not. To continue with the example at hand, nothing about the form of "George VI was crowned" tells us anything about how often George VI was crowned. He might have been crowned once in Westminster Abbey as King of England, on another occasion as Emperor of India, and a third time by his queen for a royal indiscretion. If any one or more of these obtained, " $f(x_1)$ " could still be true; x_1 may be a unique object, but that puts no restrictions on the number of f -ings of x_1 .

However " $[f(x_1)]^*(v_1)$ ", where the intended value of " v_1 " is an event, does not function in this way at all. Events do not persist the way objects do. The same event cannot be $[f(x_1)]^*$ ing on different occasions in the way the same object might answer to the same predicate on different occasions.

The upshot is that (3) is not correct and that (2) is not equivalent to (1) but to something more like

$$(5) \text{ A coronation of George VI took place.}$$

where the indefinite article leaves the plurality of crownings open. It is (5) and not (1) that should be represented by " $(\exists v)[f(x_1)]^*(v)$ ". If this is so, then either the event function in (3) should be more deviously defined, or (3) should be replaced by the more perspicuous formulation

$$(6) f(x_1) \equiv (\exists v)g(v)$$

in which "g" may be defined as suggested by Reichenbach to yield

$$(7) f(x_1) \equiv (\exists v)[f(x_1)]^*(v)$$

I shall, on Reichenbach's behalf, adopt this latter alternative, since it is in any case implicit in the remainder of his discussion of event-splitting ([5], pp. 270-272).

III. Reichenbach more, Davidson less

The argument which Davidson seeks to employ against Reichenbach's approach to action and event sentences ([2], pp. 90-92) is in essence a variant of a familiar argument from Frege.

Davidson construes Reichenbach as saying – though Reichenbach does not himself employ Davidson's phraseology – that we may transform a sentence like

(8) Amundsen flew to the North Pole.

into

(9) $(\exists x)(x \text{ consists in the fact that Amundsen flew to the North Pole})$

Using this as his pattern of analysis, Davidson considers the case where we have

(10) $(\exists x)(x \text{ consists in the fact that I flew my spaceship to the Morning Star})$

and

(11) the Morning Star = the Evening Star,

and want to make the inference to

(12) $(\exists x)(x \text{ consists in the fact that I flew my spaceship to the Evening Star})$

He suggests as a principle licensing this inference,

(13) $(x)(x \text{ consists in the fact that } S \leftrightarrow x \text{ consists in the fact that } S')$

where " S' " differs from " S " only in containing in one or more places some singular term where " S " contains another singular term that refers to the same thing. The additional and (he thinks) plausible assumption that logically equivalent statements describe the same event is also made. That is to say, (13) is allowed to hold as well when " S " and " S' " are logically equivalent.

Now, argues Davidson, suppose the sentence " S' " is the sentence " $\hat{y}(y=y \ \& \ S) = \hat{y}(y=y)$ ", which is logically equivalent to " S ". Then, from (13) we obtain

- (14) $(x)(x \text{ consists in the fact that } S \leftrightarrow x \text{ consists in the fact that } \hat{y}(y=y \ \& \ S) = \hat{y}(y=y))$

Letting “ R ” be some arbitrary sentence materially equivalent to “ S ” makes the singular terms “ $\hat{y}(y=y \ \& \ S)$ ” and “ $\hat{y}(y=y \ \& \ R)$ ” co-referential. Substituting into (14) yields

- (15) $(x)(x \text{ consists in the fact that } S \leftrightarrow x \text{ consists in the fact that } \hat{y}(y=y \ \& \ R) = \hat{y}(y=y))$

which, since “ R ” and “ $\hat{y}(y=y \ \& \ R) = \hat{y}(y=y)$ ” are logically equivalent, yields

- (16) $(x)(x \text{ consists in the fact that } S \leftrightarrow x \text{ consists in the fact that } R)$

Since only material equivalence was assumed for “ R ” and “ S ”, Davidson interprets (16) as saying that all events are identical. The conclusion he draws from this unacceptable result is that Reichenbach’s account is “radically defective”.

Even assuming that Davidson has correctly represented Reichenbach’s position (which he hasn’t!), Davidson’s argument is not immediately compelling. For starters, something could be said about the admission of class names as singular terms in the argument. One might want to treat classes as convenient fictions and class names as parsable away in good Quinean fashion. And indeed, that is exactly how Reichenbach does treat them, in his separate discussion of classes ([5], p. 192). However, since one ostensibly cannot do entirely without classes anyway, a motivation not based on ontological parsimony would have to back up such a move – unless of course one has a new way to do mathematics! An alternative move that I favor would be to block the argument by denying that “ S ” and “ $\hat{y}(y=y \ \& \ S) = \hat{y}(y=y)$ ” are logically equivalent, on the grounds that the latter but not the former entails the existence of classes.

But fortunately these lines of thought need not be pursued here. Davidson’s argument against Reichenbach can be defused independently of such considerations.

I believe that Davidson, in using a certain form of words to present Reichenbach’s claims, a form which Reichenbach does not himself employ, may have misled himself as to Reichenbach’s position.

As matter of fact, Reichenbach (cf. [5], pp. 270-271) would render

- (8) Amundsen flew to the North Pole.

not as

(9) $(\exists x)(x \text{ consists in the fact that Amundsen flew to the North Pole})$

but as

(17) A flight by Amundsen to the North Pole took place.

Davidson, however, does say that (17) is the counterpart of (9) “in a more ordinary idiom” ([2], p. 90). This use of (9) as a stylistic variant is OK as long as one does not claim more for (9) than one might naturally read off from (17). Unfortunately, it is here that Davidson goes wrong and presents us with a straw Reichenbach.

Reichenbach does not employ the expression “consists in the fact that” in his analysis. His transformations into event-splitting sentences of idiomatic English, such as (17), do not contain sentence-like components such as *that*-clauses which can be assigned truth-values. (17) is only capable of bearing truth-value in its entirety. Thus, there is no motivation for constructing from Reichenbach’s analysis the kind of argument that Davidson has presented us with.

One may protest that even though the English event sentences do not contain the imputed sentence-like components, they are nonetheless to be construed as implicitly doing so, given Reichenbach’s symbolism. That is to say, the Reichenbachian equivalence or transformation principle, “ $f(x_1) \equiv (\exists v)[f(x_1)]*(v)$ ”, does indeed have the sentence “ $f(x_1)$ ” embedded in the starred context, and so a reading of “ $(\exists v)[\text{---}]* (v)$ ” as “ $(\exists v)(v \text{ consists in the fact that ---})$ ” would not be contrary to Reichenbach’s analysis.

However, the text refutes this contention. Reichenbach explicitly states that “the transformation from thing-argument to event-argument, expressed in [$f(x_1) \equiv g(v_1)$], where “ g ” is defined as “[$f(x_1)$]*”, may be called a *holistic transformation* since only the expressions “ $f(x_1)$ ” and “ $g(v_1)$ ” as *wholes* are equivalent to each other” and there is no direct correspondence between the parts on the one side and the parts on the other ([5], p. 269). Thus, the “ $f(x_1)$ ” which appears in the starred context “[$f(x_1)$]*” does not correspond to the unembedded “ $f(x_1)$ ” appearing on the left-hand side of the triple-bar. It is no longer a sentence inside the starred context and hence cannot be logically or materially equivalent to any sentence. The “ $f(x_1)$ ” in the starred context of an event-splitting sentence functions more like a piece of genetic material from which we

can read off the thing-splitting sentence that the event-splitting sentence is a transformation of or that it may be transformed into.

With these considerations in mind, let us now turn back to Davidson's example of inference involving identity substitution and see how Reichenbach could accommodate that inference without succumbing to Davidson's objection. Let us replace

- (10) $(\exists x)(x \text{ consists in the fact that I flew my spaceship to the Morning Star})$

with its "counterpart in a more ordinary [but somewhat stilted?] idiom" which carries no misleading suggestion of sentences as component parts:

- (18) A flying by me of my spaceship to the Morning Star took place.

This may be further regimented as

- (19) $(\exists v)(v \text{ is a flying by me of my spaceship to the Morning Star})$

or alternatively,

- (20) $(\exists v)[\text{I flew my spaceship to the Morning Star}]^*(v)$

where we must remember that although the string inside the starred context looks like a sentence capable of being assigned truth values, this is merely an *orthographic accident*. It has no more meaning by itself than, say, the "Fa" portion of the wff "Fab" in another familiar notation would have. However, when taken together with the brackets and asterisk, a predicate is formed which has the force of "___ is a flying by me of my spaceship to the Morning Star".

By applying Reichenbach's transformation principle

- (7) $f(x_1) \equiv (\exists v)[f(x_1)]^*(v)$

to (20), we get

- (21) I flew my spaceship to the Morning Star,

which can be suitably regimented for present purposes by simply bracketing "the Morning Star" to indicate the argument, with the remainder as function. Then, with

- (11) the Morning Star = the Evening Star

we can, from (21), via the usual principles of extensionality, infer

(22) I flew my spaceship to (the Evening Star)

and, applying (7) again, infer

(23) $(\exists v)[I \text{ flew my spaceship to (the Evening Star)}]^*(v)$

which, if preferred, can also be written in (logician's) idiomatic English as

(24) A flying by me of my spaceship to the Evening Star took place.

Thus, using Reichenbach's analysis properly interpreted, we have represented the desired inference involving identicals without having had to resort to the principle,

(13) $(x)(x \text{ consists in the fact that } S \leftrightarrow x \text{ consists in the fact that } S')$

and in so doing, we have sidestepped Davidson's objection.

IV. Reichenbach or Davidson?

The purpose of the discussion so far has been a limited one: to set the historical record straight by showing that the radical defect imputed to Reichenbach's account by Davidson just isn't there, that his dismissal of Reichenbach was too quick. Having done this, we might also pause to remark briefly on the relative merits of the respective approaches of Davidson and Reichenbach.

Davidson's account is in part an account of how to handle entailment involving adverbial modification and he seems to suggest that Reichenbach's handling of action sentences leaves such entailment obscure ([2], p. 90). For example, consider

(25) John is moving slowly.

which entails

(26) John is moving.

Davidson claims that Reichenbach's equivalence does not give us a logical analysis to underwrite this entailment. That is to say, using the equivalence to transform each of these does nothing to reveal why one entails the other.

This however should come as no surprise, since Reichenbach's approach to action and event sentences is not motivated by a concern over adver-

bial modification, but by a concern for displaying certain ontological distinctions ostensibly made in conversational language ([5], chap. 7, *passim*). Reichenbach has independent means for handling the adverbial modification problems by resorting to functions of higher types ([5], sec. 53). That is, adverbial modifiers are treated as predicates of predicates.

Davidson ([2], pp. 92-93) would analyse (25) as

(27) $(\exists x)(\text{moving}(\text{John}, x) \ \& \ \text{slowly}(x))$

which reads roughly as: "There is an event x such that x is a moving by John and x is (done) slow(ly)." (27) would entail

(28) $(\exists x)(\text{moving}(\text{John}, x))$

which is just (26) in Davidsonese. Thus Davidson's analysis provides an underlying mechanism for the entailment of (26) by (25).

Reichenbach, on the other hand ([5], pp. 302-303), would treat "x moves" as saying that x has some specific property f , involving speed, direction, etc., which may be included in a class of motion-properties represented by a function $\mu(f)$. Adverbs such as "slowly" may be introduced as a further function on f , say $\sigma(f)$. On this pattern, (25) can be analysed as

(29) $(\exists f)[f(\text{John}) \ \& \ \mu(f) \ \& \ \sigma(f)]$

which reads roughly as: "John has the property f and f is a motion-property and f is (counts as) slow." (29) entails

(30) $(\exists f)[f(\text{John}) \ \& \ \mu(f)]$

which is Reichenbachisch for (26). Hence, we have here an alternative to Davidson's way of representing the entailment of (26) by (25).

One immediately apparent limitation of both approaches is that the analyses of adverbial modification involve conjunctions, and that treatment will give incorrect results as far as some modifiers are concerned. For example, "John virtually ran" does not entail "John ran". Yet both approaches would yield that as an entailment (cf. [1], [3], [4]).

Is there much to choose between the two approaches? The virtues, limitations, and difficulties have been discussed in detail elsewhere (e.g., [1], [3], [4], [6]) and both approaches have been superseded by accounts that treat adverbial modifiers as operators on predicates which create new predicates (e.g., [1], [4]). Reichenbach's approach is closer in spirit to these

improved accounts in that it takes seriously the fact that adverbial modifiers modify verbs, adjectives, and other adverbs. But some might think that Davidson's treatment is nonetheless to be preferred in that it is couched in a first-order extensional language, whereas Reichenbach shamelessly quantifies over properties. This difference, though, may be specious for all that: Reichenbach often resorts to "rich" language out of convenience rather than necessity. If Parsons ([4], p. 325) is correct, where Reichenbach's approach works, it mirrors what can be accomplished within a first-order language supplemented by predicate-operators; if Clark ([1], p. 321) is correct, such operators need not affect extensionality.

I'm inclined to give the round to Reichenbach.

University of Saskatchewan
Saskatoon, Canada

Karl PFEIFER

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